Rehabilitation Management Plan

January 2025

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Contents

1 Introduction to Mining Project

Tarrawonga Coal Mine (Tarrawonga) (formerly known as East Boggabri Coal Mine) is an open cut coal mine owned and operated by Tarrawonga Coal Pty Limited (TCPL), a wholly owned subsidiary of Whitehaven Coal Limited (Whitehaven) located approximately 15 kilometres (km) north-east of Boggabri and 42 km north-northwest of Gunnedah NSW (See **Figure 1**).

This Rehabilitation Management Plan (RMP, the Plan) has been prepared in accordance with the Mining Exploration and Geoscience – Resources Regulator's (RR) *Form and Way: Rehabilitation Management Plan for Large Mines* (RR, 2021) and associated guidelines (refer **Section 1.2**). The Plan has also been prepared to satisfy Condition 64 of PA 11_0047 which requires Tarrawonga to prepare and implement a Rehabilitation Management Plan in accordance with the conditions imposed on mining leases associated with the mine under the *Mining Act 1992*.

1.1 History of Operations

Historic Consents

Tarrawonga was originally approved by the Minister for Planning under Development Consent DA 88-4-2005 in November 2005 under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Mining Lease (ML) 1579 was issued for Tarrawonga in April 2006 and coal production subsequently commenced in late 2006.

Under the provisions of DA 88-4-2005 Tarrawonga was permitted to extract approximately 12.4 million tonnes (Mt) of coal from the open cut pit at Tarrawonga at a maximum rate of 2 million tonnes per annum (Mtpa) using truck and excavator method. This consent also permits road transport of the coal to the Whitehaven Coal Handling and Preparation Plant (CHPP) on the outskirts of Gunnedah for selective washing and subsequent rail transport to the Port of Newcastle. A proportion of coal produced at Tarrawonga is also permitted to be collected at the mine site by domestic customers.

On 15 October 2010, the Minister issued an approval under Section 75W of the EP&A Act to modify DA 88-4-2005 (MOD 1). This modification permitted Tarrawonga to extend the open cut pit boundary, increase the total coal production by some 4 Mt, and increase mine waste rock production, as well as associated alterations to the waste rock emplacements. The modification also included the provision of a mobile crusher for domestic coal production and various changes to site water management, soil stockpiles and supporting infrastructure. DA-88-4-2005 was surrendered in 2015.

Current Consent

In 2013, Tarrawonga received PA 11_0047 from the Planning Assessment Commission (as delegate of the Minister for Planning and Infrastructure) under Part 3A of the EP&A Act for the Tarrawonga Coal Project. PA 11_0047 provides for the continuation and extension of the mine. PA 11_0047 has been modified on ten (10) occasions with the most recent modification (MOD 10) approved by the Department of Planning, Industry and Environment (DPIE) on the 19th October 2024.

Tarrawonga is approved under PA 11_0047 to carry out mining operations at a maximum rate of 3.5 million tonnes per annum (Mtpa) using truck and excavator method until the end of December 2030. A Site Layout is shown in **Figure 2**.

WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAGONGA

FIGURE 1
REGIONAL LOCALITY

Inset A
Scale: 1:15,000,000

LEGEND

Project Approval Boundary

Data Sources:
DoR NSW Exploration and Mining Leases
NSW LPI Base Map

0 1 2 Kilometres

Coordinate System:	GDA2020
Scale:	1:100,000 at A3
Project Number:	630.30268
Date:	26-Jul-2022
Drawn by:	LC
Annual Reporting Period:	2021

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\\au.slr.local\Corporate\Projects-SLR\630-SrvNTL\630-NTL\630.30268.00000 Whitehaven RMPs\06 SLR Data\01 GIS\Tarrawonga\Tarrawonga Figure 1 - Regional Locality.mxd

WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

FIGURE 2
SITE LAYOUT

LEGEND

Project Approval Boundary

Data Sources:
DoR NSW Exploration and Mining Leases
NSW LPI Base Map

0 250 500 Metres

Coordinate System:	GDA2020
Scale:	1:18,039 at A3
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Drawn by:	LC
Annual Reporting Period:	2021

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1.2 Current Development Consents, Leases and Licences

Development Consents

Table 1 below shows the Development Consent held by Tarrawonga.

Table 1 Development Consents

Issuing / Responsible Authority	Development Consent*	Details	Date of Issue	Expiry
IPC	PA 11_0047	Project Approval for LOM Extension Project.	22/01/2013	31/12/2030
DPIE	PA 11_0047 (MOD1)	MOD1 (continued coal haulage to Gunnedah CHPP)	06/11/2014	
DPIE	PA 11_0047 (MOD2)	MOD2 (allow receipt of all types of coal reject)	03/11/2016	
DPIE	PA 11_0047 (MOD3)	MOD3 (Traffic Management Plan)	10/02/2017	
DPIE	PA 11_0047 (MOD4)	MOD4 (Sound Power Level modification)	12/05/2017	
DPIE	PA 11_0047 (MOD5)	MOD5 (Open Cut Augmentation)	01/08/2017	
DPIE	PA 11_0047 (MOD6)	MOD6 (Coal Haulage)	01/11/2018	
DPIE	PA 11_0047 (MOD7)	MOD7 (Life of Mine)	09/02/2021	
	PA 11_0047 (MOD8)	MOD8 (Trucking water) for 18 months	16/06/2020	
DPIE	PA 11_0047 (MOD9)	MOD9 (Waste Tyre Disposal)	12/05/2021	
DPIE	PA 11_0047 (MOD10)	MOD10 (Haulage Hours)	19/10/2023	

EPBC Approval

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires consideration of the potential for a "significant impact" to be imposed by an activity on a 'matter of national environmental significance'. In the event that such an impact is likely to be imposed, the activity must be referred to the Commonwealth for determination as to whether it constitutes a "controlled action". Where a development activity does constitute a controlled action, approval from the Australian Government Minister for the Environment is required.

EPBC Act approval EPBC 2011/5923 was granted on the 11 March 2013 by the former Department of Sustainability, Environment, Water, Population and Communities (now Department of Agriculture, Water and the Environment). EPBC 2011/5923 was granted to allow for clearing of certain Ecologically Endangered Communities, was last modified on 23 December 2021 and expires on 31 December 2053.

Authorisations

Tarrawonga currently holds ML 1579, ML 1685, ML 1693, ML 1749, as well as Mining Exploration Licence (EL) 5967. These authorisations are outlined in.

Table 2 Authorisations

Issuing / Responsible Authority	Licence	Grant Date	Expiry Date	Status
RR	EL 5967	24/07/2002	24/07/2021	Expired, renewal sought
RR	ML 1579	03/04/2006	02/04/2027	Current
RR	ML 1685	18/07/2013	14/11/2032	Current
RR	ML 1693	14/10/2013	14/10/2034	Current
RR	ML 1749	17/11/2017	14/11/2032	Current

Other Approvals

A summary of all licences held by Tarrawonga for the mining operations are included in **Table 3**.

Table 3 Licences

Issuing / Responsible Authority	Licence	Licence Type	Grant Date	Expiry date
Environment Protection Authority (EPA)	EPL 12365	Environment Protection Licence	09/01/2006	Anniversary date 9 January
WaterNSW	90BL253276	Monitoring bores	18/05/2006	Perpetuity
	90BL253278		18/05/2006	Perpetuity
	90BL253279		18/05/2006	Perpetuity
	90BL253280		18/05/2006	Perpetuity
	90BL254253		18/05/2006	Perpetuity
	90BL254254		18/05/2006	Perpetuity
	90BL254255		24/04/2007	Perpetuity
	90BL254221		05/04/2007	Perpetuity
	90BL254214		04/04/2007	Perpetuity
	90BL255766		19/08/2012	Perpetuity
WaterNSW	WAL 31084	Water Access Licence (WAL)	26/06/2012	Perpetuity

Applicable Guidelines

In addition to the regulatory requirements identified above, this Plan has been prepared with consideration for the following guidelines, standards and policies:

- Form and way: Rehabilitation Management Plan (large mines);
- Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines;
- Guideline: Rehabilitation risk assessment;
- Guideline: Rehabilitation objectives and rehabilitation completion criteria;
- Planning for Integrated Mine Closure Toolkit (ICMM, 2008);
- Mining Amendment (Standard Condition of Mining Leases – Rehabilitation) Regulation 2021;
- Strategic Framework for Mine Closure (ANZMEC 2000);
- Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion, Mine Rehabilitation (Commonwealth Department of Industry, Tourism and Resources);
- Best Practice Environmental Management in the Mining Industry Series;
- Enduring Value (Mineral Council of Australia 2015); and
- State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP).

1.3 Land Ownership and Land Use

Land Ownership

Land ownership within and surrounding Tarrawonga is shown in **Figure 3**, **Figure 4** and **Figure 5**. All freehold land within ML 1579 and ML 1693 is owned by Whitehaven and subsidiaries of Idemitsu (Boggabri Coal Mine). ML 1685 and ML 1749 include the Leard State Forest.

The schedule of Lands attached to PA 11_0047 is reproduced in **Appendix A**.

The Tarrawonga Coal Project covers an area of approximately 1,231 hectares (ha) within the Parish of Leard, County of Nandewar and Local Government Area of Narrabri (see Figure 1). Tarrawonga comprises a number of land parcels, including land owned by the Crown (including part of the Leard State Forest under the care and control of Forestry Corporation of NSW), Narrabri Shire Council, Whitehaven Coal Mining and Boggabri Coal. The entire area of ML 1685 is under compensation agreement with Forestry Corporation of NSW, which was executed March 2014.

Historic and Current Land Use

Tarrawonga is located in an area that is removed from any urban areas and has a relatively low density of surrounding residences. Surrounding land uses include mining (Boggabri and the Maules Creek Coal Project), commercial forestry and biodiversity conservation (within Leard State Forest), and traditional agriculture (cropping and grazing) on privately held freehold land. Tarrawonga operates within the requirement of a Forestry Permit for activities undertaken within lands owned by the Forestry Corporation of NSW.

Future Land Use

The approved final landform will provide for a combination of approximately 568 ha (MOD7) of woodland/forest and 257 ha of class 3 agricultural suitability land, including 160ha of land suitable for grazing. Revegetation of woodland/forest areas will include the planting of species characteristic of the local vegetation communities, including species from the Box-Gum Woodland endangered ecological community.

A final void will be retained in the final landform. The final void size and depth and drainage catchment will be minimised as far as is reasonable and feasible. The highwall on the eastern and northern sides of the final void would be benched with a slope of approximately 48 degrees. The overall slope of the western and southern sides of the final void would be 10 degrees to 15 degrees. The catchment area of the final void is expected to be approximately 123 ha. The final void would form a permanent waterbody and would reach an equilibrium level of approximately 255 to 261 m AHD (approximately 19 to 25 m below the spill level).

Measures to enhance biodiversity outcomes and manage offset areas will be conducted in accordance with the Tarrawonga Biodiversity Management Plan (BMP).

Detailed mine closure planning will identify infrastructure that is to be decommissioned and removed as well as infrastructure that will be retained to support the final land use (such as dams).

The post mining land use has been determined through consultation and agreement with landowners and relevant stakeholders. Ongoing consultation with stakeholders is detailed in **Section 4.2.**

1.3.1 Land Ownership and Land Use Figures

WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

FIGURE 3
LAND OWNERSHIP

Lot 56 DP754940
Lot 30 DP754940
Lot 30 DP754940
Lot 38 DP754940
Lot 38 DP1211027
Lot 86 DP754953
Lot 87 DP754953
Lot 86 DP754953
Lot 86 DP754953
Lot 88 DP754953
ML1749
ML1685
Lot 15 DP1200767
Lot 161 DP1255904
EL7435
Lot 279 DP1196626
Lot 241 DP1219864
Lot 242 DP1219864
Lot 19 DP1200767
Lot 88 DP754953
Lot 242 DP1219864
ML1693
EL5967
Lot 81 DP754953
Lot 162 DP1255904
Lot 31 DP754940
Lot 16 DP754940
Lot 10 DP754940
Lot 12 DP1182291
Lot 83 DP754953
Lot 80 DP754953
Lot 243 DP1219864
ML1755
ML1693
Lot 16 DP1182291
ML1579
Lot 29 DP754940
Lot 29 DP1192663
Lot 11 DP754940
Lot 39 DP754953
Lot 29 DP1192663
Lot 68 DP754953
Lot H DP100330
Lot 1 DP970060
Lot 9 DP1096302
Lot 67 DP754953
NARRABRI
Lot 15 DP754940
Lot 26 DP754940
Lot 1 DP1013660
NAMOI WATER CATCHMENT AREA
Lot 39 DP754953
Lot 106 DP754953
Lot 18 DP754953
Lot 68 DP754953
Lot 26 DP754940
ML1693
Lot 6 DP754940
Lot 32 DP754953
EL5967
Lot 33 DP754953
Lot 15 DP1182291
Lot 17 DP1182291
Lot 5 DP1131282
Lot A DP367991
Lot 113 DP754953
Lot 32 DP754953

