

Werris Creek Coal Mine

Final Landform Modification Modification Report

MAIN TEXT



WERRIS CREEK COAL MINE - FINAL LANDFORM MODIFICATION

MODIFICATION REPORT



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1 INTRODUCTION

The Werris Creek Coal Mine (WCCM) is an open cut coal mining operation located approximately 4 kilometres (km) south of Werris Creek and approximately 11 km north of Quirindi in the Liverpool Plains Local Government Area (LGA) of New South Wales (NSW) (Figure 1). The WCCM has been operating since 2005, with the open cut overlying and intersecting the former Werris Creek Colliery, a bord-and-pillar underground mine that operated from 1925 to 1963.

The WCCM is owned and operated by Werris Creek Coal Pty Limited (WCC), a wholly owned subsidiary of Whitehaven Coal Limited (Whitehaven). The WCCM is operated in accordance with Project Approval (PA) 10_0059.

WCC is proposing to modify PA 10_0059 to authorise changes to the final landform and rehabilitation strategy (hereafter referred to as the Final Landform Modification [the Modification]). The Modification is sought under section 4.55(2) of the NSW *Environment Planning and Assessment Act 1979* (EP&A Act).

WCC is the applicant for the Modification. This Modification Report has been prepared by WCC to support the Modification application in consideration of the *State Significant Development Guidelines* (Department of Planning, Industry and Environment [DPIE], 2021a), in particular *Appendix E – Preparing a Modification Report* (DPIE, 2021b).

1.1 APPROVALS HISTORY

The WCCM was approved by the NSW Minister for Planning and Infrastructure pursuant to section 75J of the EP&A Act in 2011. The approved WCCM development was declared to be State Significant Development (SSD) on 17 August 2018 by an order made under clause 6 of Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*.

PA 10_0059 has been modified on four occasions including in 2015 (Modification 2) to permit revisions to the overburden emplacement extent and height, construction of a dry separation plant, and revisions to the surface water management system to supply surplus void water to irrigation land.

The WCCM was granted approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2011 (EPBC Approval 2010/5571).

1.2 OVERVIEW OF THE APPROVED WERRIS CREEK COAL MINE

Mining operations at the WCCM are located within Mining Lease (ML) 1563, ML 1671 and ML 1672 (Figure 2).

The WCCM comprises a single open cut that is mined from south to north with waste rock emplaced in the mined-out sections of the open cut.

Figure 2 shows the approved extent of the WCCM operation including the open cut, waste rock emplacement area, existing rehabilitation areas, acoustic and visual amenity bund, coal processing and stockpiling areas, mine infrastructure, water management infrastructure, and other infrastructure.

The Project Site Boundary and the property descriptions associated with the WCCM are included in PA 10_0059. All freehold land associated with the approved WCCM is owned by Whitehaven.

Land surrounding the WCCM includes Crown Road, Public Road, land owned by Whitehaven and other privately-owned land.

1.2.1 Mining Operations and Closure Timing

The WCCM is approved to extract up to 2.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Mining operations are approved to be undertaken 24 hours per day, seven days per week, with the exception of blasting which is restricted to 9.00 am to 5.00 pm, Monday to Saturday.

The WCCM employs a workforce of approximately 140 full-time personnel and supports a significant indirect workforce within the region.

Although the WCCM PA 10_0059 authorises mining activities to occur until December 2032, the target coal resource is expected to be fully extracted in approximately 2024, at which time mine closure activities would commence.

1.2.2 Final Landform, Land Use and Rehabilitation Strategy

A “final landform and rehabilitation strategy” was first developed in 2010 for the *Werris Creek Coal Mine Life of Mine Project Environmental Assessment (LOM EA)* (Corkery & Co, 2010).



WHC-21-81 MODS.MT. 201C

Source: NSW Spatial Services (2020)



- LEGEND**
- Mining Lease (ML)
 - Local Government Boundary
 - State Conservation Area, Aboriginal Area
 - Major Roads
 - Railway

WERRIS CREEK MINE
 Regional Location

Figure 1



WHC-21-81 MODS-MT_2020

- LEGEND**
- Mining Lease (ML)
 - Railway
 - Operational Mine Area

Source: NSW Spatial Services (2020);
 Orthophoto: GoogleEarth (February 2021)

Figure 2

Key features of the 2010 final landform included:

- the rehabilitated waste rock emplacement with upper elevation of 445 metres (m) Australian Height Datum (mAHD) and side slopes of approximately 10 degrees or less;
- woodland ecological communities established on the gentler slopes and shrubby woodland communities on steeper slopes;
- the Acoustic and Visual Amenity Bund;
- the partially backfilled final void; and
- an area of Class III agricultural land.

Key features of the 2010 rehabilitation strategy included:

- rehabilitation domains to be established over the mine infrastructure area, water management infrastructure, waste rock emplacements, and final void, with rehabilitation completion and performance criteria relevant to each domain; and
- rehabilitation methods and procedures including decommissioning, landform shaping, subsoil and topsoil placement and ground preparation, and revegetation using direct seeding or tube stock.

Minor changes to the final landform were introduced for the *Werris Creek Coal Mine Modification 2 Environmental Assessment (Mod 2 EA)* (Corkery & Co, 2015) including extension of the waste rock emplacement footprint. Modification 2 did not change the key features of the 2010 final landform (including emplacement upper height of 445 mAHD) or the rehabilitation strategy.

Rehabilitation objectives for the WCCM are set out in Table 13 of Condition 41 of PA 10_0059 and include construction of a final landform that:

- is safe, stable and non-polluting;
- is free draining and sympathetic to natural landforms as far as practicable;
- includes a partially backfilled final void with its floor a minimum of 5 m above the predicted long-term groundwater level; and
- comprises self-sustaining native woodland communities that are suitable for a conservation final land use that is compatible with surrounding land uses.

The approved final landform is shown conceptually on Figure 1, Appendix 5 of PA 10_0059. The approved final landform includes a partially backfilled final void with a floor level of approximately 330 mAHD (i.e. approximate final void depth of 58 m below ground level [mbgl]), side slopes up to 18 degrees, and vegetated using native woodland species.

1.2.3 Biodiversity Offsets

Schedule 3, Conditions 24 to 27 of PA 10_0059 require certain biodiversity offset areas to be established with appropriate long-term security to address the residual biodiversity impacts of the approved WCCM.

The *WCCM Biodiversity and Offset Management Plan (BOMP)* (Whitehaven, 2013) was developed in accordance with the WCCM PA.

The BOMP describes the biodiversity offset strategy and includes the offset areas shown conceptually in Appendix 4 of PA 10_0059, all of which are located adjacent to (i.e. outside of) the WCCM operational mine area.

1.2.4 Water Management

The WCCM water management system comprises water management storages and collection drains, sediment control, irrigation, open cut dewatering, and evaporative fans for the management of excess water.

WCCM operates in accordance with the *WCCM Water Management Plan (WMP)* (Whitehaven, 2017) which outlines the management of excess water at the WCCM. Excess water including surface water and incidental groundwater inflow to the open cut is managed through the use of evaporators and irrigation of agricultural land near the WCCM.

WCC holds Water Access Licences in accordance with the *NSW Water Management Act 2000 (WM Act)* for incidental groundwater inflow into the open cut.

1.2.5 Environmental Monitoring and Management

Environmental monitoring and management at the WCCM have been undertaken since operations commenced in 2005.

Key strategies and plans prepared and implemented at the WCCM in accordance with the PA 10_0059 and EPBC Approval 2010/5571 that are relevant to the Modification have been mentioned above (i.e. the BOMP and WMP).

Further discussion on relevant and potential management plan and strategy revisions is provided in Section 6.

1.3 OVERVIEW OF THE MODIFICATION

1.3.1 Background to the Modification

In preparation for mine closure commencing in approximately 2024, detailed mine planning has been undertaken in consideration of:

- the operational requirements of constructing the approved partially backfilled final void;
- rehabilitation objectives relevant to the final void (i.e. safe, stable and non-polluting, with floor level 5 m above the surrounding groundwater level);
- the commitment to partially “backfill overburden into the final void above the equilibrium water level” to “prevent accumulation of void water... which may impact on final land form and land use” (Appendix 6 of PA 10_0059);
- the findings of contemporary water assessments which predict that the approved final landform would accumulate water and form a permanent pit lake which would function as a groundwater source and potential contamination risk to the surrounding groundwater (i.e. a dry final void would not be achieved by implementing the approved final landform design) (Section 1.3.3); and
- maximising coal recovery in a safe and efficient manner while allowing for efficient closure and rehabilitation of the WCCM.

1.3.2 Description of the Modification

In summary, the Modification would include the following changes to the approved WCCM final landform and rehabilitation strategy (Section 3):

- Retaining the final open cut extent as the final void. That is:
 - increasing the final void depth to approximately 118 mbgl (from the currently approved depth of approximately 58 mbgl); and
 - increasing the angle of the final void highwall/endwalls up to a maximum of approximately 66 degrees (1 Vertical [V]:0.5 Horizontal [H]).
- Development of a permanent pit lake in the final void with an equilibrated water level approximately 45 mbgl which functions as a groundwater sink with negligible risk of spilling to the surrounding environment and negligible risk of saline groundwater migrating off-site.
- Post-mining land use for the final void to be consistent with a permanent pit lake.
- Addition of native woodland revegetation areas totalling 71 hectares (ha) adjacent to the mine site.

The Modification would not change the approved mining rate, coal resource to be mined, operational mine area, Project Site Boundary, biodiversity offsets or the commitment to return part of the site to Class III agricultural land use post-mining.

The Modification presents a potential opportunity to beneficially re-use water predicted to accumulate in the final void for agriculture or other purpose, subject to further mine closure planning including identification of (and agreement with) a potential water user (Section 3.2).

A detailed description of the Modification is provided in Section 3.

1.3.3 Reasons for the Modification

Basis of the Approved Final Void Design

As stated in the LOM EA and WCCM PA, the purpose of partially backfilling the final void was to prevent the accumulation of water in the final void to allow native woodland vegetation to be established.

The approved final void floor level of 330 mAHD (approximately 58 mbgl) was based on a predicted long-term surrounding groundwater level of 325 mAHD (Corkery & Co, 2010), which is lower than the surrounding groundwater levels of 335 to 380 mAHD described in the *Werris Creek Coal Mine Life of Mine Project Groundwater Impact Assessment* (RCA Australia, 2010) developed for the LOM EA.

The approved final void design is therefore considered to be based on a predicted local groundwater level immediately adjacent to the final void, which would be influenced by drawdown due to the development of the mine, rather than the long-term post-mining surrounding groundwater level.

Findings of Contemporary Water Assessments

In preparation for mine closure commencing in approximately 2024, the following contemporary water assessments have been completed in accordance with the commitment in the approved WCCM WMP to undertake detailed modelling of the final void and surrounding groundwater as part of mine closure planning:

- A groundwater conceptualisation and modelling exercise was undertaken by SLR Consulting Australia Pty Ltd (SLR) as part of the Groundwater Assessment prepared for the Modification (Appendix A). The review used contemporary groundwater monitoring data gathered during 10 years of mine operation.
- A preliminary surface water assessment of the approved final void design was prepared by WRM Water & Environment Pty Ltd (WRM) as part of the Surface Water Assessment prepared for the Modification (Appendix B). The assessment considered the long-term water recovery within the approved final void design using contemporary climate data and assumed the final void catchment area was minimised as far as practicable.

Key findings of these assessments were:

- The long-term, post-mining groundwater level surrounding the WCCM is expected to be approximately 355 mAHD, some 30 m above the level adopted as the basis of the approved final void design (although consistent with surrounding groundwater levels described in RCA Australia [2010]) (Appendix A and Section 6.1).

- Rather than remaining dry, the approved final void design (if implemented) would accumulate water and form a permanent pit lake (Appendix B and Section 6.2). The pit lake is predicted to be surface water driven with a minor contribution (net inflow) from the surrounding groundwater due to the void lake sitting below the surrounding groundwater level. The pit lake is predicted to increase in salinity over time by concentrating salt from the surrounding emplaced waste rock and unmined geology.