Inset A
Scale: 1:15,000,000
SITE LOCATION
Darling
NEW SOUTH WALES
Sydney
Canberra
Murray
VICTORIA
ORANGE

LEGEND

- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- Property Boundaries
- Whitehaven Owned Land

Land Ownership

- Crown
- Freehold
- Local Government Authority
- NSW Government

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
NSW LPI Land Status Cadastre & Ownership

0 250 500 m

Coordinate System:	GDA2020
Scale:	1:20,000 at A3
Project Number:	630.30268
Date:	26-Jul-2022
Drawn by:	JG
Annual Reporting Period:	2021

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WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

FIGURE 4
LAND USE AND CONTOURS

LEGEND

- Current Landform Contour (5 mAHD)
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government
- Property Boundaries

Land Use

- 2.1.0 Grazing native vegetation
- 2.2.0 Production native forestry
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 5.4.0 Residential and farm infrastructure
- 5.8.0 Mining
- 6.2.0 Reservoir/dam

ML1749
ML1685
ML1693
ML1755
ML1579
EL7435
EL5967
NARRABRI
NAMOI WATER CATCHMENT AREA

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
ESRI Basemap world imagery 2022
NSW LPI Land Status Cadastre & Ownership
NSW DPE Landuse 2017

0 250 500 m

Coordinate System:	GDA2020
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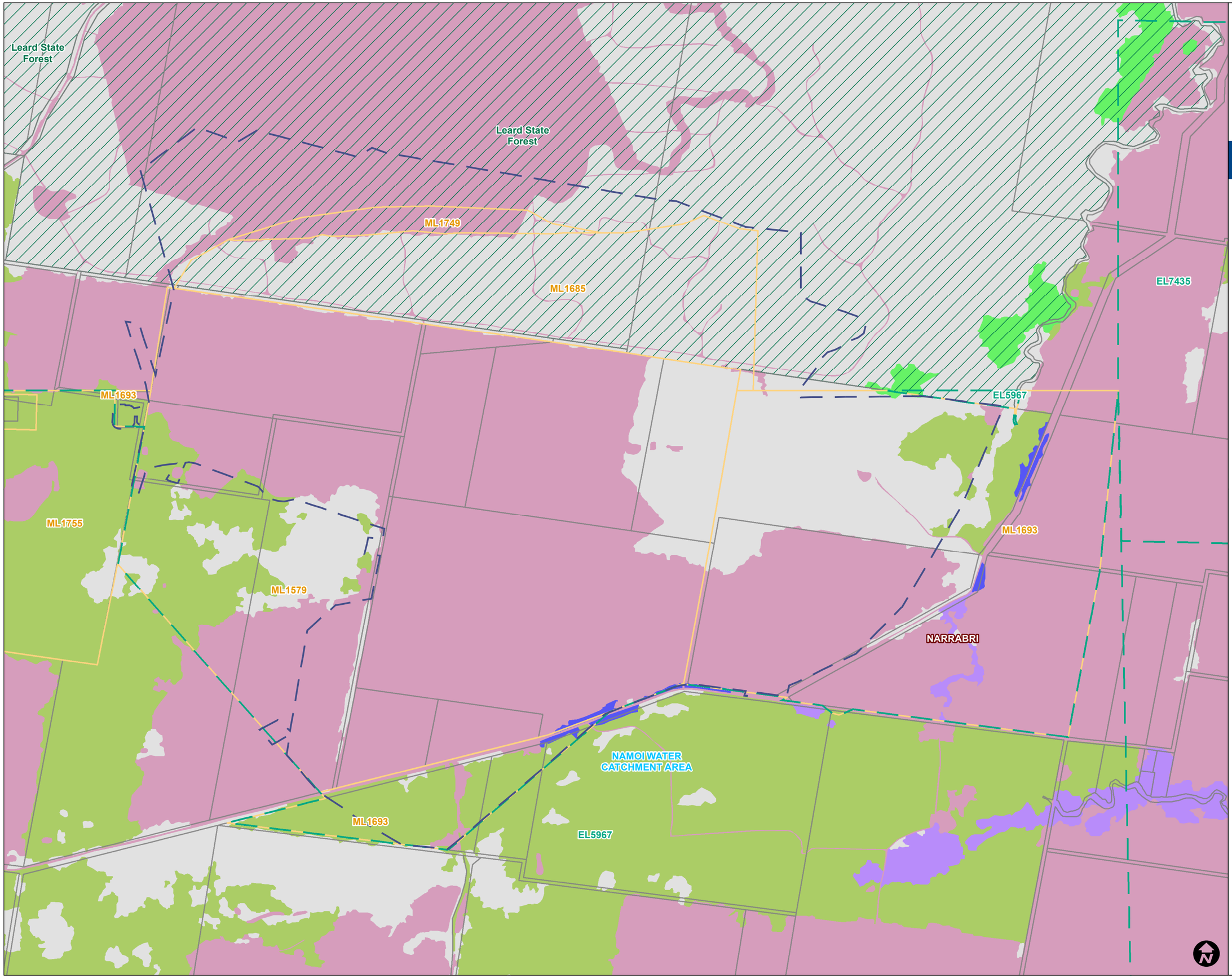
WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

FIGURE 5
VEGETATION COMMUNITIES



LEGEND

- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- Property Boundaries

Plant Community Type

- No Data
- 0 - Non-Native
- 1 - Candidate Native Grasslands
- 78 - River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
- 433 - White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion
- 434 - White Box grass shrub hill woodland on clay to loam soils on volcanic and sedimentary hills in the southern Brigalow Belt South Bioregion

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
NSW LPI Land Status Cadastre & Ownership
NSW Seed OEH Board Rivers Gwydir/Namoi regional native vegetation map v2 2015

0 250 500 m

Coordinate System:	GDA2020
Scale:	1:20,000 at A3
Project Number:	630.30268
Date:	26-Jul-2022
Drawn by:	JG
Annual Reporting Period:	2021

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\\au.slr.local\Corporate\Projects-SLR\630-SrvNTL\630-NTL\630.30268.00000 Whitehaven RMPs\06 SLR Data\01 GIS\Tarrawonga\Tarrawonga Figure 5 - Vegetation Communities.mxd

2 Final Land Use

2.1 Regulatory Requirements for Rehabilitation

The regulatory requirements specific to post mining land use, rehabilitation, and closure at Tarrawonga are summarised in Appendix **C**.

2.2 Final Land Use Options Assessment

This section is not applicable to the Tarrawonga RMP as the final land use is specified under Project Approval PA 11_0047 (refer to **Section 2.1**).

2.3 Final Land Use Statement

The final land use goal at Tarrawonga is to create a physically and chemically stable mine landform that is adequately drained and integrates with the adjoining hilly topography of the Willowtree Range and the southern extent of the Boggabri Coal Mine waste rock emplacement.

The rehabilitation of mining disturbed areas into the surrounding landscape will deliver final land uses that achieve biodiversity and agricultural outcomes. Rehabilitated landforms will also integrate with the adjoining Leard State Forest to enhance regional biodiversity and conservation outcomes. The final void will be designed and constructed to have minimal adverse impacts upon post-mining land use outcomes, and surface and groundwater resources.

A biodiversity offset is located at the Willeroi Offset Area (20 km to north-east of Tarrawonga), that comprises some 1,660 ha of existing vegetation, which will be enhanced, and additional vegetation established with the restoration of at least 193 ha of Box Gum Woodland EEC. In addition, a regional Biobank site has been established to meet requirements of the former DA-88-4-2005 MOD 1.

2.4 Final Land Use and Mining Domains

2.4.1 Final Land Use Domains

Final land use domains are defined as land management units characterised by similar final land use objectives. Each final land use domain will require specific rehabilitation methods.

The final land use domains for this Plan are presented in **Table 4** and shown on the Final Landform and Rehabilitation Plan (refer to **Figure 6**).

Table 4 Final Land Use Domains

Code	Final Land Use Domain	Description
A	Final Void	Tarrawonga has approval to retain a single void along the eastern perimeter of the open cut pit. The final void will include flood mitigation as required, and safety infrastructure.
B	Water Management Areas	Footprint of water management structures and dams retained in the final landform.
C	Agricultural - grazing	Backfilled areas of the open cut in-fill areas (approximately 285 m AHD) will be rehabilitated with selected topsoil resources suitable for managed livestock grazing. The mine facilities area and former stockpile areas would also be revegetated to an agricultural post-mining land use suitable for grazing.

D	Native Ecosystem	The elevated areas of the Northern Emplacement, Southern Emplacement and the open cut infill area to the east of the Northern Emplacement would be revegetated with native tree, shrub and grass species to achieve a native woodland/forest post-mining land use. This domain will include at least 13 ha commensurate with the White Box Yellow Box Blakeley's Red Gum Grassy Woodland and Derived Native Grassland EEC. Species selection and planting densities will vary to enhance integration with adjacent Leard State Forest and Boggabri waste emplacement area.

2.4.2 Mining Domains

Mining domains identify the footprint of areas disturbed for mining related activities. For the purpose of this Plan, mining domains have been defined as the set of discrete areas that have a particular operational or functional purpose, therefore having similar geophysical and geochemical characteristics that will have similar rehabilitation requirements.

Mining domains are presented in **Table 5**.

Table 5 Mining Domains

Code	Mining Domain	Description
1	Active Mining Area (Open cut void)	Footprint for the open cut mining pit(s).
3	Water Management Area	Network of dams, channels and associated water management infrastructure (pipelines and pumps etc.).
4	Infrastructure Area	Existing infrastructure and facilities, including administration areas, workshops, and coal handling and preparation facilities. This domain includes areas disturbed to stockpile topsoil and vegetation for reuse in rehabilitation.
5	Overburden Emplacement Area	Footprint of out of pit (Northern Emplacement and Southern Emplacement and environmental bunds) and in-pit waste rock dump areas. Reject from the Whitehaven CHPP is back hauled and co-disposed of within the Northern Emplacement and Southern Emplacement.

3 Rehabilitation Risk Assessment

Multiple risk assessments have been completed historically for the rehabilitation works associated with Tarrawonga. **Table 6** summarises the completed rehabilitation risk assessments.

Table 6 Summary of Risk Assessments

Date	Risk Assessment	Details
June 2015	MOP Risk Assessment	A risk assessment was undertaken during the preparation of the MOP to address risks to rehabilitation and closure at Tarrawonga.
2015	REA Risk Assessment	Review the environmental risks associated with the historic REA, including rehabilitation of the REA. An REA specific Trigger Action Response Plan was developed from the assessment.
2016	Risk Assessment for the proposed changes to receipt of reject	The objective of the risk assessment was to review PA 11_0047 MOD 2, in order to consider any risks associated with the proposed changes to receipt of reject.
2020	Gunnedah Open Cut Qualitative Risk Assessment	Determine the environmental aspects of the Gunnedah Open Cut Operations, rehabilitation and closure activities, products and services that it can control and those that it can influence and their associated environmental impacts.
2021	Gunnedah Open Cut Broad Brush Risk Assessment (BBRA)	BBRA reviewed material risks and controls.
2021	Gunnedah Open Cut Bowtie Risk Assessment	Bowtie reviewed material risks and controls.
2022	Rehabilitation Risk Assessment	Rehabilitation Risk Assessment is required to be undertaken as part of the Rehabilitation Reform process underway to develop a Rehabilitation Management Plan for Tarrawonga, Moderated by SLR 24/02/222

Conditions of a mining lease granted under the *Mining Act 1992* require the lease holder to conduct a rehabilitation risk assessment and implement measures to eliminate, minimise or mitigate the risks in accordance with the Resources Regulator's *Guideline: Rehabilitation risk assessment.*

A risk assessment workshop was undertaken on 24 February 2022. The workshop was used to identify the key issues that presented a risk to achieving satisfactory rehabilitation at Tarrawonga.

The risk assessment included key Whitehaven and SLR personnel and was undertaken in accordance with AS/NZS ISO 31000:2018 Risk Management – Guidelines and the Risk Management Handbook for the Mining Industry (MDG1010). Whitehaven's Risk Matrix was used to calculate the consequence and likelihood of an event and to evaluate the subsequent risk level (risk rank).

The risk assessment has been used to inform the preparation of this Plan. The objectives of the risk assessment were to:

- Identify the risks associated with rehabilitation and closure of Tarrawonga to achieve the approved post mining land uses;
- Identify knowledge gaps in Whitehaven's current understanding of the risks to rehabilitation;
- Identify the investigations/controls/action plans necessary to effectively mitigate risks and/or realise opportunities and to close any identified knowledge gaps;
- Inform the development of this RMP, to provide a basis to determine additional investigations and/or project works to be undertaken; and
- Provide the framework to satisfy relevant internal and government guidelines, requiring implementation of a risk-based approach to closure.

The risk workshop assessed a total of 59 key rehabilitation risks, which are summarised as:

- 13 risks were ranked as not applicable;
- 22 risks were ranked as low;
- 21 risks were ranked as moderate;
- 0 risks were ranked as significant;
- 3 risks were ranked as high; and
- 0 risks were ranked as extreme.