Consideration of Alternative Final Void Design

Based on the above findings, two alternative final landform designs were considered:

- Increase the level of backfilling to 360 mAHD (i.e. 5 m above long-term, post-mining groundwater level surrounding the WCCM of 355 mAHD) such that the final void depth is approximately 28 mbgl.
- Retain the final open cut extent as the final void (i.e. no further backfilling) such that the final void depth is approximately 118 mbgl and floor level is approximately 270 mAHD.

Detailed water assessments were prepared for these two scenarios by WRM (surface water) and SLR (groundwater). The assessments are described in Section 6 and presented in Appendices A and B respectively.

Increasing the Backfill Level

The detailed water assessments identified that backfilling to a level of 360 mAHD to achieve a floor level above the long-term, post-mining groundwater level surrounding the WCCM (i.e. final void depth approximately 28 mbgl) would still form a surface water driven permanent pit lake that increases in salinity over time (Sections 6.1 and 6.2).

Under this scenario, the pit lake would function as a groundwater source and potential contamination risk given its elevation above the long-term, post-mining groundwater level surrounding the WCCM (Section 6.1).

Backfilling to a level of 360 mAHD involves rehandling of approximately 19.6 million cubic metres (Mcm) of emplaced waste rock, equivalent to backfilling 45 percent of the final open cut volume.

Whitehaven considers the potential for groundwater migration away from the final void to pose as a risk to the surrounding agriculture and groundwater users. Further, the amenity impacts (i.e. air quality, noise) and direct Scope 1 greenhouse gas emissions associated with backfilling 19.6 Mcm of overburden would be incurred with no material environmental benefit.

Retaining the Final Open Cut Extent as the Final Void

The detailed water assessments (Appendices A and B) show that retaining the final open cut extent without further backfilling would result in the development of a permanent pit lake that sits well below the surrounding groundwater level. The pit lake would therefore function as a groundwater sink into perpetuity with negligible risk of spilling to the surrounding environment and negligible risk of saline groundwater migrating off-site.

Whitehaven considers that this scenario (retaining the open cut as the final void) achieves the rehabilitation objective of creating a final landform that is safe, stable and non-polluting, in contrast to both:

- Implementing the approved final void design (i.e. floor level 58 mbgl) which incurs amenity impacts associated with rehandling approximately 5 Mcm of waste rock for no material environmental benefit given that a permanent pit lake would form.
- Backfilling to achieve a floor level above the surrounding groundwater level (i.e. floor level 28 mbgl) which incurs greater amenity impacts associated with rehandling approximately 19.6 Mcm of waste rock while still forming a permanent pit lake. In addition, the permanent pit lake would function as a groundwater source and potential risk of contamination to the surrounding groundwater.

Accordingly, a modified final void design that retains the final open cut extent is proposed for the Modification.

Reasons for the Modification

The Modification is required to allow for construction of the final landform in a safe and efficient manner while achieving the rehabilitation objective of a safe, stable and non-polluting final landform. The Modification allows for timely closure of the mine and a sustainable post-mining land use to be achieved.

1.3.4 Consideration of Feasible Alternatives

Alternatives to proceeding with the Modification would be to proceed with the approved final landform design (i.e. floor level 58 mbgl) or to partially backfill the open cut to a level above the surrounding groundwater level (i.e. floor level 28 mbgl), as described in Section 1.3.3.

1.4 REPORT CONTENT

An overview of this Modification Report is presented below:

Section 1	Provides a brief description of the approved WCCM and an overview of the Modification
Section 2	Identifies the strategic context for the Modification
Section 3	Provides a detailed description of the Modification
Section 4	Identifies the key relevant statutory requirements for the Modification
Section 5	Describes the stakeholder consultation undertaken for the Modification
Section 6	Describes the existing environment, assesses the potential environmental impacts of the Modification, and describes the potential measures to avoid, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the Modification
Section 7	Provides a justification and evaluation of the Modification
Section 8	Lists the references cited in this document

Attachment 1 and Appendices A and B provide supporting information as follows:

Attachment 1	Detailed Statutory Compliance Reconciliation Table
Appendix A	Groundwater Assessment
Appendix B	Surface Water Assessment

2 STRATEGIC CONTEXT

2.1 REGIONAL CONTEXT

The WCCM is located in the New England North West region of NSW. The region includes broadacre cropping and grazing sectors, and intensive agriculture and food processing sectors. Key agricultural commodities produced in the region include beef cattle, cereal grains, cotton, poultry and wool. The region is also rich in a variety of other resources such as coal, coal seam gas and other minerals.

The WCCM is located within the Gunnedah Coalfield of the Sydney-Gunnedah Basin. The target resource is an outlier of the Permian Greta Coal Measures which has been mined by open cut methods since 2005 following underground mining that occurred until the 1960s.

The WCCM is the only coal mining operation in the local area, however the Gunnedah Coalfield is host to a number of major coal mine developments in the region including several coal mines owned by Whitehaven.

In the Liverpool Plains LGA, mainstays of the economy are agriculture, mining, and tourism. The *New England North West Regional Plan 2036* notes the importance of extractive industries (including mining) in the diverse regional economy (NSW Government, 2017).

2.2 PROJECT CONTEXT

The WCCM is located between Werris Creek and Quirindi in the Liverpool Plains LGA. The nearest coal mining operations to the WCCM are located north of Gunnedah.

Land uses in the vicinity of the WCCM comprise a combination of agricultural land uses, conservation land use, industrial and residential areas in the Werris Creek township.

The WCCM is an existing and approved mining operation comprised of a single open cut that is mined south to north and progressively backfilled, leaving a final void following closure and rehabilitation.

Key features of the approved final landform include:

- the elevated waste rock emplacement of height 445 mAHD;
- the partially the backfilled final void of approximately 58 mbgl depth; and

- the visual bund which limits visibility of the WCCM site from the Werris Creek township.

The Modification would increase the final void depth to approximately 118 mbgl to allow the mine site to be closed and rehabilitated in a safe and efficient manner while achieving the rehabilitation objective of a safe, stable and non-polluting final landform.

The modified final landform has been designed to achieve the other rehabilitation objectives for the site. That is, the modified final landform is sympathetic to surrounding natural landforms as far as practicable; and comprises self-sustaining native woodland communities that are suitable for a conservation final land use that is compatible with surrounding land uses.

Compensatory native woodland revegetation areas are proposed such that the modified final landform can be implemented with no decrease to the total area of revegetation.

The modified final landform and rehabilitation strategy can be implemented using the existing rehabilitation fleet with reduced amenity impacts given the reduced rehandling of emplaced waste rock (which would otherwise be required to establish the currently approved final landform). There would be no increase to the approved operational mine area (i.e. disturbance footprint) for the WCCM.

2.3 KEY STRATEGIC PLANNING DOCUMENTS

NSW Strategic Statement on Coal

The Modification is considered to be consistent with the NSW Government's *Strategic Statement on Coal Exploration and Mining in NSW*, which outlines how the NSW Government will act in four key areas, including "reducing the impact of coal mining".

New Standard Rehabilitation Conditions on Mining Leases in NSW

The NSW Government recently enacted changes to the *NSW Mining Act 1992* (Mining Act) that apply new standard conditions to MLs.

The new standard conditions set requirements for lease holders to (among other things) prevent or minimise harm to the environment, rehabilitate land and water as soon as practicable after disturbance, and achieve the intended and approved final land use.

The modified final landform would result in the development of a permanent pit lake that functions as a groundwater sink into perpetuity, with negligible risk of spilling to the surrounding environment and negligible risk of saline groundwater migrating off-site.

The Modification is therefore considered to be consistent with the intent of the new standard conditions as it would minimise the potential for harm to groundwater surrounding the WCCM post-mining.

In addition, it is noted that the currently approved final landform design is predicted to develop a permanent pit lake that would prevent establishment of native woodland vegetation and therefore require a change in the approved conservation final land use over the final void area. The Modification addresses this issue by:

- aligning the final landform design with the intended final land use; and
- establishing native woodland revegetation areas totalling 71 ha adjacent to the mine site to compensate for the fact that, if the Modification is approved, native woodland would not be established in the location of the final void pit lake and steeper highwall areas.

Other Strategic Plans

The *New England North West Regional Plan 2036* states that mining benefits communities and needs to be undertaken in consideration of economic, social and environmental outcomes (Department of Planning and Environment [DPE], 2017).

The *Liverpool Plains Shire Council Local Strategic Planning Statement 2040* sets planning priorities including: effective management of resources and renewable energy; protecting and enhancing areas of environmental value; and protecting and celebrating our unique sense of place.

The Modification is considered to be consistent with these strategic plans as it allows the mine to be closed and rehabilitated in a safe and efficient manner while achieving the rehabilitation objective of a safe, stable and non-polluting final landform.

3 PROPOSED MODIFICATION

3.1 OVERVIEW

Table 1 provides a summary comparison of the existing and approved WCCM and the WCCM incorporating the Modification.

The following sub-sections provide a description of the Modification components.

3.2 FINAL VOID

The WCCM WMP includes a commitment to undertake detailed modelling of the final void as part of mine closure planning. In accordance with that commitment and in preparation for mine closure commencing in approximately 2024 Whitehaven has considered and assessed the water quality and quantity characteristics of the approved final void design.

A preliminary surface water assessment by WRM and groundwater conceptualisation by SLR identified that the approved final void design would accumulate water and form a permanent pit lake that increases in salinity over time (Section 1.3.3).

It is therefore expected that implementing the approved final void design would not achieve the intended outcome of a dry final void revegetated with native woodland species for a conservation final land use.

Whitehaven has therefore undertaken detailed mine closure planning to identify improvements to the final landform design.

The Modification includes the following changes to the approved final void design:

- Retaining the final open cut extent as the final void without further backfilling. That is:
 - increasing the final void depth to approximately 118 mbgl (from the currently approved depth of approximately 58 mbgl); and
 - increasing the angle of the final void highwall/endwalls to a maximum of approximately 66 degrees (1V:0.5H).

The modified final landform would result in development of a permanent pit lake in the final void with an equilibrated water level approximately 45 mbgl that increases in salinity over time. The pit lake would function as a groundwater sink with negligible risk of spilling to the surrounding environment and negligible risk of saline groundwater migrating off site (Section 6).

The proposed changes to the final void result in no change to the approved WCCM surface disturbance footprint.

The modified final landform including the final void is shown conceptually on Figure 3.

Long-Term Stability of the Final Void Design

Whitehaven has considered the requirement to create a final landform that is safe and stable over the long term in accordance with the PA conditions.

The modified final void, including a steeper highwall section with slopes up to a maximum of 66 degrees (1V:0.5H), has been designed with the appropriate long-term geotechnical factor-of-safety of at least 1.2.

The modified final void design is also considered to be inherently more stable in comparison to the approved final void design which requires a lens of waste rock to be placed over the final void face to achieve the approved 18 degree side slopes within the final void.

The Modification does not involve any change to the approved elevated waste rock emplacement slopes, including areas where rehabilitation has been completed.

The Modification final landform is therefore considered to be geotechnically stable over the long term.

Water Licencing

WCC holds sufficient licences for groundwater take during mining operations, in accordance with the PA conditions and the requirements of the WM Act.