Rehabilitation risks, controls and proposed controls will regularly be reviewed and revised (as required)

Specific Risks relating to Rehabilitation

The key risks (including significant, high and extreme risks) to successful rehabilitation and associated risk controls identified within the February 2022 workshop have been summarised in **Table 7**. The outcomes of the risk assessment workshop have been used to inform the preparation of this Plan.

Table 7 Key Rehabilitation Risks and Identified Controls

Risk Rating	Key Risk	Key Controls	Sections Addressed
High	Biological resource salvage and maintenance (e.g., subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) through clearing, salvage and handling practices.	Short term planning process	Section 7
		Annual Rehabilitation Plan.	Section 8.3.3.
		Topsoil/subsoil mass balance.	Section 6.3.1
		Land Disturbance Process (LDP).	Section 6.3.1
		Topsoil and subsoil quality analysis.	Section 6.3.1
High	Inability to reach agreement with Boggabri regarding shared boundary landform as per project approval.	Boggabri, Tarrawonga and Maules Creek Complex Meetings as per strategy.	Section 4.4.3
High	Limited pre-existing biological resources for salvage (e.g., topsoil, weeds).	Short term planning process.	Section 7
		Annual Rehabilitation Plan.	Section 8.3.3.
		Topsoil/subsoil mass balance.	Section 6.3.1
		LDP.	Section 6.3.1
		Topsoil and subsoil quality analysis.	Section 6.3.1

Further Studies / Action Plan

A number of proposed controls and further studies were identified during the risk assessment workshop. **Table 8** presents an action plan for implementation of the additional risk controls (including significant, high and extreme risks).

Table 8 Further Studies / Action Plan

Risk Rating	Risk	Proposed Control / Study	Timeframe
High	Biological resource salvage and maintenance (e.g., subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) through clearing, salvage and handling practices.	Complete planned topsoil audit.	Ongoing - Annual
		Develop a Topsoil Stripping Procedure.	Developed in 2022, to be Finalised 2024
		Implement a Soil Management Protocol (to include Disturbance Permit).	Implemented in LDP in 2023
		Update material inventory and balance based on soil testing results.	Ongoing - Annual
		Complete overburden waste characterisation.	Completed Annually
High	Inability to reach agreement with Boggabri regarding shared boundary landform as per project approval.	To identify persons responsible for consultation with Boggabri regarding final landform.	Complete
		Include final landform in agenda for Boggabri, Tarrawonga and Maules Creek Complex Meetings.	Commenced – Raised in August 24 BTM Monthly Meeting
		Confirm that the details regarding final landform are included in the Boggabri, Tarrawonga and Maules Creek Strategy.	TBC
High	Limited pre-existing biological resources for salvage (e.g., topsoil, weeds).	Complete planned topsoil audit	2022
		Implement a Soil Management Protocol (to include Disturbance Permit).	2023
		Update material inventory and balance based on soil testing results.	2022
		Complete overburden waste characterisation.	2023

4 Rehabilitation Objectives and Rehabilitation Completion Criteria

In accordance with Schedule 3 Conditions 61 of PA 11_0047 (as modified) Tarrawonga will:

a. Rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the development under the Mining Act 1992;

b. Rehabilitate the site generally consistent with and the Rehabilitation Strategy presented in the EA; and

Rehabilitation will be completed, consistent with the rehabilitation objectives in **Table 9**.

Table 9 Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	▪ Safe, stable and non-polluting ▪ Constructed landforms drain to the natural environment ▪ Landforms fully integrated with the final landform for the Boggabri coal mine as per the EA
Final void	▪ Minimise the size and depth of the final void as far as is reasonable and feasible ▪ Minimise the drainage catchment of the final void as far as is reasonable and feasible ▪ Negligible high wall instability risk ▪ Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood level
Surface infrastructure	▪ To be decommissioned and removed, unless the Resources Regulator agrees otherwise
Agricultural land	▪ Establish a minimum of 257 hectares of Class 3 agricultural suitability land, including 160hectares suitable for grazing
All land – excluding the 257 ha of agricultural land and the final void	▪ Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: ○ local native plant species (particularly Box Gum Woodland EEC); and ○ a landform consistent with the surrounding environment
Goonbri Creek and Upper Namoi Alluvium	▪ (From PA11_0047 labelled as Table 8 in Notice of Amendment) ▪ Upper Namoi alluvial aquifer ○ No direct disturbance to the alluvial aquifer, or mining operations (excluding flood bund construction) within 10 metres of the aquifer ○ No more than negligible environmental consequences to the alluvial aquifer, including: ▪ negligible change in groundwater levels; ▪ negligible leakage to the mining pit and workings; ▪ negligible change in groundwater quality; ▪ negligible stability and erosion risks; and ▪ negligible impact to other groundwater users. ▪ Goonbri Creek

	○ Hydraulically and geomorphologically stable ○ Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity), Riparian vegetation, habitat, energy management and dissipation, bedload transport, biophysical maintenance and pool holding capacity that is the same or better than existed prior to mining ○ Flood bund (if required, see condition 37 of PA11_0047) ▪ Hydraulically and geomorphologically stable ▪ Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity) ▪ Provides suitable protection for flood events up to and including the Probable Maximum Flood.
Community	▪ Ensure public safety ▪ Minimise the adverse socio-economic effects associated with mine closure

4.1 Rehabilitation Objectives and Rehabilitation Completion Criteria

Rehabilitation Objectives

In order to achieve the broad rehabilitation objectives presented in PA 11_0047, Whitehaven have developed specific domain rehabilitation objectives.

The key rehabilitation objectives for each of the domains are defined in **Table 10**.

Table 10 Rehabilitation Domain Objectives

Mining Domain	Final Land Use Domain	Description
1. Infrastructure Area	Agricultural – Grazing (Rural Land Capability Class III) (B)	• Mining infrastructure will be removed progressively, and the area rehabilitated, when no longer required. • All land contamination will be identified and appropriately remediated. • Topsoil stockpiles will be stabilised with sterile cover crops to minimise weed infestation and retain soil biological health. • Topsoil stockpiles will be constructed and managed to optimise physical, chemical and biological characteristics. • Topsoil stockpile areas will be rehabilitated progressively when no longer required.
3. Water Management Area	Water Storage (G)	• Clean water will be diverted around operational areas prior to disturbance, where practical. • Mine water and sediment laden (dirty) water runoff from disturbance areas will • be captured and diverted to mine water and dirty water dams. • Mine water and dirty water will be preferentially used for operational requirements such as dust suppression and earthworks. • Dirty water will be treated before discharge from site in accordance with regulatory requirements (where required).

		• No mine water will be discharged from site. • Water management structures will be designed and constructed prior to disturbance, in accordance with Best Practice and “the Blue Book”. • Sediment dams and associated water management structures will remain in place until the catchment is rehabilitated and discharge water quality is similar to comparable undisturbed landforms.
4. Overburden Emplacement Area	Native ecosystem (Rehabilitation areas – Woodland) (A) Agricultural – Grazing (Rural Land Capability Class III) (B)	• Final landform will be safe, stable and adequately drained. • Final landforms will be designed to integrate with the surrounding landscape. • The Northern Emplacement will be progressively constructed to a maximum height of 370 m AHD to integrate with the southern extent of the Boggabri waste rock emplacement. Localised areas of the Northern Emplacement will be constructed up to approximately 376 m AHD to introduce micro-relief. • The Southern Emplacement will be progressively constructed to a maximum height of approximately 370 m AHD. • Outer batter slopes for the Northern and Southern Emplacements will be predominantly constructed at 10 degrees or shallower. • Any potentially acid forming (PAF) material will be covered with at least 15 m of non-acid forming material (NAF). • Final outer surfaces of overburden emplacements will be constructed with non-sodic or low sodicity and/or will be treated with gypsum. • Dump sequencing will be optimised to facilitate progressive shaping and rehabilitation.
5. Active Mining Area (Open cut void)	Native ecosystem (Rehabilitation areas – Woodland) (A) Final void (J)	• Rehabilitation resources including vegetation, topsoil and habitat resources will be identified for salvage ahead of mining. • Vegetation and topsoil will be progressively stripped ahead of mining to minimise the total area of disturbance and the potential period of soil storage. • Mined areas will be progressively backfilled and rehabilitated where possible.

Rehabilitation Completion Criteria

Completion criteria are objective target levels or values assigned to a variety of indicators (e.g., slope, species diversity, percent groundcover), which can be measured to demonstrate progress and ultimate success of rehabilitation. As such, they provide a defined end point, at which point in time rehabilitation can be deemed successful and the lease relinquishment process can proceed. The **draft** rehabilitation completion criteria for all areas Tarrawonga are listed **Table 11**, **Table 12** and **Table 13.**

Closure criteria have been informed by the following information:

- Relevant conditions of PA 11_0047;
- The Department of Regional NSW – Mining, Exploration & Geosciences (DRNSW – MEG) rehabilitation guideline documents including:
    - Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines;
    - Guideline: Rehabilitation objectives and rehabilitation completion criteria;
- Completion criteria from the previously approved MOP;
- Similar rehabilitation projects; and
- Specific information collected to date during detailed planning investigations.

It is noted that the rehabilitation completion criteria for Tarrawonga will remain in Draft until approved by the RR.

Table 11 Draft Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Rehabilitation Objective	Indicator *(specific attribute associated with the objective)*	Rehabilitation Completion Criteria *(benchmark for the indicator, based on analogue data where appropriate)*	Validation Method *(evidence that the benchmark has been achieved)*
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**Ecological rehabilitation** The **vegetation composition** of the rehabilitation is recognisable as the target vegetation community ((Narrowleaved Ironbark - cypress pine - White Box shrubby open forest (BVT 316 and PCT 592) contained within the BioNet Vegetation Classification.)	Native plant species recorded from monitoring plots are characteristic of the target vegetation community (e.g., target PCT)	Rehabilitation monitoring verifies that native ecosystem indicators have achieved the completion criteria targets listed in **Table 13**.	Before and after photos, rehabilitation monitoring reports, independent ecological reports that validate rehabilitation completion criteria have been met.
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**Ecological rehabilitation** The **vegetation structure** of the rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community ((Narrowleaved Ironbark - cypress pine - White Box shrubby open forest (BVT 316 and PCT 592) contained within the BioNet Vegetation Classification.)	Cover and abundance of plant growth forms recorded from monitoring plots are characteristic of the target vegetation community (e.g., PCT), or an ongoing trend toward becoming characteristic is evident from the monitoring data	Rehabilitation monitoring verifies that native ecosystem indicators have achieved the completion criteria targets listed in **Table 13**.	Before and after photos, rehabilitation monitoring reports, independent ecological reports that validate rehabilitation completion criteria have been met.
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**Ecological rehabilitation** Levels of **ecosystem function** have been established that demonstrate the rehabilitation is self-sustainable.	Indicators of nutrient cycling are suitable for sustaining the target vegetation community (e.g., PCT(s))	▪ Rehabilitation monitoring verifies that native ecosystem indicators have achieved the completion criteria targets listed in **Table 13**. ▪ Established species survive and/or regenerate after disturbance. ▪ Species are capable of setting viable seed, flowering or otherwise reproducing.	Rehabilitation monitoring reports, which demonstrate long-term function of rehabilitated landform
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**Landform stability** The final landform is stable for the long-term and does not present a risk of environmental harm downstream / downslope of the site or a safety risk to the public/stock/native fauna.	Visual/ measured/ modelled evidence of erosion/ landform stability.	Survey or remote sensing of the rehabilitated landforms shows an absence of erosion that could compromise stability. Any erosion is minimal with no ongoing management works.	Survey or remote sensing monitoring, visual inspection records, photograph series from photo points, Specialist consultant assessment reports.
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)				
Water storage (G)	Water management area (3)				
Final void (J)	Active mining area (open cut void) (5)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**Landform stability** Landform that is commensurate with surrounding natural landform and where	Minimal active erosion	There are no gully or tunnel erosion features and there is an absence of rilling (> 300 mm deep).	Survey or remote sensing monitoring, visual inspection records, photograph series from photo points, Specialist consultant assessment reports.

Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)	appropriate, incorporates geomorphic design principles.			
Water storage (G)	Water management area (3)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Surface Water</u>** Runoff water quality from mine site meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	Water quality parameters selected from Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 and or Environment Protection Licence	Runoff water quality from rehabilitation areas represents an acceptable level of change from a defined reference condition (refer to Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000). Water quality in retained dams and/or voids is suitable for the final land use.	Water quality sampling and analyses as per the approved *Water Management Plan*
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)				
Water storage (G)	Water management area (3)				
Final void (J)	Active mining area (open cut void) (5)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Removal of Infrastructure</u>** All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials	No external services connected to site (generator and mobile communication tower used)	NA	NA
			Demolition and removal of all surface infrastructure that is not required for the final land use.	Infrastructure removed.	Statement provided Demolition records As-constructed final landform
			Removal of all concrete footings, foundations and pavements	All concrete footings, foundations and pavements have been removed	Demolition records Surveyed verification and marked on the as-constructed final landform plan. Disposal records/waste receipt
			Surveying and sealing of all drill holes and exploration boreholes in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement that verify complete to departmental guidelines and relevant standards.
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)	**<u>Removal of Infrastructure</u>** All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials	No external services connected to site (generator and mobile communication tower used)	NA	NA
			Demolition and removal of all surface infrastructure that is not required for the final land use.	Infrastructure removed.	Statement provided Demolition records As-constructed final landform
			Removal of all concrete footings, foundations and pavements	All concrete footings, foundations and pavements have been removed	Demolition records

					Surveyed verification and marked on the as-constructed final landform plan. Disposal records/waste receipt
			Surveying and sealing of all drill holes and exploration boreholes in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement that verify complete to departmental guidelines and relevant standards.
Water storage (G)	Water management area (3)	**<u>Removal of Infrastructure</u>** All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials	No external services connected to site (generator and mobile communication tower used)	NA	NA
			Demolition and removal of all surface infrastructure that is not required for the final land use.	Infrastructure removed.	Statement provided Demolition records As-constructed final landform
			Removal of all concrete footings, foundations and pavements	All concrete footings, foundations and pavements have been removed	Demolition records Surveyed verification and marked on the as-constructed final landform plan. Disposal records/waste receipt
			Surveying and sealing of all drill holes and exploration boreholes in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement that verify complete to departmental guidelines and relevant standards.
Final void (J)	Active mining area (open cut void) (5)	**<u>Removal of Infrastructure</u>** All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials	No external services connected to site (generator and mobile communication tower used)	NA	NA
			Demolition and removal of all surface infrastructure that is not required for the final land use.	Infrastructure removed.	Statement provided Demolition records As-constructed final landform
			Removal of all concrete footings, foundations and pavements	All concrete footings, foundations and pavements have been removed	Demolition records Surveyed verification and marked on the as-constructed final landform plan. Disposal records/waste receipt
			Surveying and sealing of all drill holes and exploration boreholes in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement that verify complete to departmental guidelines and relevant standards.
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Land contamination</u>** There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Waste material and/or visible contamination areas on site surface.	There are no visible signs of contamination following the removal of plant, equipment and materials. Any contamination has been appropriately remediated in	Contamination reports. Written statement. Photographic records
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement				

	area (4)			accordance with legislative requirements for the intended final land use. Retained dams are decontaminated in accordance with regulatory requirements. Surface layer is free of any hazardous materials	Waste facility receipts.
Water storage (G)	Water management area (3)				
Final void (J)	Active mining area (open cut void) (5)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Bushfire</u>** The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Appropriate bushfire hazard controls (where required) have been implemented on the advice from the NSW Rural Fire Service.	Bushfire controls implemented similar to surrounding land management on similar vegetation communities	Rehabilitation monitoring reports. site aerial image
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)				
Water storage (G)	Water management area (3)				
Final void (J)	Active mining area (open cut void) (5)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Groundwater</u>** Groundwater quality meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	Water quality parameters selected from Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000	Water quality generally consistent with ANZECC guidelines for specific environment. Independent hydrological assessment report.	Independent hydrological assessment report
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)				
Water storage (G)	Water management area (3)				
Final void (J)	Active mining area (open cut void) (5)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Groundwater</u>** Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and flows	If there were any impacts to groundwater levels, groundwater flow these would be generally consistent with development consent(s) (including associated Management Plans).	Independent hydrological assessment report.
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)				
Water storage (G)	Water management area (3)				

Final void (J)	Active mining area (open cut void) (5)				
Native ecosystem (A)	Overburden emplacement area (4) Active mining area (open cut void) (5)	**<u>Management of waste and process materials</u>** Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained / encapsulated so it does not pose any hazards or constraints for intended final land use.	Quality assurance records for the location of rejects and depth of capping material. Records of contamination.	▪ There are no visible signs of contamination following the removal of plant, equipment and materials. ▪ All rubbish/ waste materials have been removed from site. ▪ Any carbonaceous material has been removed from the footprint of the infrastructure areas and disposed of in the void, with at least 3m cover.	▪ Statement provided and before/after photos. ▪ Waste disposal records ▪ Photographs, Rehabilitation monitoring reports, as-constructed surveys, quality assurance records Test pit records
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)				
Water storage (G)	Water management area (3)				
Final void (J)	Active mining area (open cut void) (5)				
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)	**<u>Agricultural revegetation</u>** Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Vegetation health, Species composition and regeneration	▪ Rehabilitation monitoring verifies that species in pasture rehabilitation areas comprise a mixture of grasses representative of pasture vegetation. ▪ Rehabilitation monitoring verifies that vegetation health is comparable to reference sites (within 20%). ▪ Rehabilitation monitoring verifies that species in pasture rehabilitation areas comprise a mixture of grasses representative of pasture vegetation. ▪ Established species survive and/or regenerate after disturbance ▪ Species are capable of setting viable seed, flowering or otherwise reproducing.	Vegetation health, Species composition and regeneration
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)	**<u>Agricultural revegetation</u>** Land use capability is capable of supporting the target agricultural land use 257ha of Class 3 agricultural suitability land.	Native plant species recorded from monitoring plots are characteristic of pasture species suitable for grazing.	▪ Rehabilitation monitoring verifies that species in pasture rehabilitation areas comprise a mixture of grasses representative of pasture vegetation. ▪ Pasture areas are assessed to have a Rural Land Class VI or better (capable of sustaining grazing), consistent with the final landform	Rehabilitation monitoring records. Agricultural/Grazing/Economic assessments

				▪ Area of land rehabilitated to pasture is commensurate with the Project Approval and RMP	
Agricultural – grazing (B)	Infrastructure area (1) Overburden emplacement area (4)	**<u>Agricultural revegetation</u>** Land use capability is capable of supporting the target agricultural land use 160ha suitable for grazing.	Native plant species recorded from monitoring plots are characteristic of pasture species suitable for grazing.	▪ Rehabilitation monitoring verifies that species in pasture rehabilitation areas comprise a mixture of grasses representative of pasture vegetation. ▪ Pasture areas are assessed to have a Rural Land Class VI or better (capable of sustaining grazing), consistent with the final landform ▪ Area of land rehabilitated to pasture is commensurate with the Project Approval and RMP	Rehabilitation monitoring records. Agricultural/Grazing/Economic assessments
Water storage (G)	Water management area (3)	**<u>Water approvals</u>** Structures that take or divert water such as final voids, dams, levees etc. are appropriately licensed (e.g. under the Water Management Act 2000) and where required ensure sufficient licence shares are held in the water source(s) to account for water take.	Final landform considers advice from relevant Government Agency whether sufficient licence shares are available in the water source to account for water stored in voids and dams in the proposed final landform.	Water approvals / licences are granted by relevant NSW Government Agency.	Confirmation from relevant Government Agency that relevant water approvals / licences can be granted.
Final void (J)	Active mining area (open cut void) (5)				

Table 12 Rehabilitation Completion Criteria for Tarrawonga - Phase – Ecosystem and land use Establishment

Phase – Ecosystem and land use Establishment (Rehabilitation areas Woodland)*		**Methodology**	**Benchmark**	**Initial establishment monitoring (12 to 18 months)**	**2 to 5 years**	**5 to 10 years**	**Justification Validation Method** ***(evidence that the benchmark has been achieved)***	**Comment**
Woodland rehabilitation revegetation for White Box grassy woodland (BVT 226 and PCT 1383) and **Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest (BVT 316 and PCT 592)**	Native Species Richness	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	At least 19 individuals per 20x20 plots	At least 24 individuals per 20x20 plots	At least 24 individuals per 20x20 plots	Rehabilitation monitoring records.	Targets are set to allow for ecosystem and land use establishment phase to be achieved within 10 years of initial seeding
	Abundance of Species that will Contribute to Native Overstorey Cover	Measured following the BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	At least 8 individuals per 20x20 plots	At least 8 individuals per 20x20 plots	At least 8 individuals >2m per 20x20 plots	Rehabilitation monitoring records.	
	Abundance of Species that will contribute to Native Mid-storey Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	At least 2 species present per 20x20 plots	At least 2 species present per 20x20 plots	At least 2 species present per 20x20 plots	Rehabilitation monitoring records.	

Phase – Ecosystem and land use Establishment (Rehabilitation areas Woodland)*		Methodology	Benchmark	Initial establishment monitoring (12 to 18 months)	2 to 5 years	5 to 10 years	Justification Validation Method *(evidence that the benchmark has been achieved)*	Comment
	Native Groundcover (Grasses)	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	20%	20%	20%	Rehabilitation monitoring records.	
	Vegetation Surface Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	60%	60%*	60%	Rehabilitation monitoring records.	
*** Minimum targets set based on analogue data with reference to Sunnyside completion criteria.**								

Table 13 Rehabilitation Completion Criteria for Tarrawonga - Phase – Ecosystem and land use Development

Phase – Ecosystem and land use Development		Methodology	Benchmark	BVT NA 592	Local Reference (Analogue) (80%)	Justification Validation Method *(evidence that the benchmark has been achieved).*
Woodland rehabilitation revegetation for White Box grassy woodland (BVT 226 and PCT 1383) and Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest (BVT 316 and PCT 592)	Native Species Richness	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	24	38*	Rehabilitation monitoring records.
			Minimum Target	19	33*	Rehabilitation monitoring records.
	Native Overstorey Cover	Measured following the BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	40%	19%*	Rehabilitation monitoring records.
			Minimum Target	25%	10%*	Rehabilitation monitoring records.
	Native Mid-storey Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	25%	35.7%*	Rehabilitation monitoring records.
			Minimum Target	6%	11.7 %*	Rehabilitation monitoring records.
	Native Groundcover (Grasses)	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	30%	37.9 %*	Rehabilitation monitoring records.
			Minimum Target	20%	8.3% *	Rehabilitation monitoring records.
	Vegetation Surface Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Target	>85%	>60%*	Rehabilitation monitoring records.
*** Local analogue data based on one monitoring event (2021).**						

4.2 Rehabilitation Objectives and Rehabilitation Completion Criteria – Stakeholder Consultation

Stakeholder Engagement Plan

TCPL has prepared a Stakeholder Engagement Plan (SEP) to facilitate stakeholder consultation for Tarrawonga's rehabilitation objectives and completion criteria. This document details Tarrawonga's stakeholders and the strategies used to communicate with them and provide the foundation for working with stakeholders prior to and during the closure process. The SEP will be regularly revised to reflect the outcomes of technical investigations, the ongoing development and execution of this RMP and the outcomes of ongoing engagement.

Since the commencement of rehabilitation and closure planning for Tarrawonga, Whitehaven has consulted with regulatory authorities including RR as well as relevant landholders as summarised in **Table 14**.

Relevant Statutory Authorities

Whitehaven has consulted with and will continue to consult with the following regulatory bodies in relation to the Tarrawonga operations and rehabilitation:

- Department of Agriculture, Fisheries and Forestry (DAFF);
- Department of Climate Change, Energy, the Environment and Water (DCCEEW)
- Department of Planning, Housing and Infrastructure (DPHI);
- Department of Primary Industries and Regional Development;
- Biodiversity Conservation Trust
- Department of Industry, Science and Resource;
- Transport for New South Wales;
- NSW Resource Regulator
- North West Local Land Services;
- Forestry Corporation of NSW; and
- Narrabri and Gunnedah Shire Councils.

Other Key Stakeholders

Tarrawonga has consulted with and will continue to consult with a number of community groups and landholders in relation to the Tarrawonga operations and rehabilitation, including:

- Association of Mining Related Council;
- Namoi Catchment Water Study;
- Essential Energy;
- Aboriginal stakeholder groups;
- Local community and affected landowners;
- Leard State Forest Environmental Group
- Community groups; and
- Staff, contractors and unions.

Community Consultative Committee

A Community Consultative Committee (CCC) operates in accordance with Condition 7 of PA11_0047 with an Independent Chairperson nominated to facilitate the meetings. The Committee meets quarterly and consists of local Boggabri and Gunnedah community members and Tarrawonga employees.

Rehabilitation is also discussed at the BTM CCC (Combined CCC for Tarrawonga, Boggabri and Maules Creek mines).

Summary of Stakeholder Engagement Completed to Date

Whitehaven routinely engages with stakeholders regarding rehabilitation and mine closure.

The Mine Site Rehabilitation Plan (2020) and previous MOPs, including the most recent (Mining Operations Plan Tarrawonga Coal Mine 1 November 2015 – 1 November 2022 (Amendment F) included engagement with the local communities and stakeholder groups regarding final land use options and rehabilitation expectations.

Key issues associated with final land use and rehabilitation addressed in the Tarrawonga Coal Project EA consultation process included:

- Design criteria for the proposed low permeability barrier and permanent Goonbri Creek alignment (no longer required as approved under MOD 7), including geomorphic integrity of the constructed alignment, rehabilitation of riparian vegetation communities and long-term impacts to ground water recharge and surface water flows to downstream users;
- Requirement for the Project to be conditioned to produce a final void and mine closure plan that addresses long term impacts of the proposed final void on groundwater resources;
- Agricultural Resource Assessment methodologies to identify suitable soil resources for woodland and agricultural post mining land uses, and reinstate agricultural cropping land with no net loss of Class 3 agricultural land;
- Landform design including emplacement heights and slopes, and final void design to minimise ground water impacts; and

All issues raised in the consultation process for the Project EA were comprehensively addressed in the approval process and are reflected in the commitments in the Project EA Statement of Commitments and PA 11_0047 MOD 1 conditions.