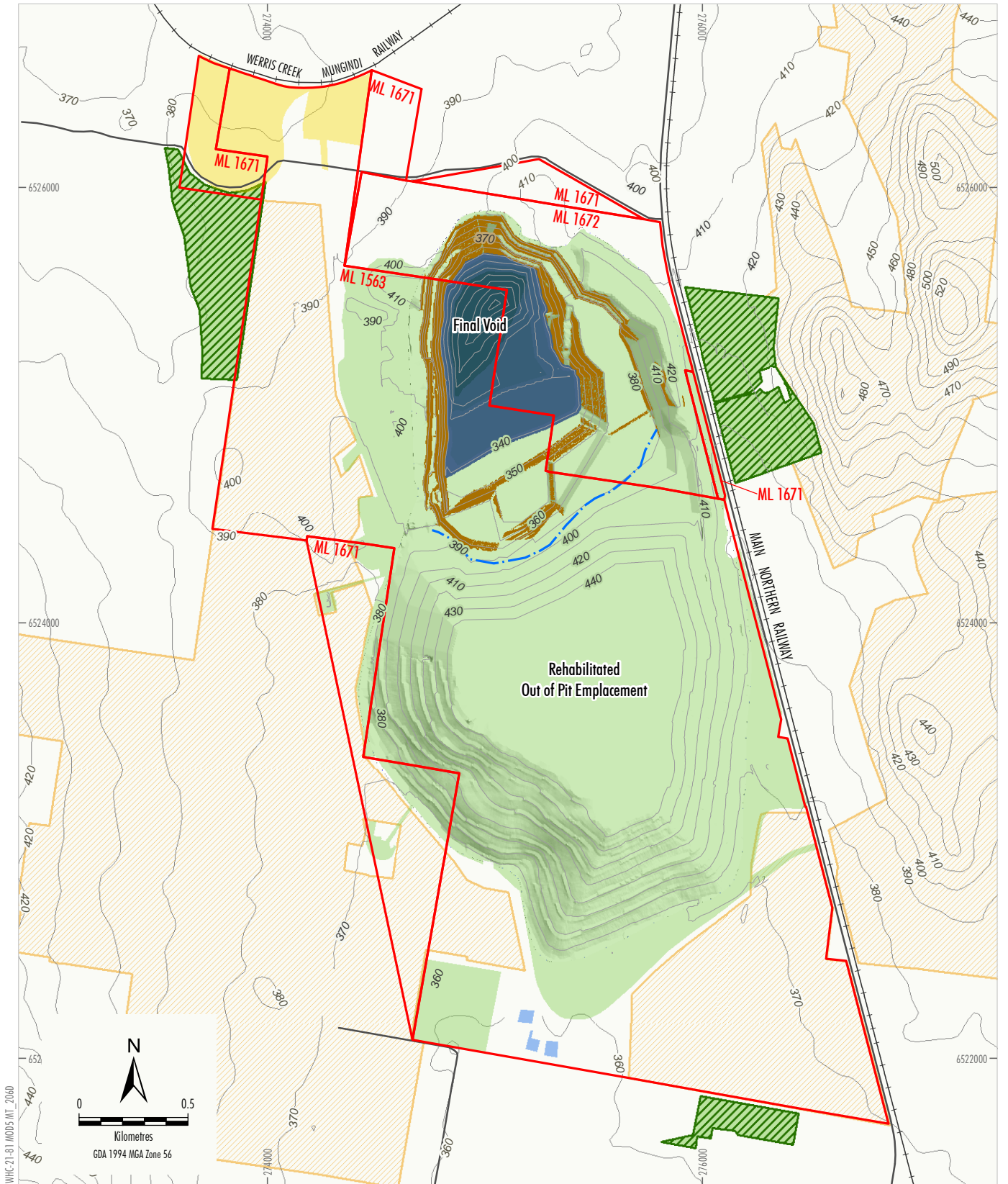
The Modification involves a permanent pit lake in the final landform and associated water take into perpetuity.

WCC currently holds sufficient licences to account for the predicted groundwater take post-mining.

Long-term predicted groundwater take is discussed further in Section 6.

Table 1
Summary Comparison of the Approved and Modified WCCM

Project Component	WCCM Project Approval (as modified)	WCCM Incorporating the Modification
Mine life	December 2032.	No change to approved mine life (2032). Coal resource expected to be fully extracted in approximately 2024.
Hours of operation	24 hours per day, 7 days per week except blasting (9.00 am to 5.00 pm Monday to Saturday) and road transport of product coal (7.00 am to 6.00 pm on Monday to Friday and in exceptional circumstances 7.00 am to 2.00 pm on Saturdays).	No change.
Coal extraction and processing	Extraction of up to 2.5 Mtpa of ROM coal (calendar year). Crushing and screening of ROM coal undertaken at the Coal Processing Area.	No change.
Product coal stockpiling and transport	Up to 250,000 tonnes of product coal stockpiled on site and up to 50,000 tonnes of product coal transported from the site by public road each calendar year.	No change.
Conceptual landform rehabilitation	The approved final landform is shown conceptually on Figure 1, Appendix 5 of PA 10_0059.	As shown in Figure 3.
Final landform and rehabilitation objectives	Mine site to be safe, stable and non-polluting, with constructed landforms sympathetic to natural landforms as far as practicable, final land uses compatible with surrounding land uses, and visual impacts minimised as far as reasonable and feasible.	No change. Final landform incorporates a permanent pit lake functioning as a groundwater sink with negligible spill risk or groundwater contamination risk.
	Woodland areas and vegetated land to establish at least 280 ha of White Box-Yellow Box-Blakely's Red Gum Woodland EEC, and establish self-sustaining ecosystems comprising local native plant species and at least 180 ha of shrubby woodland.	Establishment of an additional 71 ha of native woodland revegetation (351 ha in total) in areas adjacent to existing approved biodiversity offset areas to compensate for reduction in native woodland over the final void.
	Amenity bunds and overburden emplacements to be revegetated and planted with local native woodland species and free draining.	No change.
	Size and depth of final void to be minimised as far as is reasonable and feasible, with a minimum of 5 m above the predicted long-term groundwater level.	Final void depth approximately 118 mbgl (void floor level of 270 mAHD) with side slopes ranging up to maximum of 66 degrees (1V:0.5H). Final landform incorporates a permanent pit lake functioning as groundwater sink with negligible spill risk or groundwater contamination risk.
	Project infrastructure decommissioned and removed unless otherwise agreed.	No change.
	Minimise the adverse socio-economic effects associated with mine closure.	No change.
Waste rock management	Removal of waste rock and backfill within the waste rock emplacement area. Disposal of waste heavy vehicle tyres in emplacement areas.	No change.
Water supply and demand	Mine water supply obtained from surface water and groundwater inflows to pit area, sediment basins and storage dams, and licensed groundwater extraction.	No change.
Water management	On-site water management system comprises water management storages and collection drains, runoff diversions, sediment control, irrigation, open cut dewatering and evaporative fans for the management of excess water.	No change during mining and closure. Post-mining, incidental groundwater take in the final void to be licenced in accordance with the WM Act.
Biodiversity offset strategy	Table 12, Condition 24 of PA 10_0059.	No change.
Employment	Approximately 140 personnel are employed at the WCCM.	No change.



WHC-21-81 MODS.MT_2060

Source: NSW Spatial Services (2020); Whitehaven (2021)

- LEGEND**
- Mining Lease (ML)
 - Railway
 - Approximate Extent of Class III Agricultural Land
 - Approximate Extent of Native Woodland Rehabilitation
 - Approximate Extent of Water Storage
 - Approximate Extent of Final Void Lake (343 m AHD)
 - Approximate Extent of Highwall and Steep Low Wall Areas
 - Approximate Extent of Compensatory Revegetation Area
 - Existing Offset Area
 - Indicative Drain Alignment

WERRIS CREEK MINE

Modification Final Landform

Figure 3

Direct Benefits of the Modification

In comparison to implementing the approved final landform design (i.e. final void floor level 330 mAHD), the Modification would incur lower amenity impacts and lower direct Scope 1 greenhouse gas emissions by avoiding rehandling of approximately 5 Mcm of emplaced waste rock to partially backfill the open cut.

Potential Future Benefits of the Modification

An opportunity exists to beneficially re-use the final void pit lake water for agricultural or other purposes. Whitehaven has considered the approximate amount and quality of water that could be reliably supplied in accordance with water take rules under the WM Act (Section 6.2, Appendix B).

Progressing this opportunity would be subject to further feasibility assessment and design, in addition to identification, negotiation and agreement with the final water user/s.

3.3 FINAL LAND USE

The modified final void design results in the development of a permanent pit lake which, in combination with the steeper highwall areas, would prevent establishment of native woodland species and a conservation final land use.

Therefore, the Modification includes a change to the approved final land use over the permanent pit lake area and steeper highwalls, from conservation to uses that are consistent with a permanent pit lake.

Beyond the final void lake and steep highwall areas, the Modification does not propose to change the approved final land use which comprises conservation and agricultural land use. The commitment to establish Class III agricultural land over the rail load-out area is not proposed to change for the Modification.

The Modification final land uses are shown conceptually on Figure 3.

3.4 COMPENSATORY REVEGETATION AREA

The Modification includes additional areas of native woodland revegetation adjacent to the existing and approved biodiversity offset areas surrounding the mine site.

The purpose of the revegetation areas is to compensate for the reduction in native woodland over the final void area.

The proposed compensatory revegetation areas totalling approximately 71 ha are shown conceptually on Figure 3.

3.5 COMPONENTS OF THE WERRIS CREEK COAL MINE NOT BEING MODIFIED

The Modification does not involve changes to the following approved components of the WCCM:

- operational mine area;
- mining tenements;
- approved mine life to 2032 (noting that closure is expected to commence following completion of coal extraction in 2024);
- coal extraction limit and processing;
- mine site layout and site access;
- blasting activities and waste rock management;
- product coal handling and off-site transport;
- final landform components other than the final void and the site rehabilitation strategy (Section 3.5.1);
- biodiversity offsets (Section 3.5.2).
- water management infrastructure and objectives; and
- hours of operation and workforce.

3.5.1 Final Landform and Rehabilitation

Other than the final void, the previously assessed WCCM final landform components (e.g. former infrastructure areas, water management infrastructure, and waste rock emplacements) would not be changed by the Modification.

The Modification would be implemented consistent with the WCCM's approved post-mining land use (aside from the change to the final land use proposed in the final void area), primary and secondary rehabilitation domains, rehabilitation practices and measures (including vegetation establishment and growth), rehabilitation monitoring and performance measures.

WCC would revise the approved *WCCM Mining Operations Plan (MOP)* (Whitehaven, 2015) (or equivalent Rehabilitation Management Plan) to incorporate the Modification.

3.5.2 Biodiversity Offset Strategy

The approved biodiversity offset strategy is conceptually shown on Appendix 4 of the WCCM PA (10_0059) and summarised in Table 12, Condition 24 of the PA. It includes the Mine Site Offset Area and five other offset areas located near the WCCM. The Mine Site Offset Area includes undisturbed land within the mine site boundary and is separated from the open cut mining area.

The Modification proposes no change to the Mine Site Offset Area or any other offset area in the WCCM biodiversity offset strategy.

3.6 PROPOSED AMENDMENT TO PROJECT APPROVAL 10_0059

It is expected that modifications to the following PA (10_0059) conditions would be required to incorporate the Modification:

- Rehabilitation objectives in Table 13, Condition 41 of Appendix C.
- Conceptual final landform shown in Figure 1 of Appendix 5.
- Commitments stated in Condition 2.4 of Appendix 6.

No other changes to the WCCM PA conditions are anticipated to be required.

4 STATUTORY CONTEXT

This section outlines the statutory context relevant to the assessment of the Modification.

In accordance with the guideline *Preparing a Modification Report* (DPIE, 2021b), Attachment 1 provides a detailed statutory compliance table for the WCCM incorporating the Modification that identifies the relevant statutory provisions and where these provisions are addressed in this Modification Report.

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The EP&A Act and the NSW *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) set the framework for planning and environmental assessment in NSW.

4.1.1 Applicability of Section 4.55 of the EP&A Act

As the approved WCCM development has been declared to be SSD (Section 1.1), WCC is seeking to modify the WCCM PA (10_0059), which is now taken to be a development consent, under section 4.55(2) of the EP&A Act.

Section 4.55 of the EP&A Act relevantly states:

4.55 Modifications of consents - generally

...

(2) Other modifications

A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

- (a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and*

- (b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and*
 - (c) it has notified the application in accordance with*
 - (i) the regulations, if the regulations so require, or*
 - (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
 - (d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be...*
- (3) In determining an application for modification of a consent under this section, the consent authority must take into consideration such of the matters referred to in section 4.15(1) as are of relevance to the development the subject of the application. The consent authority must also take into consideration the reasons given by the consent authority for the grant of the consent that is sought to be modified.*

With respect to the "substantially the same development" requirement under section 4.55(2)(a) of the EP&A Act, clause 3BA(6) of Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017* relevantly provides:

3BA Winding-up of transitional Part 3A modification provisions on cut-off date of 1 March 2018 and other provisions relating to modifications

...

- (6) In the application of section 4.55 (1A) or (2) or 4.56 (1) of the Act to the following development, the consent authority need only be satisfied that the development to which the consent as modified relates is substantially the same development as the development authorised by the consent (as last modified under section 75W):*

- (a) *development that was previously a transitional Part 3A project and whose approval was modified under section 75W,*

...

The consent authority is, therefore, required to satisfy itself that the WCCM as modified would result in the WCCM remaining substantially the same development as the development as last modified under section 75W of the EP&A Act (i.e. Modification 2).

The comparative analysis provided in Table 1 outlines the key elements of the approved WCCM (as modified) and the Modification. As stated above, Modification 2 was the most recent modification under the (now repealed) section 75W of the EP&A Act.

The WCCM incorporating the Modification would demonstrably remain an open cut coal mine that is progressively backfilled and, upon closure and rehabilitation, comprises of a final void and an elevated waste rock emplacement rehabilitated with native woodland.

Therefore, the consent authority can be satisfied that the WCCM incorporating the Modification would remain “substantially the same” development as the development as last modified under section 75W of the EP&A Act (i.e. Modification 2).

4.1.2 Objects of the EP&A Act

The objectives listed in section 1.3 of the EP&A Act include consideration of social and economic welfare of the community, ecologically sustainable development (ESD), economic use and development of land, protection of environment and heritage, and community participation (Attachment 1).

The Modification is considered to be generally consistent with the objects of the EP&A Act, as it would:

- facilitate ESD by increasing economic efficiencies associated with the closure and rehabilitation of the mine, while not increasing the potential environmental impacts of the final landform and not reducing the total mined resource;
- not require new surface disturbance, thereby avoiding additional impacts to ecological communities and cultural heritage;

- reduce amenity impacts (noise, air quality) and greenhouse gas emissions associated with closure through avoided rehandling of waste rock, while not increasing the visual amenity impacts of the final landform; and
- would be developed in a manner that incorporates community engagement, with a range of stakeholders consulted during the preparation of this Modification Report (Section 5).

4.1.3 Evaluation under Section 4.15(1) of the EP&A Act

In evaluating the Modification, under section 4.15(1) of the EP&A Act, the consent authority is required to take into consideration a range of matters as they are of relevance to the subject of the application (Attachment 1):

This Modification Report has been prepared to address the matters in section 4.15(1) of the EP&A Act as follows:

- Consideration of relevant environmental planning instruments is provided in Attachment 1.
- Clause 2.10 of the *State Environmental Planning Policy (Planning Systems) 2021* states that development control plans do not apply to SSD, such as the WCCM.
- This Modification Report has been prepared in consideration of the relevant provisions of the EP&A Regulation (Attachment 1).
- A description of the existing environment, an assessment of the potential environmental impacts associated with the Modification, and a description of the potential measures to avoid, mitigate, rehabilitate, remediate, monitor and/or offset the potential impacts of the Modification are described in Section 6 and Appendices A and B.
- The suitability of the proposed final landform for the WCCM has previously been considered and would not substantially change for the Modification. That is, the Modification is wholly located within the approved WCCM boundary and involves an incremental increase in final void depth to approximately 118 m bgl and steepness of side slopes to a maximum of 66 degrees (1V:0.5H).
- Consideration of whether the Modification is considered to be in the public interest is provided in Section 7.

The consent authority is also required to take into consideration any reasons given by the consent authority for the grant of the consent that is sought to be modified.

4.2 OTHER RELEVANT NSW LEGISLATION

In addition to the EP&A Act, other NSW legislation applicable to the WCCM and relevant to this Modification includes:

- *Biodiversity Conservation Act 2016* (BC Act);
- Mining Act;
- *Protection of the Environment Operations Act 1997* (PoEO Act); and
- WM Act;

WCC would continue to obtain the necessary licences and approvals under these Acts as required, including revisions to relevant plans, licences or agreements to incorporate the Modification.

4.2.1 Biodiversity Conservation Act 2016

The BC Act provides the legislative framework for biodiversity conservation in NSW.

Part 7 of the BC Act concerns the biodiversity assessment process for approvals under the EP&A Act.

Relevantly, clause 30 of the NSW *Biodiversity Conservation (Savings and Transitional) Regulation 2017* provides that the BC Act applies to the modification of a "planning approval" (which includes a development consent) even if the planning approval was granted before the commencement of the BC Act.

However, clause 30A states (emphasis added):

30A New Act applies to modifications of planning approvals granted or applied for before commencement of new Act

(1) *The provisions of Division 4 of Part 7 of the new Act apply to applications for the modification of a planning approval—*

(a) *where the planning approval was granted before the commencement of the new Act, and...*

(2) *For that purpose—*

(a) *the provisions apply in relation to the original development as proposed to be modified, and*

(b) *a biodiversity development assessment report is required to be submitted and taken into consideration if Division 4 of Part 7 of the new Act would have applied to the original development (as proposed to be modified) if planning approval had been granted after the commencement of the new Act, and*

(c) *however a biodiversity development assessment report is not required to be submitted if the authority or person determining the application for modification (or determining the environmental assessment requirements for the application) is satisfied that the modification will not increase the impact on biodiversity values, and...*

As the consent authority can be satisfied that the Modification will not increase the impact of the approved development on "biodiversity values", this Modification Application is not accompanied by a biodiversity development assessment report.

In this regard, the Modification does not involve additional land disturbance and is not expected to increase the impacts of the approved development on biodiversity values.

It is noted that the Modification includes a commitment to provide additional areas of native woodland revegetation adjacent to the existing and approved biodiversity offset areas surrounding the mine site. The purpose of these revegetation areas is to compensate for the fact that, if the Modification is approved, native woodland would not be established in the location of the final void pit lake and steeper highwall areas.

As such, to the extent that the BC Act (and in particular Part 7) is relevant to this Modification Application, the consent authority can be satisfied of the relevant matters.

4.2.2 Mining Act 1992

The objectives of the Mining Act are to encourage and facilitate the discovery and development of mineral resources in NSW, having regard to the need to minimise impacts on the environment and ensuring effective rehabilitation of disturbed land and water.

The Modification is considered to be consistent with these objectives as it would allow for the construction of the WCCM final landform in a safe and efficient manner while achieving the rehabilitation objective of a safe, stable and non-polluting final landform.

The development as modified would be wholly within existing mining leases and the development as modified would continue to be carried out in accordance with the conditions of these mining leases (Figure 3). Therefore, there would be no need for the amendment or variation of the existing authorities or the issue of new authorities under the Mining Act.

Recent changes to the Mining Act apply new rehabilitation conditions to mining leases (Section 2.3). At the time of writing, new rehabilitation conditions were issued in draft for the WCCM mining tenements. The Modification is considered to be consistent with the purpose of the draft new rehabilitation conditions, as it would minimise the potential for harm to groundwater sources surrounding the WCCM post-mining.

WCC would procure approval of a revised WCCM MOP (Whitehaven, 2015) (or equivalent Rehabilitation Management Plan) to incorporate the Modification.

Section 380AA of the Mining Act states:

380AA Restrictions on planning applications for coal mining

- (1) *An application for development consent, or for the modification of a development consent, to mine for coal cannot be made or determined unless (at the time it is made or determined) the applicant is the holder of an authority that is in force in respect of coal and the land where mining for coal is proposed to be carried out, or the applicant has the written consent of the holder of such an authority to make the application...*

In this respect, the current registered holders of the WCCM mining tenements are wholly owned by Whitehaven. WCC is the applicant for the Modification and is wholly owned by Whitehaven (Section 1).

4.2.3 Protection of the Environment Operations Act 1997

The PoEO Act and the *Protection of the Environment Operations (General) Regulation 2021* define the general obligations for environmental protection for development in NSW, and are administered by the NSW Environment Protection Authority.

Operations at the WCCM are currently undertaken in accordance with existing Environment Protection Licence (EPL) 12290 issued under the PoEO Act.

It is not anticipated that any variation to EPL 12290 would be required as a result of the Modification.

4.2.4 Water Management Act 2000

The WM Act contains provisions for the licensing, allocation, capture and use of water resources. Under the WM Act, water sharing plans establish rules for sharing water between different users and between the various environmental sources (namely rivers or aquifers).

The Modification would not change peak water licencing, supply sources or storage requirements for the operational phase of the WCCM.

The modified final landform is predicted to receive incidental groundwater inflows post-mining (Section 6, Appendix A).

Sufficient licences are held to accommodate the licensable take (including post-mining take) for the WCCM incorporating the Modification, as per the requirements of the WM Act.

4.3 ENVIRONMENTAL PLANNING INSTRUMENTS

Key environmental planning instruments of relevance to the WCCM incorporating the Modification are discussed in the detailed statutory reconciliation compliance table provided in Attachment 1.

4.4 COMMONWEALTH LEGISLATION

The current WCCM operations are approved to be undertaken in accordance with EPBC Approval 2010/5571 granted on 21 December 2011 (and subsequently varied by notice, most recently in 2017) under the Commonwealth EPBC Act.

The relevant controlling provisions were:

- listed threatened species and communities (sections 18 and 18A of the EPBC Act); and
- listed migratory species (sections 20 and 20A).

The Modification does not seek to change the approved surface development extent and therefore would not involve additional potential impacts on listed threatened species and communities, or listed migratory species, to those previously assessed.

The potential impacts of the Modification on water resources have been assessed in the Groundwater Assessment (Appendix A) and Surface Water Assessment (Appendix B) and summarised in Sections 6.1 and 6.2, respectively. Appendices A and B indicate that there would be no significant impact on water resources as a result of the Modification.

5 ENGAGEMENT

WCC consults with key stakeholders on a regular basis in regard to the approved WCCM.

Consultation for the Modification has been conducted with key NSW Government agencies, local council, and the local community. Consultation with landholders near the mine has commenced and will continue to occur following lodgement of the Modification application.

Consistent with *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2021c), key objectives of the engagement undertaken for the Modification are to:

- engage with key stakeholders about the Modification;
- seek input from key stakeholders on elements of the Modification; and
- continue the ongoing dialogue between WCC and key stakeholders regarding the development of the WCCM.

A summary of this consultation with key stakeholders is provided below. It is anticipated that consultation will continue during both the public exhibition of this Modification Report and the assessment of the Modification Application.

5.1 NSW GOVERNMENT AGENCIES

Department of Planning and Environment

A briefing with DPE was conducted in August 2021 to provide an overview of the proposed Modification and proposed scope of environmental assessments and stakeholder consultation.

As part of the briefing, DPE requested that WCC consults with DPE – Water, the NSW Natural Resources Access Regulator (NRAR), and the NSW Resource Regulator in preparing the Modification.

A Scoping Letter for the Modification was provided to DPE in September 2021. Following this correspondence, DPE wrote to WCC on 8 October 2021 confirming the proposed approval pathway and that it was generally satisfied with the proposed scope of the assessments and consultation for the Modification.

WCC will continue to consult with DPE throughout the Modification assessment process.

Other Government Agencies

A multi-agency briefing with DPE, DPE – Water and NSW Resources Regulator was conducted in August 2021 to provide an overview of the proposed Modification and proposed scope of environmental assessments and stakeholder consultation. Representatives of the NRAR were invited to the briefing however were unable to attend.