Table 14 presents a high-level summary of the additional key consultation undertaken for the project to date.

Table 14 Consultation Summary to Date

Stakeholder	Date	Issues Raised
RR	5 Sept 2019	PGM contacted the RR in April 2019 regarding the MOP and MOP Plans. The RR provided a response in May 2019, and this feedback has been considered in preparing both the MOP document and MOP Plans. Comments from the RR were received on 5 Sept 2019, in regard to the submitted MOP document (this document). A cross referencing table was included with the resubmission email/letter, outlining where these queries have been addressed.
RR	19 June 2020	Whitehaven consulted with RR on the appropriate format for addressing the aspects in the row above and determined the requirement for a MOP Amendment.

Proposed Future Consultation

Consultation will continue with stakeholders during the life of mine, in accordance with the SEP. **Table 15** presents a summary of the proposed future consultation activities key stakeholders.

Table 15 Summary of proposed future stakeholder engagement activities

Stakeholder	Activities
RR	Ongoing revisions of the RMP (Condition 64,Schedule 3 of PA11_0047) Submission of the Annual Review and Annual Rehabilitation Report

	Detailed Mine Closure Planning
DPHI	Annual Reviews Ongoing revisions of the RMP (Condition 64,Schedule 3 of PA11_0047) Submission of the Annual Review and Annual Rehabilitation Report Detailed Mine Closure Planning
CCC	Annual Reviews Ongoing revisions of the RMP (Condition 64,Schedule 3 of PA11_0047) Quarterly CCC Meetings Detailed Mine Closure Planning
Agencies	Annual Reviews Ongoing revisions of the RMP (Condition 64,Schedule 3 of PA11_0047) Submission of the Annual Review and Annual Rehabilitation Report Detailed Mine Closure Planning
Stakeholder and Community Interest Groups	Ongoing revisions of the RMP Detailed Mine Closure Planning
BTM Complex	BTM Complex Meetings
Registered Aboriginal Parties	Detailed Mine Closure Planning

As part of the above-mentioned consultation, Tarrawonga will seek feedback on actions which would minimise impacts associated with the Final Void and Mine Closure Plan. Implementation of reasonable and feasible measures will be detailed within the Final Void and (refer to **Section 6.3.3**).

5 Final Landform and Rehabilitation Plan

5.1 Final Landform and Rehabilitation Plan

In accordance with the requirements of the *Form and Way: Rehabilitation Management Plan for Large Mines* (RR, 2021a) a *Final Landform and Rehabilitation Plan* has been prepared to show the proposed final land use and final landform for Tarrawonga (refer **Figure 6** - Final Landform and Rehabilitation Plan and **Figure 7).**

WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

FLRP PLAN 1: FINAL LANDFORM FEATURES

TCA21437
TCR21417
TCR21457
TCR21427
TCR21407
TCR21397
TCR21467
TCR21477
TCR21367
TCR21487
TCR21387
TCR21377
TCR21357
TCR21347
TCR21337
TCR21497
TCR21507
TCR21317
TCR21327
TCR21307
TCR21517

LEGEND

- Rehabilitation Monitoring Sites
- Project Approval Boundary

Final Landform Feature

- Conceptual High-Wall Safety Bund
- Drop Structures
- Existing Drop Structures
- Existing Rehabilitation Contour Banks
- Existing Water Storage
- Proposed Flood Bund
- Proposed Sediment Dam
- Proposed Water Storage
- Swale Drainage Paths
- Final Void

Final Landuse Domain

- Agricultural – Grazing
- Final Void
- Native Ecosystem
- Water Management Areas

0 250 500 Metres

Coordinate System:	GDA2020
Scale:	1:20,000 at A3
Project Number:	630.30268
Date:	27-Jul-2022
Drawn by:	LC

WHITEHAVEN COAL

UAV Image Date: 06th September 2021

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WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

FLRP PLAN 2: FINAL LANDFORM CONTOURS

LEGEND

- Final Landform Contour (2 mAHD)
- Project Approval Boundary

0 250 500 Metres

Coordinate System:	GDA2020
Scale:	1:20,000 at A3
Project Number:	630.30268
Date:	26-Jul-2022
Drawn by:	LC

WHITEHAVEN COAL

UAV Image Date: 06th September 2021

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6 Rehabilitation Implementation

6.1 Life of Mine Rehabilitation Schedule

Whitehaven will adopt a progressive approach to the rehabilitation of disturbed areas within the Project Site to ensure that, remaining mining disturbance areas are promptly shaped, top-dressed and vegetated to provide a stable landform.

The life of mine rehabilitation schedule associated with rehabilitation activities has been presented in **Figure 8** and **Figure 9**. The figures illustrates the projected rehabilitation status at approximately five-yearly intervals until the completion of decommissioning activities and achievement of the final land use.

Infrastructure

Further construction activities planned during the LOM at Tarrawonga includes a new mine water (void water) dam (required prior to 2030).

Key infrastructure will be decommissioned following the cessation of mining activities, including the infrastructure located within the Mine Facilities Area and Services Corridor. Infrastructure that supports or facilitates the approved post mining land use may not be decommissioned. Planning for infrastructure decommissioning will be included in the detailed mine closure process.

Mining Activities

Mining is currently approved at Tarrawonga up until 2030 and incorporates the following key activities:

- Continued development of coal mining operations in the Maules Creek Formation to facilitate a Run of Mine (ROM) coal production rate of up to 3.5 Million tonnes per annum (Mtpa).
- Transport of ROM coal via the approved haulage route to the Whitehaven Coal Handling Preparation Plant (CHPP), or to the Boggabri CHPP via internal haul roads, subject to a suitable commercial agreement between Boggabri and Tarrawonga Mines;
- Progressive backfilling of the mine void behind the advancing open cut mining operation with waste rock and minor quantities of reject material from the Gunnedah CHPP; and
- Progressive development and use of new haul roads and internal roads, water management infrastructure as well as stockpiles, laydown areas and gravel/borrow areas.

Mine Operations

Mine operations at Tarrawonga involve open cut mining with a truck and excavator/shovels fleet to produce up to 3.5 Mtpa ROM. The extent of mining operations were reduced in February 2021 (Modification 7) in ML 1693 to avoid mining the Upper Namoi alluvium and within 200 m of Goonbri Creek.

ROM coal is transported to the Whitehaven CHPP for processing.

Coal rejects are transported from the Whitehaven CHPP to Tarrawonga by road to co-disposed with waste rock material within the footprint of the open cut. All reject material is placed at least 30 m within the open cut boundary and is placed at least 5 m below the final landform surface of the open cut infill area.

Mining operations will use overburden and interburden materials to in-fill the mine void behind the advancing open cut, as well as being placed in the two adjoining out-of-pit mine waste rock emplacements (Northern Emplacement and Southern Emplacement).

The Northern Emplacement will be constructed with three elevated catchment areas to approximately 370 m AHD with areas up to approximately 376 m AHD to introduce micro-relief. The top surface of the northern extent of the emplacement would remain approximately 1,500 m wide. Water management structures would be installed to facilitate a free draining landform, directing water from the top surface to sediment basins at the base of the emplacement. The elevated areas of the Northern Emplacement and the open cut infill area to the east of the Northern Emplacement will be revegetated to integrate with the Leard State Forest.

During rehabilitation, the final height of the Southern Emplacement would remain at approximately 370 m AHD and will be integrated with the Northern Emplacement. Water management structures would be installed to facilitate a free draining landform, directing water from the top surface to sediment basins at the base of the emplacement. The Southern Emplacement would be constructed predominantly with batter slopes of 10 degrees or shallower.

Vickery Extension Project

Once the Vickery Extension Project (Vickery) CHPP, train load-out and rail spur infrastructure is constructed and reaches full operational capacity, ROM coal processing from Tarrawonga would transition to the Vickery CHPP. Tarrawonga ROM coal would then be transported via the private haul road and placed on the Vickery ROM pad for subsequent rehandling, processing, and transportation.

Coal rejects generated by the processing of Tarrawonga ROM coal at the Vickery CHPP would be disposed of at Vickery in accordance with relevant management requirements of the Vickery Extension Project.

Mine Production Schedules

The assumptions and principles that have been used to develop the LOM rehabilitation schedule are detailed in **Table 16** Indicative LOM Mine Production Schedule.

Table 16 Indicative LOM Mine Production Schedule

EIS Year (MOD 7)	Year	Waste Rock (Mbcm)	ROM Coal (Mtpa)
3	2022	38.2	3.5
4	2023	34.0	3.5
5	2024	37.4	3.5
6	2025	36.1	3.5
7	2026	34.0	3.5
8	2027	27.1	2.7
9	2028	24.0	2.4
10	2029	23.6	2.1
11	2030	11.1	1.0
Totals		**265.5**	**25.7**

Importantly, the staging of the open cut mining operations would be determined by the requirements of the coal market, product specification and/or blending requirements. As these requirements are likely to vary over the LOM, the development sequence of the open cut, coal extraction rates and rehabilitation areas may vary.

WHITEHAVEN REHABILITATION MANAGEMENT PLAN

TARRAWONGA

LOM PLAN 2

LEGEND

- Project Approval Boundary

Final Landform Feature

- Conceptual High-Wall Safety Bund
- Drop Structures
- Existing Drop Structures
- Existing Rehabilitation Contour Banks
- Existing Water Storage
- Proposed Flood Bund
- Proposed Sediment Dam
- Proposed Water Storage
- Swale Drainage Paths
- Final Void

Final Landuse Domain

- Agricultural – Grazing
- Final Void
- Native Ecosystem
- Water Management Areas
- Water Storage (Excluding Final Void)

0 250 500 Metres

Coordinate System:	GDA2020
Scale:	1:20,000 at A3
Project Number:	630.30268
Date:	27-Jul-2022
Drawn by:	LC

WHITEHAVEN COAL

UAV Image Date: 06th September 2021

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WHITEHAVEN FORWARD PROGRAM

TARRAWONGA

LOM PLAN 1

LEGEND

- Project Approval Boundary
- Ecosystem and Land Use Establishment

0 250 500 Metres

Coordinate System:	GDA2020
Scale:	1:20,000 at A3
Project Number:	630.30268
Date:	27-Jul-2022
Drawn by:	LC
Annual Reporting Period:	2024

WHITEHAVEN COAL

UAV Image Date: 06th September 2021

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6.2 Phases of Rehabilitation and General Methodologies

Achievement of a physically and chemically stable mine landform that is adequately drained and integrates with the adjoining topography will be demonstrated through the implementation of a series of conceptual rehabilitation phases. As defined by the *Form and way: Rehabilitation Management Plan (large mines)* the rehabilitation phases are presented in **Table 17**.

Table 17 Rehabilitation Phases

Rehabilitation Phase	Description
Phase 1: Active Mining	This phase is associated with active mining operations across the domains.
Phase 2: Decommissioning	This phase of rehabilitation includes activities associated with the removal of mining infrastructure, unless agreed to be retained, and the removal, remediation or management of contaminated and hazardous materials.
Phase 3: Landform Establishment	This phase of rehabilitation consists of the processes and activities required to construct the approved final landform. In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (that is, rock raking or ameliorating sodic materials).
Phase 4: Growth Medium Development –	This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short-lived pioneer species) to ensure achievement of the approved or, if not yet approved, the proposed: - rehabilitation objectives; - rehabilitation completion criteria; and - final landform and rehabilitation plan. This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.
Phase 5: Ecosystem and Land Use Establishment -	This phase of rehabilitation consists of the processes to establish the final land use following construction of the final landform. For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control.
Phase 6: Ecosystem and Land Use Development –	This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved or, if not yet approved, the proposed: - rehabilitation objectives; - rehabilitation completion criteria; and - final landform and rehabilitation plan. For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile. This phase of rehabilitation may include specific vegetation

	management strategies and maintenance such as tree thinning, supplementary plantings and weed management.
Phase 7: Rehabilitation Completion (sign-off) –	The final phase of rehabilitation when a rehabilitation area has achieved the final land use for the mining area: - as stated in the approved rehabilitation objectives and the approved rehabilitation completion criteria; and - as spatially depicted in the approved final landform and rehabilitation plan. Rehabilitation areas may be classified as complete when the RR has determined in writing that rehabilitation has achieved the final land use following submission of the relevant application by the lease holder.

6.2.1 Active Mining Phase

Appropriate measures and strategies are implemented during the active phase of mining to enhance rehabilitation outcomes. Works in this phase are summarised below.

Soils and Materials

Management protocols for soils and subsoils are implemented to minimise risks and enable soil resources within disturbance areas to be characterised, stripped, stockpiled and re-used appropriately. The management protocols also enable consideration of the main soil types observed within the project disturbance boundary and any specific constraints or management measures to be adopted for each soil type.

Soil Resources

Soil characterisation undertaken by Agricultural Resource Assessment: "Tarrawonga Coal Project" (Mckenzie Soil Management, 2011), **Table 18** shows that seven soil types are present within the project disturbance boundary.

Table 18 Soil Types

Soil Groupings	Australian Soil Classification Orders	Australia Soil Classification Suborders	Description
Deep Recent Alluvium (28)	Rudosol (28)	Stratic	Characterised by a number of alluvial depositional layers that have been little altered by pedogenic processes except at or near the surface.
Shallow Stony Soil (11)	Tenosol (11)	Leptic	Shallow stony soils with only weak pedological development.
		Brown-Orthic	
		Yellow-Orthic	
		Bleached Leptic	
Duplex Soil – loam topsoil, clay-rich subsoil (17)	Chromosol	Red	Characterised by a strong contrast in texture between topsoil and subsoil.
		Brown	
		Grey	
	Sodosol (10)	Red	Strong texture contrast between topsoil and sodic subsoil, which is not strongly acidic.
		Brown	
		Grey	

		Yellow	
	Kurosol (2)	Red	Duplex soils with strongly acidic subsoil.
Non-Duplex Loams	Kandosol (5)	Grey	lack strong texture contrast and have poorly structured massive subsoils.
	Dermosol (2)	Yellow	lack strong texture contrast, but had structured B horizons
		Brown	

The assessment found (see **Error! Reference source not found.** and **Error! Reference source not found.**) that small areas of the site have topsoil and subsoil suitable for agricultural rehabilitation to a depth of 300 centimetres (alluvium Rudosols). Approximately 80ha of the site associated with White box trees has soil that allow for a stripping depth of centimetres. The majority of the site has topsoil and subsoil with major constraints, which is suitable for woodland rehabilitation to a depth of 10 centimetres. Generally, topsoils and subsoils require amelioration, which is described further in Section 6.2.4.

a. Soil Resources Balance

Table 19 presents the current topsoil balance for Tarrawonga. The TCM Topsoil Register will be revised to ensure that it contains all components required to meet the Forward Program and LOM Rehabilitation Schedule.

Table 19 Topsoil Balance

Final Landuse	Area (ha)	Assumed rehabilitation depth (mm)	BCM Volume (m3)
Pasture	257	200	514,000
Woodland	341.6[1]	200	683,200[1]
Final Void	81	200	162,000
		Total Topsoil Required	1,359,200
		Topsoil Stockpiles	1,224,074
		Topsoil Stripping – 2024[2]	99,492
		Topsoil Stripping – 2024 Onwards[2]	135,866.9
		Balance	100,232.9

[1] Figure is periodically updated to deduct rehabilitation that has reached Ecosystem Establishment phase. Not reflective of total Woodland hectares required for TCM.
[2] Assuming 0.45m of soil stripped including topsoil and subsoil.

As outlined in **Table 19** growth medium available onsite for rehabilitation has been calculated as a surplus of 100,232.9m³.

Management

Topsoils and subsoils will be stripped to a depth determined by site specific soil testing and documented in the site-specific soil stripping plans. Earthmoving plant operators will be supervised to ensure that stripping operations are conducted in accordance with the stripping plan and in situ soil conditions. The process summarised below for stripping topsoil will be followed:

- The area to be stripped of soil will be clearly demarcated and surveyed;

- Where practical, stripped material will be placed directly onto reshaped overburden and spread immediately (if mining sequences, equipment scheduling, and weather conditions permit) to avoid the requirement for stockpiling and costs with double handling;

- As part of the planning process, sufficient area for stockpiling or placement of soil will have been identified and these areas will be accessible;

- As part of the planning process, temporary drainage, sediment control and structures to prevent erosion will be implemented for each area if required;

- Where practicable, soil stripped from each vegetation community will be used in areas identified for rehabilitation for the corresponding vegetation community; and

- Where topsoil is unavailable or of insufficient quality, subsoil or mine spoil may be able to be ameliorated to form a suitable growing media. The pre-disturbance soil testing program and the rehabilitation monitoring and research activities will be used to determine whether subsoil amelioration is required.

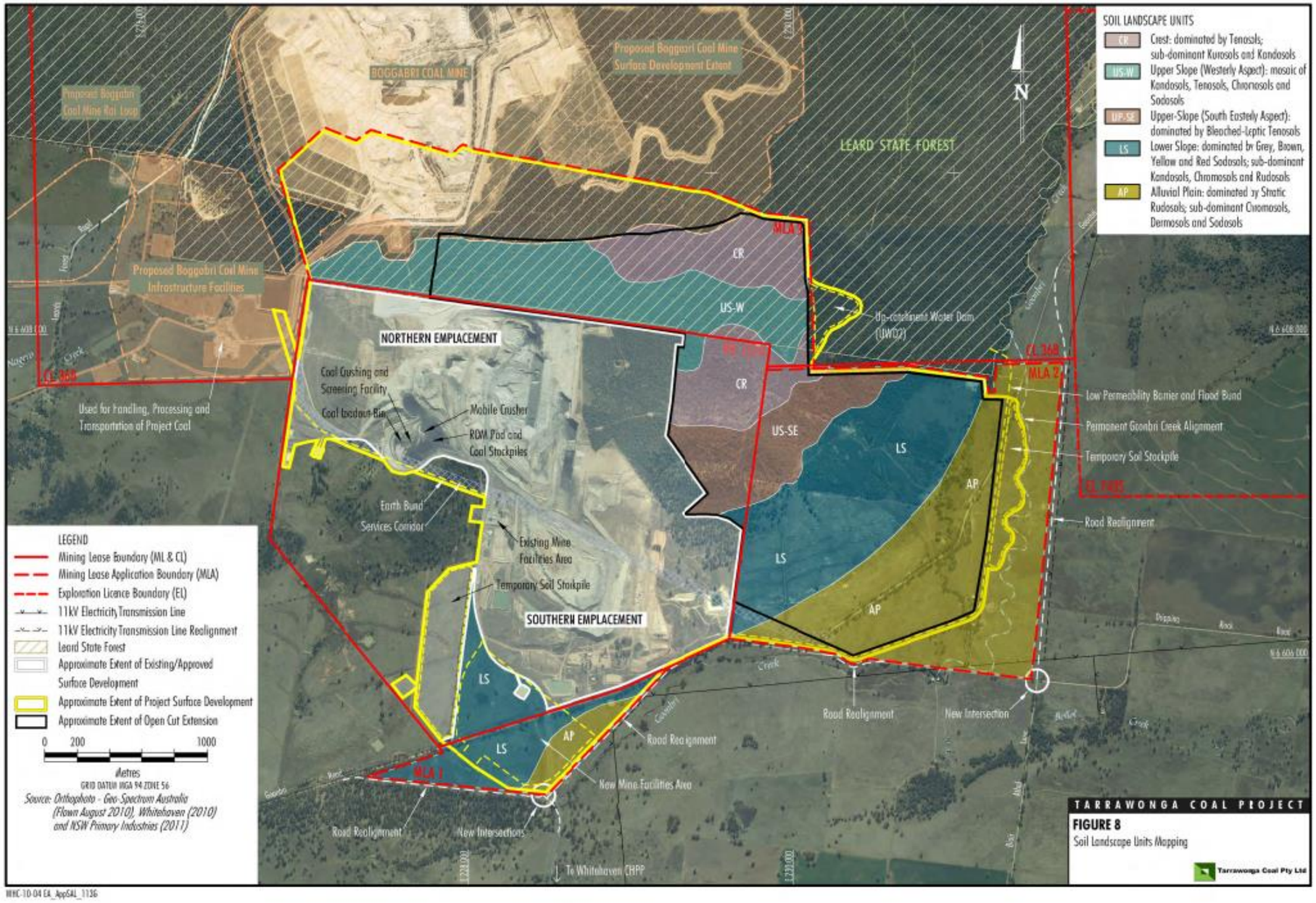

Figure 10- Soils and Materials Resources

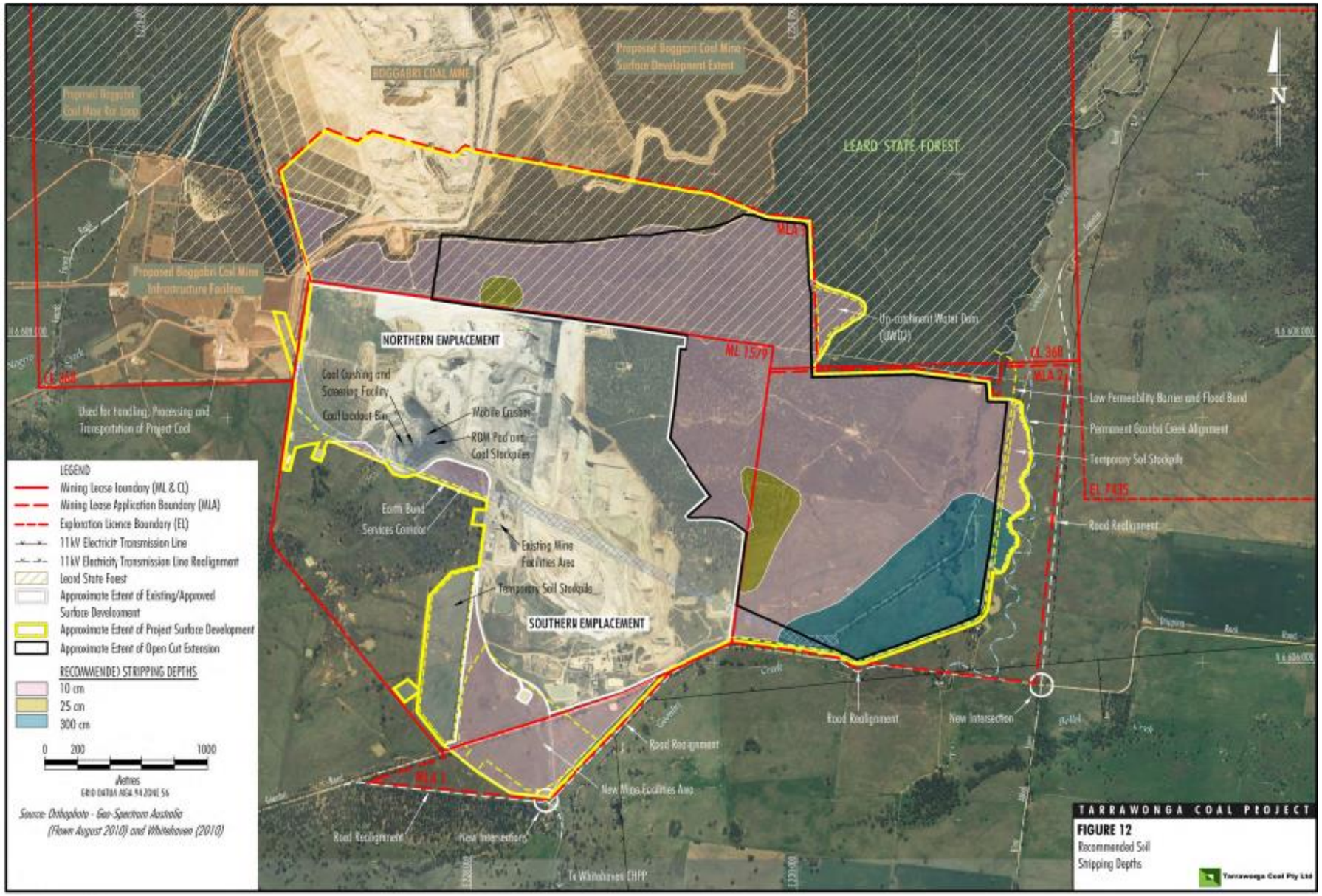

Figure 11- Soils and Materials Stripping Depths (Cont)

b. Flora

Management

Risks of impacts to flora are avoided, mitigated and managed through the implementation of Tarrawonga LDP.

The LDP is applied prior to the clearing of any native vegetation and is used to manage the clearing process and to document all licensing, safety and management requirements.

The LDP form is a checklist that must be completed for each stage of clearing by key personnel responsible for the clearing activities, the relevant technical expert (e.g., Surveyor or Electrical Engineer to confirm no presence of cables, etc.) and signed off by the site's Environmental Officer or a delegate.

An independent ecological expert will undertake regular assessments to confirm that maximum disturbance (in hectares) limits, specified for each of the years 5, 10, 15 and 17 is generally consistent with the planned disturbance program for the mine.

Resources

Native seed collection is undertaken in the areas to be cleared where practicable, and from the remainder of mining tenements and offset areas. Seed collection is generally undertaken by suitable experienced or qualified contractors throughout the year as required by the seeding times of target species;

Native seed utilised in rehabilitation is generally supported by seed viability testing and quality control processes to help guide application rates.

Weed management programs implemented as part of the Tarrawonga BMP are undertaken on pre-strip areas where heavy weed presence is observed.

c. Fauna

Management

Pest Fauna is managed during the active mining phase to minimise impacts and ensure rehabilitation objectives and outcomes related to biodiversity are achieved.

Minimising impacts to fauna are achieved through the implementation of management strategies detailed in the Tarrawonga BMP. Key strategies relevant to mine rehabilitation, include:

- Clearing will be subject to a pre-clearance survey by an appropriately qualified ecologist to ensure clearing activities are managed to minimise impacts on fauna;
- If required, fauna relocations are completed in consideration of recommendations from an appropriately qualified ecologist;
- A two-stage clearing approach will be employed to minimise impacts on possible fauna in identified habitat trees; and
- Removal of vegetation will be restricted to a clearing window of 15 February to 30 April annually.