Matters raised during the briefing have been addressed in the Modification Report and relevant appendices as follows:

- the Modification application is to consider the minimal impact considerations of the NSW Aquifer Interference Policy (Section 6.1 and Appendix A);
- potential impacts of the Modification on groundwater dependent ecosystems are to be considered (Section 6.1 and Appendix A);
- the Modification Report is to describe the potential future benefits associated with beneficial re-use of the final void water body (Section 6.2 and Appendix B);
- the modified final landform is required to be geotechnically safe and stable over the long term, in accordance with the WCCM PA conditions (Section 3.2); and
- the Modification Report is to describe the approach to establishing revegetation within the modified final landform (Section 3.5).

5.2 LOCAL COUNCIL

WCC meets with representatives of the Liverpool Plains Shire Council regarding the approved WCCM as required. An overview of the Modification and proposed scope of environmental assessments and engagement was presented to Council representatives in January 2022.

In the briefing Council raised the following issues related to the Modification:

- the issue of potential odour impacts resulting from the final void water body (Section 6.2.4);
- long-term final void water quality and potential options for beneficially using the final void water (Section 6.2 and Appendix B);

- the long-term stability of the proposed final void design (Section 3.2); and
- community engagement for the Modification (Section 5.3).

5.3 COMMUNITY ENGAGEMENT

Community Consultative Committee

The WCCM Community Consultative Committee (CCC) was established for the WCCM in 2005 in accordance with the then Development Approval (172-7-2004) and has continued for the approved WCCM accordance with the WCCM PA (10_0059).

The CCC provides a mechanism for ongoing communication between WCC and representatives of the local community, including an independent chairperson, councillors from the Liverpool Plains Shire Council, local residents and community members.

WCC works closely with the two surrounding communities of Werris Creek and Quipolly. The CCC provides a means for WCC to consult with these communities.

An overview of the Modification was provided at the CCC meetings in July and November 2021. Minutes of these meetings are available on the Whitehaven website.

Local Landholders

Whitehaven has commenced discussions with landowners surrounding the WCCM regarding potential impacts of the WCCM on private groundwater bores (Section 6.1). Whitehaven will continue to undertake these discussions throughout the Modification assessment stage.

Whitehaven has notified other landholders in the vicinity of the WCCM of the Modification via a letter. The letter provided an overview of the Modification and specialist assessments completed and included the contact information of a Whitehaven representative. It is expected Whitehaven will continue consultation with landholders throughout the Modification assessment stage.

Public Consultation

The Whitehaven website (www.whitehaven.com.au) provides regular updates on the WCCM, and provides access to relevant environment and community information, including compliance reports and approval documents.

The WCCM contact desk (02 6763 6000) allows members of the public to contact WCC with enquiries or complaints.

6 ASSESSMENT OF IMPACTS

WCC has undertaken a review of the potential environmental impacts of the Modification to identify key potential environmental issues requiring assessment.

The key potential environmental impacts of the Modification relate to the modified (increased) final void depth and the associated water resource impacts and consequences.

A discussion of the predicted groundwater and surface water resource impacts is provided in Sections 6.1 and 6.2 respectively.

Section 6.1 and 6.2 and relevant appendices include a description of the existing environment, an assessment of the potential impacts of the Modification and, where relevant, a description of the measures that would be implemented to avoid, minimise, mitigate and/or offset the potential impacts.

Section 6.3 discusses the potential impacts of the Modification on other aspects, including visual and other amenity (noise and air quality), greenhouse gas emissions, hazards and risks, and social and economic outcomes of the Modification.

6.1 GROUNDWATER

6.1.1 Methodology

A Groundwater Assessment for the Modification has been prepared by SLR (2022) and is presented in Appendix A. The Groundwater Assessment has been peer reviewed by Dr Noel Merrick and the review letter is also provided in Appendix A.

The Groundwater Assessment:

- provides an overview of the WCCM hydrogeology and groundwater monitoring data from approximately 10 years of WCCM operations;
- conducts a model conceptualisation exercise and develops a two-dimensional groundwater model of the WCCM post-mining;
- provides a revised prediction of the long-term post-mining groundwater level surrounding the WCCM;

- provides groundwater behaviour predictions and associated effects for the Modification final landform (i.e. no further backfilling) and the final landform scenario required to achieve the rehabilitation objective of backfilling to 5 m above the long-term, post-mining groundwater level surrounding the WCCM (herein referred to as the “additional backfill design”); and
- compares the predicted groundwater effects of the Modification final landform and the additional backfill design on the hydrogeological regime and potential groundwater receptors.

The Groundwater Assessment has been prepared in consideration of the following:

- *Australian Groundwater Modelling Guidelines* (Barnett *et al.* 2012);
- WM Act and relevant water sharing plans;
- NSW Aquifer Interference Policy (AIP) (NSW Government, 2012); and
- PoEO Act.

6.1.2 Existing Environment

Previous Assessments

The *Werris Creek Coal Mine Life of Mine Project Groundwater Impact Assessment* was prepared by RCA Australia (2010) for the Werris Creek LOM EA.

Groundwater Management and Monitoring

Groundwater management and monitoring at the WCCM is conducted in accordance with the WCCM WMP (Whitehaven, 2017).

Local Geology

The WCCM comprises of six geological formations (Appendix A):

- The Greta Coal Measures – Willow Tree Formation has seven coal seams running through WCCM, all of which are mined via open cut methods.
- The Werrie Basalt Formation is up to 2 km thick throughout the WCCM, this formation completely encompasses the Greta Coal Measures.

- The Temi formation is composed mainly of tuffaceous sandstones, conglomerates, and shales. The Currabubula Formation underlies the Temi Formation and is composed of sandstones, and mudstones.
- The Warrigundi Igenous Complex is composed of igneous extrusive flows and intrusive dykes of dacite and rhyolite.
- The Quaternary Alluvium is composed predominantly of sand and gravel with alluvial clay usually observed at the surface.

Hydrogeological Regime

The groundwater regime at the WCCM and surrounds has been described in previous groundwater assessments and the approved WMP.

The four main hydro-stratigraphic units at the WCCM include:

- Greta Coal Measures – Willow Tree Formation.
- Werrie Basalt.
- Temi and Currabubula Formation.
- Quaternary Alluvial of the Quipolly and Werris Creek Alluvium.

Open cut mining at the WCCM is undertaken in the Greta Coal Measures, which is a semi-confined to confined aquifer with groundwater flow occurring predominantly through higher permeability coal layers. WCCM will soon deplete these measures through open cut mining methods.

The Werrie Basalt is a semi-confined to confined aquifer surrounding and underlying the Greta Coal Measures of the WCCM, with groundwater flows occurring through fractures. The aquifer supports stock and domestic bores (Appendix A).

A claystone layer at the base of the Greta Coal Measures has low permeability and is considered important in limiting connectivity between the WCCM and adjacent Werrie Basalt (Appendix A).

The Temi and Currabubula Formation are unconfined to the east and west of WCCM and confined under the Werrie Basalt (Appendix A).

The Quipolly Alluvium runs along the course of the ephemeral Quipolly Creek located 2.5 km south of the WCCM and supports mainly irrigation. The isolated area of alluvium associated with Werris Creek (also ephemeral) located 3.7 km north of the WCCM supports mainly domestic and stock use.

Of the hydrogeologic units surrounding the WCCM, alluvium associated with Quipolly and Werris creeks is likely to be regarded as ‘highly productive’ as defined under the AIP (Appendix A). Other hydrogeological units including the Werrie Basalt are likely to be regarded as ‘less productive’ under the AIP (Appendix A).

6.1.3 Assessment

Assessment Approach

A two-dimensional cross-sectional groundwater model was developed for the Groundwater Assessment. The model was used to:

- predict the long-term post-mining groundwater level surrounding the WCCM; and
- consider the groundwater behaviour and associated effects for two final landform scenarios:
 - the additional backfill design; and
 - the Modification final landform.

As described in Section 6.1.1, it is noted that the additional backfill design scenario is what would be required to achieve the rehabilitation objective of backfilling the final void to 5 m above the long-term post-mining groundwater level surrounding the WCCM (i.e. in accordance with Condition 41, Schedule 3 of the WCCM PA). That is, the scenario where the final void is backfilled to 360 mAHD such that the final void depth is 28 mbgl.

The Modification final landform involves retention of the final open cut extent as the final void without further backfilling (i.e. depth 118 mbgl and side slopes up to a maximum slope of 66 degrees).

The key findings of the Groundwater Assessment (Appendix A) are presented in the following sub-sections.

Revised Predicted Post-Mining Groundwater Level

The revised long-term recovered groundwater level was determined from modelling the additional backfill design scenario and the Modification final landform (Appendix A).

The Groundwater Assessment concluded the revised long-term recovered groundwater level surrounding the WCCM was 355 mAHD, which broadly aligns with pre-mining groundwater levels (Appendix A).

Comparison Between Modified Final Void Design and the Additional Backfill Design Scenario

Water Quantity

The Groundwater Assessment includes predicted groundwater inflows and outflows for a nominal range of void pit lake levels. These predictions were used in the final void water recovery analysis undertaken for the Surface Water Assessment (Section 6.2).

On the basis of the key finding of the Surface Water Assessment (i.e. the additional backfill scenario would still form a permanent surface water driven pit lake [Section 6.2, Appendix B]), the Groundwater Assessment concluded:

- The additional backfill design scenario (i.e. final void depth 28 mbgl) would form a permanent pit lake which acts as a groundwater source with net outflows of approximately 7.4 megalitres per year (ML/year).
- The Modification final landform (i.e. void depth 118 mbgl) would also form a pit lake however it would act as a groundwater sink into perpetuity with net inflows of approximately 12.5 ML/year which would be licensed in accordance with the WM Act requirements.

Key characteristics of the resulting final void pit lake under each scenario are described in Section 6.2 and Appendix B.

Water Quality

The Groundwater Assessment considered the risk of potential contaminated (i.e. saline) groundwater migrating into or out of the final void under each scenario using a modelled particle tracking methodology (Appendix A).

The particle tracking analysis concluded (Appendix A):

- Under the additional backfill scenario (i.e. void depth 28 mbgl), the resulting pit lake sits above the level of surrounding groundwater which is predicted to cause infiltration and migration of potentially contaminated groundwater through the spoil and outward into the surrounding basalt and towards Quipolly Creek.
- In contrast, the Modification final landform (i.e. void depth 118 mbgl) would contain this infiltration due to the final void pit lake acting as a groundwater sink into perpetuity.

As described in Appendix A, available information on the chemical properties of emplaced waste rock indicates that salinity is likely to be the main contaminant (i.e. the spoil is benign and non-acid forming). Under the additional backfill scenario, migration of saline water from the final void pit lake into the Werrie Basalt may impact water quality in proximity to the mine.

The results of the Groundwater Assessment (Appendix A) and Surface Water Assessment (Appendix B) indicate that groundwater outflow salinity would:

- Exceed the median salinity of the surrounding Werrie Basalt (1,220 micro siemens per centimetre [$\mu\text{S}/\text{cm}$]) after approximately 100 years.
- Exceed the discharge water salinity concentration limit in Condition L2 of EPL 12290 (2,000 $\mu\text{S}/\text{cm}$) after approximately 200 to 250 years.

Based on the outcomes of the Groundwater Assessment and particle tracking analysis, the Modification final landform (i.e. void depth 118 mbgl) is expected to function as a groundwater sink into perpetuity with no risk of saline groundwater migration off-site. This is considered to be a better environmental outcome in comparison to the additional backfill design scenario (i.e. void depth 28 mbgl) which presents a contamination risk to the surrounding groundwater.

Groundwater Inflows

When considering that the approved WCCM post-mining landform contemplates a dry final void with no net inflow (take) of groundwater, the Modification would result in approximately 12.5 ML/year of inflows to the final void post-mining. It is noted that this volume is significantly less than the inflows reported during mine operations.