Management of fauna impacts to ensure rehabilitation objectives and outcomes related to biodiversity are achieved through the creation of fauna habitat resulting from the revegetation programme.

Resources

Prior to clearing, habitat features (stag trees, fallen logs and large flat rocks) suitable for salvage will be identified managed and recorded. The salvaged habitat features would be used throughout rehabilitation to create habitat to achieve the specific fauna outcomes that are outlined in the approved rehabilitation objectives and rehabilitation completion criteria in **Section 4**.

d. Rock/Overburden Emplacement

Overburden and interburden mined during the MOP period will continue to be used to in-fill the mine void behind the advancing open cut, as well as being placed in the two adjoining out-of-pit mine waste rock emplacements (Northern Emplacement and Southern Emplacement) (Plans 3a to 3h).

The waste rock emplacements at Tarrawonga will be progressively shaped for rehabilitation activities, including final re-contouring, topsoiling and revegetation.

e. Waste Management

Wastes produced at the Tarrawonga Coal Mine comprise of:

- General domestic-type wastes from on-site buildings and routine maintenance consumables;
- Oils and grease
- Heavy vehicle tyres; and
- Sewage.

Domestic-type wastes will be collected and disposed of by a licensed waste disposal contractor, with recyclable materials separated, where possible. Waste oils from maintenance activities are pumped from equipment to bunded storage tanks or removed from site by a service truck. Sewage is managed via onsite facilities serviced by licensed contractors. Up to 441 tonnes of waste tyres in each calendar year can be disposed of in pit as per conditions in EPL12365.

Prior to decommissioning, Phase 1 and 2 Assessments will be undertaken to identify potential land contamination. Should contamination be identified, consideration will be given to the remediation and management of contaminated soil onsite.

f. Geology and Geochemistry

Coal resources at Tarrawonga are located within the Maules Creek sub-basin of the Early Permian Bellata Group. The target coal seams are contained within the Maules Creek Formation. Individual coal seams range up to approximately 4.5 m thick, and average 1.5 m.

Below the Maules Creek Formation are the Goonbri and Leard Formations, which are basal units of the Gunnedah Basin sedimentary sequence and unconformably overlie the Boggabri Volcanics.

Geochemistry assessments concluded that overburden and interburden would generally be expected to be non-acid forming (NAF). A small quantity of overburden, including some strata immediately adjacent to some of the coal seams, was identified as containing slightly increased sulphur concentrations with low or no acid neutralising capacity. These materials were classified as potentially acid forming – low capacity (PAF-LC).

The geochemistry assessments also found that a relatively high proportion of the overburden and interburden from the Project open cut extension areas is likely to be moderately to highly sodic. The assessment noted that if overburden and interburden left exposed on the dump surface, the spoil would become dispersive and result in increased risks of erosion.

g. Material Prone to Spontaneous Combustion

Spontaneous Combustion on Coal Stockpiles

The risk of a spontaneous combustion event at Tarrawonga is considered to be low. Testing was conducted on each coal seam to be exposed by mining at Tarrawonga, with 0.44% sulphur content being the highest recorded value (Velyama Seam). The low percentage of inorganic sulphur is indicative of a low potential for exothermic oxidation reactions.

Potential spontaneous combustion on coal stockpiles is also considered to be low and is managed in accordance with the site safety management system. Key controls in managing spontaneous combustion include:

- Regular inspections of ROM coal stockpiles by site supervisors to check areas for evidence of combustion and general stockpile maintenance;

- Mobile equipment compacts the stockpile area when working in the area;

- Training for personnel and contractors working in proximity to the ROM coal stockpiles to be alert for, and respond to, indications of spontaneous combustion.

Observations of spontaneous combustion in rehabilitation areas will be managed in accordance with the Rehabilitation and Closure TARP provided in **Section 10**.

Spontaneous Combustion on Overburden Emplacement Areas

Sampling in 2011 concluded overburden and interburden is unlikely to be reactive. Regardless, the site implements operational protocols to minimise the risk of spontaneous combustion.

The coal at Tarrawonga has a low percentage of inorganic sulphur and hence a low potential for exothermic oxidation reactions. The short residence time of ROM coal stockpiles at the mine also minimises the potential for spontaneous combustion incidents.

The risk of spontaneous combustion of reject is inherently lower than for coal and is further minimised through the dilution and dispersion effect of overburden co-disposal. Testing completed on the Whitehaven CHPP rejects confirmed this with results showing a low propensity for spontaneous combustion.

Observations of spontaneous combustion in rehabilitation areas will be managed in accordance with the Rehabilitation and Closure TARP provided in **Section 10**.

h. Material Prone to Generating Acid Mine Drainage

Assessments undertaken for the Project EA identified that a small quantity of overburden, including some strata immediately adjacent to some of the coal seams, contains slightly increased sulphur concentrations with low or no acid neutralising capacity. These materials were classified as potentially acid forming – low capacity (PAF-LC). Acid generating materials will be managed in accordance with relevant requirements of PA 11_0047 and will utilise advice from a geochemist to ensure appropriate material sampling and analysis is undertaken, particularly in relation to surface water and groundwater management. Any occurrences of PAF-LC material will be managed by selectively handling and emplacing the material, so it is covered with at least 15 m of NAF material.

WHC will follow the reject co-disposal emplacement protocol to limit sulphide oxidation and acid generation and/or the migration of any acid or sulphate species that may be generated from migrating beyond the pit shell.

Tarrawonga will continue to undertake water quality monitoring within on-site water storages during the life of the mine in accordance with the Water Management Plan. If in the event acid rock drainage (ARD) is identified, a works program for the identification of any PAF-LC material would be undertaken and specific controls implemented.

i. Ore Beneficiation Waste Management (Reject and Tailings Disposal)

Coal from Tarrawonga is sent to the Whitehaven CHPP for processing. Whitehaven blends product coal from its mines in the Gunnedah region (including Tarrawonga) to produce thermal coal and coking coal prior to shipment through the Port of Newcastle. Whitehaven typically produces three main products.

Coarse and fine reject generated from the CHPP is transported to Tarrawonga for emplacement. Tarrawonga can receive up to 700,000 tonnes of reject material annually, which is co-disposed in the northern and southern emplacement areas in accordance with the reject co-disposal emplacement protocol.

j. Erosion and Sediment Control

Key sources of erosion and sedimentation are generally related to surface water runoff from exposed surfaces, including cleared areas, stockpiles (coal, soil and waste rock) and unsealed roads, and to a lesser degree caused by wind erosion from emplacement areas and stockpiles.

Erosion and sediment control (ESC) at Tarrawonga is managed in accordance with the Tarrawonga Site Water Management Plan (including an Erosion and Sediment Control Plan), relevant regulatory requirements and the relevant guideline documents.

k. Ongoing Management of Biological Resources for Use in Rehabilitation

Biological resources such as native seeds and habitat features ((stag trees, fallen logs and large flat rocks) will be managed to ensure viability for use in rehabilitation. Management measures include but are not limited to the management of weeds, effective storage, regular inspections and maintenance programs.

l. Mine Subsidence

Tarrawonga is located in an area where no historic underground mining has been undertaken. Subsequently, mine subsidence is not applicable to Tarrawonga.

m. Management of Potential Cultural and Heritage Issues

Aboriginal heritage is managed in accordance with the Heritage Management Plan which was developed in consultation with Registered Aboriginal Parties (RAPs) and OEH (now Heritage NSW).

Engagement with RAPs and Heritage NSW will be undertaken as part of detailed mine closure planning. Advice will be sought prior to 2030 and in conjunction with Maules Creek and Boggabri mines as to the transfer of artefacts from the Aboriginal Keeping Place to the rehabilitated post mining landscape.

n. Exploration Activities

Exploration activities will be undertaken in accordance with the requirements of the *Exploration Code of Practice: Rehabilitation*. Disturbance from previous exploration activities will be rehabilitated prior to mine closure. All exploration drill holes will be sealed in accordance with relevant RR DRG guidelines at the time.

6.2.2 Decommissioning

The Decommissioning and Demolition Phase encompasses all works required to prepare land for rehabilitation including removal of any unnecessary built infrastructure, foundation and hardstand materials, services, equipment and materials including wastes and contamination.

Decommissioning, demolition, and removal of infrastructure from the mine site will generally be undertaken during the mine closure phase. Any infrastructure including dams, roads and buildings which is beneficial for future use by post mining landowners may be left in place subject to relevant landowner agreements and regulatory approvals.

Decommissioning and demolition activities will be appropriately planned and documented to ensure that appropriate approvals are in place for the works.

Further detail regarding demolition activities will be determined as the operation approaches closure. Detail in this regard will be reported in the Forward Program.

a. Site Security

Site security measures will be implemented during and following the decommissioning process to prevent access by members of the public and secure rehabilitation areas, including any heritage places or objects and any retained infrastructure items. Site security measures include:

- Site sign-in and induction processes;
- Maintenance of existing security fences and signage; and
- Restricted offroad access to rehabilitated areas.

b. Infrastructure to be Removed or Demolished

Site features, services and structures to be decommissioned and demolished to achieve the final land use are described in

Table 20 .

Table 20 Infrastructure to be Decommissioned

Code	Mining Domain	Description
1	Infrastructure Area	Access Road, Helipad, Carpark, Administration Buildings, Bathhouse, Electricity Services, Workshop Buildings, Laydown Area, ROM Hopper and Pad, Conveyors, Crusher, Coal Transfer Bins, Weighbridge, Telecommunication Services, Sewage Facilities, Signage and Gates, Service Lines (air, water, fuel), Pipelines, Cables and Tanks (Fuel, Chemical, Explosives)
3	Water Management Area	Dams (SB4, PW2, PW3, PW4, PW5), Sediment Dams (Could include the following, depending on approved Final Landform: SB25, SB6, SUMP, SD17, SB7, SD1, SB5B, SD2, SB5A, SB23A, SB23B, SD9, SB16A, SB16B, SD8, SD27, SD28, SB26, SD26, SB24B), Pumps, Pipelines, Transfer Stations and Laydown/Storage areas
4	Overburden Emplacement Area	Signage, Pipelines, Access Roads, Storage Areas, and Communication Facilities
5	Active Mining Area (Open cut void)	Signage, Access Roads and Storage Areas

As required by the Tarrawonga consent, all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.

The Detailed Mine Closure Planning process conducted over the life of mine, in consultation with DPE, RR, NSC and CCC will further identify key actions, assessments, studies, detailed designs, and regulatory approvals required to decommission and/or demolish built infrastructure.

c. Buildings, structures and fixed plant to be retained

Site features, services and structures to be retained for future use as part of the final land use are described in **Table 21**.

Table 21 Infrastructure to be Retained

Code	Mining Domain	Description
1	Infrastructure Area	All infrastructure to be removed unless otherwise agreed following consultation completed as part of detailed mine closure planning.
3	Water Management Area	
4	Overburden Emplacement Area	
5	Active Mining Area (Open cut void)	

The Detailed Mine Closure Planning process conducted over the life of mine, in consultation with DPIE, RR, NSC and CCC will

- Determine and obtain the necessary approvals
- Determine the structural integrity of the building/structure/infrastructure to be retained
- Identify the associated short-term and long-term risks to public safety and the environment from the structures remaining in place, which should identify potential modes of failure
- Address any potential residual risks such as potential for structures to fail
- Engage (where required) a suitably qualified engineer to verify that any risks have been satisfactorily addressed.

d. Management of Carbonaceous/Contaminated Material

Carbonaceous Material

During decommissioning, detailed inspections or audits will be undertaken within the footprint of surface infrastructure including stockpiles, access roads and haul roads to identify remaining sources of carbonaceous material. Following the inspections or audits carbonaceous material will be transported to the northern or southern emplacement areas for emplacement. If rehabilitation has progressed to landform establishment for all areas of the northern and southern emplacement areas, carbonaceous material will be transported to other Whitehaven mines or facilities for management (subject to approvals).

Contaminated Material

Contamination assessments will be completed as part of the detailed mine closure planning and decommissioning processes:

- Tarrawonga will utilise a suitably experienced and qualified person to conducted contamination and remediation assessments;
- Phase 1 and Phase 2 (where required) assessments will be undertaken for all features, services and structures within the Infrastructure Area domain;
- Subject to the findings and recommendations of the Phase 1 assessment, a targeted Phase 2 assessment will be completed.
- If contamination is identified, a Remedial Action Plan will be developed, detailing remediation strategies for potential contamination.
- Contaminated materials with be managed so that remedial works are undertaken during the Active Mining phase and as part of the decommissioning process. Hazardous Materials Management

During decommissioning, hazardous materials (hydrocarbons and chemicals) will be managed and stored in accordance with the site Waste Management Plan. Removal of hazardous materials will be undertaken by a licensed waste disposal contractor and disposed / recycled at a licensed waste facility.

e. Underground Infrastructure

Tarrawonga is an open cut mine and does not have any portals, decline entries, shafts, underground workings, underground equipment, or subsidence monitoring lines. Subsequently, underground infrastructure is not applicable to Tarrawonga.