Inflows would be from the Werrie Basalt (Appendix A) which is part of the Gunnedah-Oxley Basin Murray Darling Basin Groundwater Source within the *Water Sharing Plan for the NSW Murray-Darling Basin Porous Rock Groundwater Sources*.

WCC holds sufficient licences to accommodate the licensable take for the WCCM incorporating the Modification post-mining, as per the requirements of the WM Act.

The Modification would not change peak water licencing, supply sources or storage requirements for the operational phase of the WCCM.

Groundwater Users

The minimal impact considerations in the AIP (NSW Government, 2012) were considered in the Groundwater Assessment (Appendix A) for the 'highly productive' alluvium associated with Werris Creek and Quipolly Creek, and 'less productive' Werrie Basalt.

The AIP minimal impact considerations are defined for groundwater sources, connected water sources, and their dependent ecosystems, culturally significant sites and water users (NSW Government, 2012). There are two levels of minimal impact considerations specified in the AIP (NSW Government, 2012):

- If the predicted impacts are less than the Level 1 minimal impact considerations, then these impacts will be considered as acceptable.
- Impacts greater than the Level 1 minimal impact considerations can be considered as having impacts that are within the range of acceptability, with extra monitoring and potential mitigation or remediation required.

Under the AIP the minimal impact considerations include drawdown not greater than 2 m at neighbouring bores in 'less productive' fractured rock aquifers (i.e. the Werrie Basalt) and the 'highly productive' alluvium associated with Werris Creek and Quipolly Creek, before additional monitoring and mitigation may be required.

The Groundwater Assessment concluded that no significant change in water level is predicted in the 'highly productive' Werris Creek or Quipolly Creek alluvium, and therefore no drawdown impacts on privately-owned alluvial bores are expected (Appendix A).

The Groundwater Assessment (Appendix A) identified that the residual groundwater drawdown in the less productive Werrie Basalt is predicted to potentially exceed the AIP minimal impact considerations at four privately-owned registered groundwater bores due to the development of the Modification final landform.

Whitehaven has commenced discussions with the three landowners on which the four potentially impacted groundwater bores are located in accordance with the requirements of the AIP. The purpose of the consultation is to explain the predicted groundwater impacts associated with the Modification final landform and determine the status of the groundwater bores (i.e. current usage, standing water level, yield and water quality characteristics).

Should it be identified through this consultation that the predicted drawdown would potentially impacts the ability of the landholder to use a bore for its intended purpose, Whitehaven would progress with negotiating 'make good' provisions for the affected groundwater user in accordance with the AIP. Appropriate make good provisions for a Modification-related drawdown greater than 2 m at a groundwater bore may include:

- deepening the affected groundwater bore (including lowering pump set and/or provision of new pump set and power supply if required);
- construction of a new groundwater bore (including provision of a new pump set and power supply if required); and/or
- provision of an alternative water supply of suitable quality and quantity.

These contingency measures would be assessed on a case-by-case basis (i.e. including an assessment of the bore details and viability of any proposed measures), and implemented in consultation with the affected landholder and relevant regulators.

In relation to the predicted potential impacts, the Groundwater Assessment notes that monitoring in the Werrie Basalt indicates that privately-owned groundwater bores have not been subject to significant drawdown, including at the maximum depth of mining (Appendix A).

Accordingly, ongoing groundwater monitoring, as well as any updates to the groundwater model, would also be used to confirm the predicted drawdown at these bores.

Groundwater Dependant Ecosystems

The Australia Government Bureau of Meteorology Groundwater Dependent Ecosystems Atlas identifies patches of “moderate potential” and “high potential” terrestrial groundwater dependant ecosystems (GDE) in the riparian corridors of Quipolly and Werris Creek.

The *Water Sharing Plan for the Namoi Alluvial Groundwater Sources Order 2020* identifies an approximately 1 km reach of “groundwater dependent vegetation” which is a high priority GDE along Quipolly Creek approximately 3 km south-southeast of WCCM (Appendix A).

The Groundwater Assessment concludes that no residual drawdown impacts to terrestrial GDEs associated with the alluvial aquifers are predicted (Appendix A).

6.1.4 Mitigation Measures, Management and Monitoring

Groundwater monitoring and management measures outlined in the approved WCCM WMP would continue to be conducted for the WCCM incorporating the Modification, both for the remaining operational phase and closure and rehabilitation phase.

The WMP would be reviewed and, where necessary, updated to incorporate the Modification.

6.2 SURFACE WATER

6.2.1 Methodology

A Surface Water Assessment for the Modification has been prepared by WRM (2022) and is presented in Appendix B.

The Surface Water Assessment:

- provides an overview of the existing surface water environment for the WCCM;
- develops a final void water balance model of the WCCM post-mining;
- prepares a conceptual post-mining surface water drainage system that minimises the final void catchment area as far as practicable;
- compares the surface water behaviour predictions and associated effects of the additional backfill design scenario to those resulting from the modified final landform design; and

- conducts an extreme rainfall analysis in consideration of the risk of accumulated surface water spilling to the surrounding environment.

6.2.2 Existing Environment

Previous Assessments

The *Werris Creek Coal Mine Life of Mine Project Surface Water Assessment* was prepared by GSS Environmental Pty Ltd (2010) for the Werris Creek LOM EA.

Site Water Management and Monitoring

Surface water management and monitoring at the WCCM is conducted in accordance with the WMP (Whitehaven, 2017).

Regional Hydrology

Surface water resources in the local area are defined by two east-west running semi-permanent creeks fed from the ranges to the east of WCC.

Werris Creek is 3.7 km north of the WCCM and considered an ephemeral stream fed primarily by surface runoff due to the limited spatial extent and depth of groundwater of the associated alluvial aquifer.

Quipolly Creek located 2.5 km south of WCCM is also considered ephemeral (confirmed with gauged data in downstream Quirindi Creek). Quipolly Dam is 6.5 km east-southeast of WCCM along the upstream portion of Quipolly Creek and is likely to exert a significant control on flows in the creek.

6.2.3 Assessment

Assessment Approach

A final void water balance model was developed for the Surface Water Assessment. The model was used to consider the long-term surface water behaviour and associated effects for the additional backfill design scenario and modified final landform design.

The additional backfill design scenario for the Surface Water Assessment is based on a backfill level 5 m above the revised predicted long-term post mining groundwater level surrounding the WCCM, consistent with the Groundwater Assessment approach.

The post-mining groundwater level surrounding the WCCM predicted in the Groundwater Assessment (i.e. 355 mAHD, Appendix A) was adopted for the Surface Water Assessment.

Also consistent with the Groundwater Assessment approach, the Modification final landform involves retention of the final open cut extent as the final void without further backfilling (i.e. final void depth approximately 118 mbgl).

The key findings of the Surface Water Assessment (Appendix B) are presented in the following sub-sections.

Post-Mining Surface Water Drainage

A conceptual drainage channel design was developed for the WCCM final landform as part of the Surface Water Assessment (Appendix B). The purpose of constructing the drain in the final landform would be to minimise the final void catchment area as far as practicable. The resulting final void catchment area would be approximately 75 ha and has been adopted in the Surface Water Assessment.

Comparison Between Modified Final Void Design and the Additional Backfill Design Scenario

The Surface Water Assessment concluded the following in relation to the additional backfill design scenario (Appendix B):

- the final void water level rises above the partially backfilled level and forms a permanent pit lake after approximately 90 years, reaching equilibrium soon after, and remaining at approximately 4 m depth on average.
- the void initially receives groundwater inflows, however, after forming a pit lake (after 90 years), the void has a groundwater outflow at rising salinity; and
- in the long-term the void is a source of groundwater outflows to the surrounding groundwater system. The quality of the groundwater outflows deteriorates over time, reaching approximately 6,000 $\mu\text{S}/\text{cm}$ after 1,000 years.

In relation to the modified final landform, the Surface Water Assessment concluded (Appendix B):

- the final void initially collects water rising to approximately 60 m depth after 90 years and reaching an equilibrium depth of 73 m after approximately 600 years with a salinity continuously rising up to 8,000 $\mu\text{S}/\text{cm}$ after 1,000 years;
- the void receives groundwater inflows over the entire simulation as it remains below the surrounding groundwater equilibrium level; and
- in the long-term, the void acts as a perpetual sink and does not contribute water or salinity to the surrounding groundwater system. Therefore, forming a safe, stable and non-polluting landform.

Extreme Event Analysis

Modelling of an extreme storm events impact was insignificant with an approximate 1.1 m increase in void water level for the modified final void design (Appendix B).

Potential for Beneficial Reuse of Final Void Lake

An opportunity exists to beneficially re-use the final void pit lake water for agricultural or other purposes. The Surface Water Assessment has considered the approximate quantity and quality of water that could be reliably supplied.

Modelling of the modified final void indicated up to 210 ML/year could be extracted for beneficial re-use (Appendix B).

Progressing this opportunity would be subject to significant further feasibility assessment and design, in addition to identification, negotiation and agreement with the final water user/s, and licencing in accordance with the WM Act.

6.2.4 Mitigation Measures, Management and Monitoring

WCCM would continue to implement the existing water management measures described in the WMP to prevent discharge of mine water and manage off-site discharges of sediment laden water in accordance with EPL 12290.

This would include the ongoing implementation of the water monitoring requirements and proactive management of site water inventories under wet climate conditions to reduce potential surface water impacts.

The WMP will be updated, where necessary, to incorporate the Modification.

Potential Odour Issues

Nuisance pit lake odour is not expected for the following reasons (Appendix B):

- The final void catchment area has been minimised as much as practically possible, reducing the potential for nutrient runoff from its catchment.
- The void area will be fenced off, and stock will not have access to the pit lake. Therefore, stock will not contribute organic material to the pit lake.

6.3 OTHER MATTERS

6.3.1 Land Resources

The Modification does not propose to change the approved final land use of native woodland conservation and agriculture for the majority of the WCCM final landform area, however the final land use over the final void pit lake and highwall/endwall areas would be changed from native woodland conservation to uses that are consistent with a permanent pit lake.

To compensate for this change in use in the final void, a compensatory 71 ha of native woodland revegetation would be established adjacent to the mine site and existing biodiversity offset areas. The proposed compensatory revegetation areas are shown conceptually on Figure 3.

Accordingly, the Modification would not materially change the post-mining land capability and importantly, would not change the commitment to establish 37 ha area of Class III agricultural land over the rail load-out area post-mining.

6.3.2 Visual

Potential visual impacts of the approved WCCM operation were assessed as part of the LOM EA (Corkery & Co, 2010) and Mod 2 EA (Corkery & Co, 2015).

Key views of the WCCM are from Werris Creek Road which runs north-south to the east of WCCM, the Werris Creek township 4 km to the north, and private property surrounding the mine which include some elevated areas with views of the WCCM open cut.

Key measures introduced to mitigate visual impacts of the WCCM on these sensitive receivers included construction of Visual and Acoustic Amenity Bund, use of a native vegetation screen, tree planted around the mine perimeter, and progressive rehabilitation of disturbed areas including the waste rock emplacement. These measures have the effect of minimising visibility of the mine from public viewing points (Werris Creek Road, Werris Creek township).

The Modification does not propose to change the elevated components of the final landform including the rehabilitated waste rock emplacement and Visual and Acoustic Amenity Bund. As such, the Modification would not result in any change to visual impacts when viewed from Werris Creek Road, Werris Creek township, or surrounding private land that is not elevated.

The approved WCCM final landform included a final void of approximate depth 58 mbgl and side slopes of 18 degrees. The Modification would increase the final void depth to 118 mbgl and side slopes up to a maximum of 66 degrees.

In comparison to the approved final landform, the Modification is expected to involve a minor increase in visual modification of the landscape when viewed from private land that is elevated and in close proximity to the final void. This is due to the deeper final void and presence of steeper highwall areas.

6.3.3 Aboriginal Heritage

Potential impacts of the approved WCCM on Aboriginal Cultural Heritage were assessed as part of the LOM EA (Corkery & Co, 2010).

As described in the Mod 2 EA (Corkery & Co, 2015) and *WCCM Heritage Management Plan* (Whitehaven, 2014), the Narrawolga Axe Grinding Grooves were relocated to the Willow Tree Visitor Information Centre in consultation with the Nungaroo Local Aboriginal Land Council and Liverpool Plains Shire Council.

There would be no additional surface development as a result of the Modification and therefore no associated impacts to Aboriginal cultural heritage sites.

6.3.4 Amenity

In comparison to implementing the approved conceptual final landform design, the Modification would involve a reduction in noise and air quality impacts by reducing rehandling of emplaced waste rock required to partially backfill the open cut.

Noise and air quality management at the WCCM would continue to be conducted in accordance with the approved *WCCM Noise Management Plan* (Whitehaven, 2014) and *WCCM Air Quality and Greenhouse Gas Management Plan* (Whitehaven, 2014). These approved plans are not expected to require any change to incorporate the Modification.

6.3.5 Greenhouse Gases

Greenhouse gas emissions associated with the approved WCCM operations were assessed and calculated by Heggies Pty Ltd (Heggies, 2010).

As the Modification will not increase the approved mining rate and coal resource to be mined, the annual direct and indirect greenhouse gas emissions from the WCCM will not change. The Modification would involve a minor reduction in greenhouse gases by reducing rehandling of emplaced waste rock required to partially backfill the open cut.

The Modification would continue to be managed in accordance with the *WCCM Air Quality and Greenhouse Gas Management Plan* (Whitehaven, 2014).

6.3.6 Social

The Modification involves optimisations to closure and rehabilitation of the WCCM, which has been operating in its current form (as an open cut) since 2005.

The Modification would not change the peak workforce or approved WCCM mine life, nor the currently planned commencement of closure activities in approximately 2024. As such, no additional demand for services (e.g. housing and health services) in the region is expected.

The WCCM incorporating the Modification would continue to comply with PA limits for noise, air quality and blasting.

As such, the Modification would not result in any additional social impacts than the existing WCCM.

6.3.7 Economic

The Modification does not propose to reduce the recovery of the coal resource which would continue to be mined in accordance with approved plans, with associated royalties contributed to the state of NSW.

The Modification is required to allow for construction of the final landform in a safe and efficient manner while achieving the rehabilitation objective of a safe, stable and non-polluting final landform.

6.3.8 Hazards & Risks

Operational hazards associated with the approved WCCM were assessed as per the LOM EA (Corkery & Co, 2010).

It is considered that the Modification is broadly consistent with the hazards and risks associated with the previously assessed final landform (i.e. the partially backfilled final void). The modified final void, including steeper highwall section with slope up to a maximum slope of 66 degrees (1V:0.5H), has been designed with the appropriate long-term geotechnical factor-of-safety of at least 1.2.

Notwithstanding, in comparison to the approved final landform, the Modification is considered to involve additional hazards within in the post-mining landform, primarily associated with the steeper highwall areas and final void water body.

Accordingly, a Preliminary Hazard Analysis (PHA) would be conducted as part of detailed design and planning for closure of the WCCM.

The PHA would consider (but not be limited to) the following aspects of the modified final landform (if approved):

- restriction of animal and human access to final void face; and
- provision of egress for access to the final void water body by humans or animals.

7 EVALUATION OF MERITS

This section provides a justification for the Modification and conclusion for the Modification Report. As part of the justification of the modified Project, consideration has been given to:

- the engagement undertaken for the Modification;
- key environmental assessment outcomes including the potential impacts of the Modification;
- the relevant statutory and policy requirements; and
- the benefits of the Modification.

Stakeholder Engagement Overview

WCC has consulted with a number of stakeholders during the Modification process, including key State government agencies, local council and the local community.

Feedback received from stakeholders during the consultation undertaken for this Modification is described in Section 5. It is anticipated that further consultation will continue during both the public exhibition of this Modification Report and the assessment of the Modification Application.

Consolidated Summary of Assessment of Impacts

WCC has undertaken a review of the potential environmental impacts of the Modification and the key potential environmental impacts are related to the modified (increased) final void depth and associated water resource impacts and consequences.

It is concluded that the Modification would not increase impacts on water resources, namely the risk of contamination of surrounding groundwater post-mining.

Compliance with Relevant Statutory and Policy Requirements

An outline of the statutory requirements relevant to the assessment of the Modification is provided in Section 4.

The Modification is considered to be generally consistent with the objectives of the EP&A Act (Section 4.1.1).

In evaluating the Modification, under section 4.15(1) of the EP&A Act, the consent authority is required to take into consideration a range of matters as they are of relevance to the subject of the application.

This Modification Report has been prepared to generally address the requirements of section 4.15(1) of the EP&A Act to assist the consent authority (Section 4.1.2).

A detailed statutory compliance reconciliation table for the WCCM incorporating the Modification that identifies the relevant statutory provisions and where these provisions are addressed in this Modification Report is provided in Attachment 1.

Evaluation of the Modification

The Modification would increase the final void depth to 118 mbgl to allow the mine site to be closed and rehabilitated in a safe and efficient manner while achieving the rehabilitation objective of a safe, stable and non-polluting final landform.

The modified final landform has been designed to achieve the other rehabilitation objectives for the site, namely that the final landform is sympathetic to surrounding natural landforms as far as practicable; and comprises self-sustaining native woodland communities that are suitable for a conservation final land use that is compatible with surrounding land uses.

Compensatory native woodland revegetation areas are proposed such that the modified final landform can be implemented with no decrease to the total area of revegetation.

The modified final landform and rehabilitation strategy can be implemented using the existing rehabilitation fleet with reduced amenity impacts due to avoided rehandling of emplaced waste rock.

There would be no increase to the approved operational mine area (i.e. disturbance footprint) for the WCCM.

As such, the approval of the Modification is considered to be justified.

Conclusion

The WCCM incorporating the Modification would remain substantially the same as the development that was originally granted for the WCCM, as last modified under section 75W of the EP&A Act (i.e. Modification 2).

The WCCM (as modified) would continue to comply with existing PA limits and criteria, and rehabilitation requirements.

WCC would also continue to operate the WCCM (as modified) in accordance with the existing management and monitoring regime described in the PA (10_0059).

In weighing up the main environmental impacts () associated with the proposal, as assessed and described in this Modification Report, the Modification, on balance, is considered to have merit.

8 REFERENCES

- Barnett et al (2012) *Australian Groundwater Modelling Guidelines*.
- Department of Planning and Environment (2017) *New England North West Regional Plan 2036*
- Department of Planning, Industry and Environment (2021a) *State Significant Development Guidelines*.
- Department of Planning, Industry and Environment (2021b) *Appendix E – Preparing a Modification Report*
- Department of Planning, Industry and Environment (2021c) *Undertaking Engagement Guidelines for State Significant Project*.
- GSS Environmental Pty Ltd (2010) *Surface Water Assessment for the Werris Creek Coal Mine Life of Mine Project*.
- Heggies Pty Ltd (2010) *Air Quality Assessment for Werris Creek Coal Mine Life of Mine Project*.
- Liverpool Plains Shire Council (2020) *Liverpool Plains Shire Council Local Strategic Planning Statement 2040*.
- NSW Government (2012) *NSW Aquifer Interference Policy*.
- R. W. Corkery & Co. Pty Limited (2010) *Environmental Assessment for Werris Creek Coal Mine Life of Mine Project*.
- R. W. Corkery & Co. Pty Limited (2015) *Mining Operations Plan for the Werris Creek Coal Mine*.
- RCA Australia (2010) *Groundwater Impact Assessment for Werris Creek Coal Mine Life of Mine Project*.
- SLR Consulting Australia Pty Ltd (2022) *Groundwater Closure Assessment Hydrogeological Conceptual Model and Numerical Modelling*
- Werris Creek Coal Pty Limited (2015) *Werris Creek Coal Mine Modification 2 Environmental Assessment*.
- Whitehaven Coal Limited (2013) *Biodiversity and Offset Management Plan*.
- Whitehaven Coal Limited (2014) *WCCM Heritage Management Plan*.
- Whitehaven Coal Limited (2015) *WCCM Mining Operations Plan*.
- Whitehaven Coal Limited (2017) *Werris Creek Coal Water Management Plan*.
- WRM Water & Environment PTY LTD (2022) *Final Landform Modification – Werris Creek Mine Surface Water Assessment*

ATTACHMENT 1

DETAILED STATUTORY COMPLIANCE RECONCILIATION TABLE

**Table A1-1
Summary Statutory Compliance for State Legislation**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i>			
section 1.3	Relevant objects of the EP&A Act: <ul style="list-style-type: none"> ■ 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. ■ Facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment. ■ Promote the orderly and economic use and development of land. ■ Protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats. ■ Promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage). ■ Promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State. ■ Provide increased opportunity for community participation in environmental planning and assessment. 	Section 4.1.2	✓
section 4.15	Relevant environmental planning instruments: <ul style="list-style-type: none"> ■ <i>State Environmental Planning Policy (Planning Systems) 2021</i> ■ <i>State Environmental Planning Policy (Resources and Energy) 2021</i> ■ <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i> ■ <i>Liverpool Plains Local Environmental Plan 2011</i> (Liverpool Plains LEP). ■ Any planning agreement or draft planning agreement that a developer has entered into under section 7.4 of the EP&A Act. ■ <i>The Environmental Planning and Assessment Regulation 2021</i> (EP&A Regulation). The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; the suitability of the site for the development; any submissions made in accordance with the EP&A Act or the EP&A Regulation; the public interest.	Section 4.1.3. Remainder of Table A-1. Table A-2.	✓

Table A-1 (Continued)
Summary Statutory Compliance for State Legislation

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Environmental Planning and Assessment Regulation 2021 (EP&A Regulation)</i>			
clause 61(3)(b)	The consent authority is required to consider the <i>Dark Sky Planning Guideline</i> (Department of Planning and Environment, 2016). To the extent that clause 61(3) is relevant, as the Modification would not change night-lighting activities at the Werris Creek Coal Mine (WCCM), there would be no resulting change to the previously approved impacts on the Siding Springs Observatory or Dark Sky Region.	-	✓
clause 98	Clause 98 provides for the circumstances in which a modification application may be made. In accordance with clause 98(1)(a), this Modification Application is made by WCC, the owner of the land to which the Modification Application relates. Accordingly, the land owner consent provisions in clause 98(1)(b) are not considered to be relevant to this Modification. With respect to clause 98(6), the WCCM incorporating the Modification does not relate to land owned by a Local Aboriginal Land Council.	-	✓
clauses 99 and 100	<p>Clauses 99 and 100 of the EP&A Regulation provide for the making and content of a modification application. With respect to these two clauses, this Modification Application:</p> <ul style="list-style-type: none"> ■ contains the information required by the EP&A Act and EP&A Regulation (refer to Sections 4.1 of this Modification Report); ■ has been prepared in consideration of the guideline <i>Preparing a Modification Report</i> (DPIE, 2021); ■ contains the information required by clause 100(1)(a) to (c) (Section 1) and a description of the Modification and its expected impacts (Sections 1 to 3 and 6); and ■ is not accompanied by a Biodiversity Development Assessment Report (Section 4.2.1). 	Section 4.1 Sections 1 to 3, Section 6 Section 4.2.1	✓
clause 103	<p>Clause 103 of the EP&A Regulation concerns applications to modify a development consent that relates to "mining or petroleum development" on certain land.</p> <p>With respect to this clause and the defined meaning of "mining or petroleum development" in the <i>State Environmental Planning Policy (Resources and Energy) 2021</i> (clause 2.24[A]), no mining lease under the <i>Mining Act 1992</i> is required to be issued to enable the development as modified to be carried out, because the relevant WCCM development (as modified) would continue to be carried out within the land subject to the existing mining leases for the WCCM. As such, this Modification Application is not accompanied by a current gateway certificate or a site verification certificate.</p>	-	✓
clause 105	Division 2 of Part 5 of the EP&A Regulation provides for the public notification of modification applications. The consent authority is required to attend to the relevant public notice requirements in this Division. In this regard, clause 106 applies to a s 4.55(2) modification application if the original development application was for SSD and clause 107 applies to a s 4.55(2) modification application to which clause 106 does not apply.	-	✓

Table A-1 (Continued)
Summary Statutory Compliance for State Legislation

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Biodiversity Conservation Act 2016</i>			
section 7.14(2)	The consent authority is to take into consideration the likely impact of the proposed development on biodiversity values as assessed in the Biodiversity Assessment Report. The Modification would be located in the approved disturbance area and would therefore not result in an increase to impacts on biodiversity values, including threatened species and ecological communities, relative to the impacts already approved.	Section 4.2.1	✓
section 7.16(3)	If the consent authority is of the opinion that the WCCM (as modified) is likely to have serious and irreversible impacts on biodiversity values, the consent authority is required to: <ul style="list-style-type: none"> ■ take those impacts into consideration; and ■ determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is to be granted. 	Section 4.2.1	✓
<i>Mining Act 1992</i>			
section 380AA	An application for development consent to mine for coal cannot be made or determined unless the applicant is the holder of an authority that is in force in respect of coal for the relevant land, or the applicant has the written consent of the holder of such an authority to make the application.	Section 4.2.2	✓
<i>Protection of the Environment Operations Act 1997 (PoEO Act)</i>			
section 43	Operations at the WCCM are currently undertaken in accordance with existing Environment Protection Licence (EPL) 12290 issued under the PoEO Act. The EPL contains conditions that relate to emission and discharge limits, environmental monitoring and reporting. It is not anticipated that any variation to EPL 12290 would be required as a result of the Modification.	Section 4.2.3	✓
<i>Water Management Act 2000 (WM Act)</i>			
sections 89, 90 and 91	Whitehaven holds appropriate licences under the WM Act for the existing activities at the WCCM. Appropriate licences under the WM Act would continue to be held.	Section 4.2.4	✓

Table A-2
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Planning Systems) 2021</i>			
Part 2.2	The Planning Systems SEPP provides for the declaration of SSD. In this respect, the approved WCCM development was declared to be SSD on 17 August 2018 by an order made under clause 6 of Schedule 2 to the <i>Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017</i> .	-	✓
clause 2.7	Clause 2.7(1) relevantly provides for the Independent Planning Commission to be the declared consent authority for certain applications to modify a development consent for SSD, if the application is made by a person who has disclosed a "reportable political donation" under section 10.4 of the EP&A Act in connection with the modification application. In this respect, this Modification Application is not made by a person who has disclosed a reportable political donation.	-	✓
clause 2.10	Under clause 2.10, development control plans do not apply to SSD.	-	✓
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.1	Clause 2 of the Chapter 2 (Mining, petroleum and extractive industries) of the Resource and Energy SEPP relevantly states that the aims of the Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries: <ul style="list-style-type: none"> ■ to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and ■ to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and ■ to promote the development of significant mineral resources, and ■ to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and... The consent authority can be satisfied that the Modification is consistent with the relevant aims of the Mining SEPP for the reasons given in Section 4.1.2 above with respect to the objects of the EP&A Act.	Section 4.1.2	✓
clause 2.9	Clause 2.9 states that development for the purpose of mining may be carried out (with consent) on land where agriculture or industry may be carried out (with or without development consent). The WCCM including the Modification is entirely within land that is zoned for primary production, for which development for the purpose of agriculture or industry may be carried out (with or without consent) under the Liverpool Plains LEP.	-	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.16	<p>Clause 2.16 provides various non-discretionary development standards for mining. In this regard, it is noted that:</p> <ul style="list-style-type: none"> ■ The Modification would not increase any potential impacts on cumulative noise level, cumulative air quality level, airblast overpressure, or ground vibration (i.e. the non-discretionary development standards listed under clause 2.16[1] to [6]). ■ The minimal impact considerations in the AIP (NSW Government, 2012) were considered in the Groundwater Assessment (Appendix A). 	Section 6.1.3 Appendix A	✓
clause 2.17	<p>Before determining an application for consent for the purposes of mining the consent authority must:</p> <p>(a) <i>consider –</i></p> <p>(i) <i>the existing uses and approved uses of land in the vicinity of the development, and</i></p> <p>(ii) <i>whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and</i></p> <p>(iii) <i>any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and</i></p> <p>(b) <i>evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a)(i) and (ii), and</i></p> <p>(c) <i>evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).</i></p> <p>Land use in the vicinity of the WCCM is characterised by a combination of agricultural land, rural residences and the Werris Creek township. The Modification would be wholly within the existing WCCM mining leases and requires no new surface development.</p> <p>The Modification involves increasing the depth of the final void with no material change in the final void size (area), nor any change to the other final landform components including the elevated waste rock emplacement and visual amenity bund.</p> <p>Accordingly, the WCCM incorporating the Modification is considered to be compatible with existing and approved uses of land, namely an open cut coal mine rehabilitated to conservation and agriculture final land uses.</p>	-	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.19	<p>Before determining an application for development in the vicinity of mining, petroleum or extractive industry, the consent authority must (among other things) consider whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery.</p> <p>In this regard, the WCCM incorporating the Modification would continue to progress in accordance with approved mine plans until the target coal resource is fully extracted. There would be no change to the approved mining rate or total coal resource to be mined. Further, the development as modified is not expected to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials.</p> <p>Public benefits of the Modification include an incremental decrease in amenity impacts (noise, air quality) by avoiding rehandling of emplaced waste rock.</p> <p>As such, no additional measures to avoid or minimise incompatibility with existing and approved surrounding land uses are considered to be required.</p>	-	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.20	<p>Clause 2.20(1) of the Resource and Energy SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, 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 the following:</p> <ul style="list-style-type: none"> (a) <i>that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,</i> (b) <i>that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,</i> (c) <i>that greenhouse gas emissions are minimised to the greatest extent practicable.</i> <p>In addition, clause 2.20(2) requires that, without limiting clause 2.20(1), in determining a development application for development for the purposes of mining petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.</p> <p>The potential impact of the Modification on water resources has been assessed in the Groundwater Assessment (Appendix A) and Surface Water Assessment (Appendix B) and summarised in Sections 6.2 and 6.3, respectively. Appendices A and B indicate that there would be no significant impact on water resources as a result of the Modification.</p> <p>The Modification does not seek to change the approved surface development extent and, therefore, would not involve additional potential impacts on threatened species and biodiversity to those previously assessed.</p> <p>In addition, the Modification does not seek to change any operational components of the WCCM and would involve a minor reduction greenhouse gas emissions by avoiding rehandling of emplaced waste rock to backfill the final void.</p>	-	✓
Clause 2.21	<p>Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery, and whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.</p> <p>In this regard, the WCCM incorporating the Modification would continue to progress in accordance with approved mine plans until the target coal resource is fully extracted. There would be no change to the approved mining rate or total coal resource to be mined.</p> <p>The Modification allows for timely closure of the mine and a sustainable post-mining land use to be achieved.</p>	Section 1.3	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.23	<p>Clause 17 of the Resource and Energy SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development. In particular, the consent authority must consider whether conditions of the consent should:</p> <ul style="list-style-type: none"> (a) require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or (b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or (c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under clause 3 of Schedule 6 to the Act and the Contaminated Land Management Act 1997), or (d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety. <p>Table 1, Section 3.1 provides a comparison of the modified rehabilitation strategy against the minimum requirements under Condition 41 of Schedule 3 to PA 10_0059.</p> <p>In summary, the modified WCCM meets the minimum requirements under Condition 41 of Schedule 3 to PA 10_0059.</p> <p>The compensatory revegetation areas would comprise of Box Gum Woodland (derived native grassland), that would facilitate revegetation to achieve Box Gum Woodland (woodland).</p> <p>In addition to the above, WCC would continue to progressively rehabilitate the WCCM in accordance with existing approvals in all areas other than the proposed final void lake and highwall areas.</p> <p>WCC would also procure approval of a revised MOP (Whitehaven, 2015) (or equivalent) to incorporate the Modification.</p>	-	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
Part 2.4	<p>Part 2.4 of the Resource and Energy SEPP concerns "mining or petroleum development", which is defined under clause 17A to mean:</p> <p>(1) <i>In this Part, mining or petroleum development means—</i></p> <p>(a) <i>development specified in clause 5 (Mining) of Schedule 1 to State Environmental Planning Policy (State and Regional Development) 2011, but only if—</i></p> <p>(i) <i>a mining lease under the Mining Act 1992 is required to be issued to enable the development to be carried out because—</i></p> <p>(A) <i>the development is proposed to be carried out outside the mining area of an existing mining lease, or</i></p> <p>(B) <i>there is no current mining lease in relation to the proposed development, or</i></p> <p>(ii) <i>the development is for the purposes of extracting a bulk sample as part of resource appraisal or a trial mine comprising the extraction of more than 20,000 tonnes of coal or of any mineral ore, or</i></p> <p>...</p> <p>(2) <i>However, mining or petroleum development does not include development carried out on land that is outside—</i></p> <p>(a) <i>the mining area of a proposed mining lease, or</i></p> <p>(b) <i>the area of a proposed production lease.</i></p> <p>With respect to Part 2.4, the Modification Application does not involve "mining or petroleum development" as a mining lease under the Mining Act is not required to enable the development (as modified) to be carried out. The relevant development as modified would continue to be carried out within the land subject to the existing mining leases for the WCCM.</p>	-	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>			
clause 4.6	<p>Chapter 4 (Remediation of Land) of the Resilience and Hazards SEPP is concerned with the remediation of contaminated land. Relevantly, clause 4.6(1) and (2) state:</p> <p>(1) <i>A consent authority must not consent to the carrying out of any development on land unless—</i></p> <p>(a) <i>it has considered whether the land is contaminated, and</i></p> <p>(b) <i>if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and</i></p> <p>(c) <i>if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.</i></p> <p>(2) <i>Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines</i></p> <p>As the development as modified would not involve any change of use of any of the land specified in clause 4.6(4), this Modification Application is not accompanied by the report referred to in clause 4.6(2) above. Further, the consent authority can be satisfied that the relevant land is suitable for the purpose for which the development (as modified) is proposed to be carried out.</p>	-	✓
clause 3.12	<p>A consent authority must consider current circulars or guidelines published by the DPE relating to hazardous or offensive development, whether to consult with relevant public authorities regarding any environmental or land use safety requirements, a preliminary hazard analysis prepared by the applicant, feasible alternatives to the development and likely future use of surrounding land.</p> <p>To the extent that clause 13 is relevant to the Modification Application, the consent authority can be satisfied that the development as modified will be carried out appropriately to manage potential hazards and pollution.</p> <p>The Modification would not involve the use of any additional hazardous materials and would not change the approved disturbance extent or operations of the WCCM. Hazardous materials would continue to be managed in accordance with the Project Approval and approved management plans.</p>	-	✓

Table A-2 (Continued)
Summary Statutory Compliance for Environmental Planning Instruments

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Liverpool Plains LEP</i>			
clause 2.3	<p>The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone. Under the Liverpool Plains LEP, the WCCM site is located within land zoned as RU1 – Primary Production. Under the Liverpool Plains LEP, development for the purpose of “open cut mining” is permissible with consent on land zoned RU1 – Primary Production.</p> <p>Development for the purpose of mining (as defined in the Resource and Energy SEPP) is therefore considered to be permitted with consent on land zoned RU1 – Primary Production.</p> <p>The WCCM incorporating the Modification is consistent with the objectives of the relevant land use zones under the Liverpool Plains LEP as it is considered to be consistent with the existing and approved coal processing operation and would not restrict the use of adjoining land uses.</p>	-	✓