6.2.3 Landform Establishment

Landform establishment is the process of shaping the final landform to a safe, stable and non-polluting landform that is appropriate for the desired final land use and consistent with the surrounding landscape. The final landform for the Tarrawonga Coal Mine is shown on the Final Landform Plan in **Section 5**. Based on geomorphic design in conformance with MOD 7 proposed final landform.

a. Water Management Infrastructure

Elements such as drainage paths, contour drains, ridgelines, and emplacements will be shaped, as much as practical, to undulating profiles in keeping with natural landforms of the surrounding environment. Water management structures will be designed to collect surface runoff from rehabilitation or disturbed areas.

Sedimentation dams will be constructed and retained during rehabilitation to collect runoff from rehabilitated areas until discharge water quality meets regulatory criteria and dams can be decommissioned.

Water management structures that will remain following mine closure is detailed in **Section 6.3.2**.

b. Final Landform Construction: General Requirements

The conceptual final landform for the Modification has been designed to integrate with the surrounding natural and modified landforms, including consideration of elevation, slope and drainage. The key features of the Modification final landform are generally consistent with the currently approved Tarrawonga Coal Mine, including:

- The final landform will be safe, stable and adequately drained. The final landform will be designed to integrate with the surrounding landscape using a geomorphic engineered design.
- The Northern Emplacement will be progressively constructed to a maximum height of 370 m AHD to integrate with the southern extent of the Boggabri waste rock emplacement. Localised areas of the Northern Emplacement will be constructed up to approximately 376 m AHD to introduce micro-relief.
- The Southern Emplacement will be progressively constructed to a maximum height of approximately 370 m AHD (as approved in Modification 7).
- Outer batter slopes for the Northern and Southern Emplacements will be predominantly constructed at 10 degrees or shallower.
- Any potentially acid forming (PAF) material will be covered with at least 15 m of non-acid forming material (NAF).
- Final outer surfaces of overburden emplacements will be constructed with non-sodic or low sodicity and/or will be treated with gypsum.
- Dump sequencing will be optimised to facilitate progressive shaping and rehabilitation.
- The final landform will provide an optimum opportunity for the successful restoration of native forest and woodland including the critically endangered White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.

c. Final Landform Construction: Reject Emplacement Areas and Tailings Dams

ROM coal is crushed and screened onsite before being transported to the Whitehaven Coal Handling and Processing Plant (WCHPP) approved under DA0079-2002 (as modified). Reject that is backloaded from the WCHPP is co-disposed within the Northern and Southern Emplacement Areas.

Reject material from the Whitehaven CHPP (comprising reject generated by processing coal from Tarrawonga and other Whitehaven sites) is returned via truck to nearby Whitehaven pits including Tarrawonga for disposal. All reject material will be co-disposed in the pit void within the footprint of the void with waste rock material.

Reject material is “mixed” with the waste overburden and interburden and placed at least 30m inside the pit boundary, at least 5m below the final landform surface and at a setback angle of 30 degrees for any dumping of rejects above the premined surface. Rejects are dozer pushed from the northern to the southern side of the REA to reduce the overall height/maximum RL and capped in a in a series of smaller lifts 15m high, instead of a single lift to full height.

No Tailings Storage facilities are currently in use at TCM and thus, no rehabilitation required.

Closure Cover System and Water Quality Monitoring Programme for the REA

A detailed assessment of a closure cover system for the REA at TCM, including development of a water quality monitoring programme, was undertaken by SLR Consulting Australia Pty Ltd (SLR, 2017). A summary of SLR (2017) findings in relation to the above items are presented below.

Specific Closure Design Objectives and Closure Performance Criteria for the Cover System and Landform Design

The overall objectives of the REA closure design are to provide for containment of the rejects in a permanently and stable state, both physically and chemically and a final landform that is stable, is commiserate with surround topography, meats stakeholder expectations and requires minimal maintenance.

The closure performance criteria include:

- Long term average soils losses are less than 150 t/ha/yr;
- Long term Factor of Safety against circular slip failure of the slope is greater than 1.5.

Detailed REA performance indicators and closure criteria are presented in Appendix A of SLR (2017).

The final REA landform is yet to be established and as such monitoring to determine achievement of above closure criteria is yet to commence.

Water Quality Monitoring Programme

SLR (2017) reviewed the current surface water quality management, monitoring and reporting regimes for TCM, inclusive of approved licensed discharge points with associated water quality criteria and concluded that the collective regime is adequate for monitoring of water quality from the REA following closure activities.

Additional water quality monitoring bores within the REA footprint to base depth are to be installed to monitor drainage (seepage) water. The additional bores are to be installed post capping and will be outlined in a revised Tarrawonga Water Management Plan.

The final REA landform is yet to be established. Once the final landform has been established the groundwater monitoring bores will be commissioned in accordance with SLR (2017) recommendations.

Geochemical Analysis

Geochemical analysis of TCM topsoil and waste rock (overburden) material at Tarrawonga included analysis of a large number of samples. The sampling did not indicate the presence of PAF, and the Geochemical Abundance Index (GAI) shows it to be typical of crustal abundance.

Additional sampling and analysis of topsoil and overburden materials will be completed prior to commencing any final capping of the REA.

Erosion Modelling

SLR (2017) undertook erosion modelling of the proposed REA cover system using material specific parameters under the proposed final embankment conditions to determine the erosion likely to occur at the rehabilitated landform. The modelling showed that some dispersive topsoils can be treated with gypsum to reduce the exchangeable sodium percentage (ESP). The modelling also shows that increasing soil cover, further reduces erosion risks.

The final REA landform is yet to be established. TCM will undertake topsoil amelioration and groundcover establishment, as described in Section 6.2.4. in accordance with SLR recommendations and this RMP.

Soil-Plant-Atmosphere Model

Previous studies (SLR 2017) show that implementation of the REA design will limit water percolation into the rejects below the capping and thus the design objectives of low seepage and maintaining the low phreatic surface within the capped REA will be met.

Closure Surface Water Management System

Key features of the closure surface water management / drainage system for the REA include: -

- Contour banks spaced at approximately 60m and with capacity to convey the 20-year rainfall event without excessive scour. Contour banks across the REA will collect runoff and direct it westwards to a drop structure.
- A drop structure, located west of the REA, to convey flows to the base of the final REA landform. The drop structure will have capacity to convey the 50-year rainfall event.
- Basins, channels and dams to convey water south to existing sediment dams SB16A and SB16B located south of the existing Mine Infrastructure Area.

d. Final Landform Construction: Final Voids, Highwalls and Low Walls

Mining Domain 6 – Void (Open cut void)

The principal objective of landform establishment activities associated with the final void is to create a safe and stable landform that is non-polluting. A detailed methodology to treat the final void will be developed in a Final Void and Mine Closure Plan that will be developed closer to mine closure when more certainty about the final void conditions will be known. A draft version of the Final Void and Mine Closure Plan was submitted to the Resources Regulator in December 2019. General principles that may be adopted to make the final void safe and stable include:

- Battering back low wall and benching of highwalls to minimise potential for failures and mass movement;

- Capping (or excavating) exposed coaliferous material with inert material to prevent ignition from spontaneous combustion, bushfires or human interference;
- Constructing a physical barrier to isolate the perimeter of the void to prevent human access. The highwall areas will be secured by the construction of a trench and a safety berm; and
- Surface runoff from land surrounding the void will be diverted so as to prevent any potential development of instability of the void walls.

An updated (final) Final Void and Mine Closure Plan will be submitted to the Resources Regulator by the end of December 2024, in accordance with Condition 65, Schedule 3 of 11_0047.

Mining Domains 1, 4 and 5 – Infrastructure Area/Overburden Emplacement Area/Stockpiled Material

The Northern Emplacement will be shaped to integrate with the Boggabri Coal Mine waste rock emplacement to the north, and the Leard State Forest to the east, providing habitat connectivity with undisturbed vegetation communities at Leard State Forest. Rehabilitation along the northern area of the Northern Emplacement along the boundary with the Boggabri Coal Mine would be undertaken in accordance with the Common Boundary Integration Management Plan. Both the Northern Emplacement and Southern Emplacement will be shaped to integrate with the open cut infill area.

Waste rock will be selectively handled and blended to avoid emplacement of potentially acid forming material in concentrated areas. Where PAF-LC material is identified it will be encapsulated with at least 15 m of NAF to minimise potential for acid leachate.

Dispersive materials will be avoided for material layers at the final landform surface where practical to minimise potential for significant scouring or land slumping. Non-sodic and low sodicity materials will be selectively handled and preferentially emplaced at or near the surface. Where there are potentially dispersive materials emplaced at or near the surface, appropriate amelioration with lime or gypsum will be undertaken to stabilise soils, particularly foundation materials for earthworks structures such as contour banks.

e. Construction of Creek/River Diversion Works

The Tarrawonga final landform does not include creek or diversion works. Subsequently, construction of creek/river diversion works is not applicable to Tarrawonga. In 2021 (MOD7), a reduction in the open cut mining extent was made to avoid mining through Goonbri Creek and the associated Upper Namoi alluvium. This change to the Tarrawonga mine plan removed the need to construct the low permeability barrier and removed the requirement to realign a section of Goonbri Creek.

6.2.4 Growth Medium Development

In the context of this RMP, growth medium development encompasses activities to reinstate soils with the initial physical, chemical and biological characteristics required to establish the desired vegetation community.

Characterisation

Sampling will determine if the topsoil and subsoil is suitable for rehabilitation use or if it requires amelioration or selective handling and placement. If the growth medium cannot be effectively ameliorated, unsuitable subsoil and spoil, including PAF material, will be buried and capped.

Capping spoil will be ameliorated if required, and contour ripped prior to the placement of the topsoil.

Topsoil Respreading and Amelioration

- Topsoil will be spread onto areas requiring rehabilitation to a nominal depth of 150-200 mm for agricultural post mining land use and 200mm for other disturbance areas, and will consider the soil depth information obtained through the pre-stripping soil sampling;
- The soil testing results will be used to determine if physical and/or chemical amelioration is required, and the rates and method of application. The spreading of soil, addition of soil ameliorants, fertiliser, and application of seed will be carried out where possible in consecutive operations to reduce the potential for soil loss to wind and water erosion; and

- All soils will be lightly ripped prior to seeding. This will be conducted on the contour where possible and will be managed to minimise the potential for unsuitable spoil material being ripped up to the surface.

Seed Bed Preparation

Thorough seedbed preparation will be undertaken to ensure optimum establishment and growth of vegetation. All soils will be lightly ripped prior to seeding to ensure any ameliorants are incorporated into the soil and rough surface is established to capture seed. This will be conducted along the contour where possible and will be managed to minimise the potential for unsuitable spoil material being ripped up to the surface.

For tree planting / tubestock areas, tree mounds should be scheduled well ahead of the target planting date to allow for settlement, to capture rain, improve soil moisture and ongoing moisture retention.

Secondary Domain D – Rehabilitation Area – Pasture

The lower flat areas on the open cut infill area will be revegetated with pasture species that would be suitable for sustainable and managed livestock grazing. These lower flat areas would be prepared with a total soil profile depth of approximately 150 to 200 mm overlaid on mine waste rock.

All topsoils intended for re-use in agricultural rehabilitation areas will be further assessed prior to stripping to determine their suitability for re-use and determine specific amelioration requirements. Once soils are spread, ameliorants such as gypsum will be applied, and the area ripped as per seed bed preparation above.

Secondary Domain E – Rehabilitation Area – Woodland

Native vegetation areas encompass all woodland rehabilitation areas. Soil resources for native vegetation rehabilitation will generally be re-spread 200 mm deep. Once soils are re-spread, ameliorants such as gypsum will be applied, and the area ripped as per seed bed preparation above.

6.2.5 Ecosystem and Land Use Establishment

In the context of this RMP, ecosystem establishment includes activities to establish the desired floristic composition (species diversity and density) and habitat features. The phase incorporates seeded and management actions such as weed and feral pest control to achieve species establishment and growth to juvenile communities, and habitat augmentation.

Revegetation activities are undertaken progressively and will be planned to occur after the completion of reshaping, topdressing with growth media and construction of drainage structures.

Temporary stabilisation, being aerial seeding of a cover crop, of the southern face of the southern waste emplacement was undertaken in July 2015. Visual monitoring of the area treated will be undertaken to determine whether any follow up work is required to achieve stability. Temporary stabilisation will occur at the site as and when required.

Secondary Domain D – Rehabilitation Area – Pasture

257 ha class 3 agricultural suitability land, including 160 ha suitable for grazing will be re-established on the open cut infill area, mine facilities areas and former stockpile areas. Detailed management of Agricultural Rehabilitation Areas will be further developed in future revisions of this RMP.

Secondary Domain E – Rehabilitation Area – Woodland

Revegetation

Native vegetation areas are seeded with a native seed mix and planted with native Tubestock/Hiko species. Woodland Rehabilitation Areas will include areas will include species commensurate with the Box-Gum Woodland EEC. Species used in revegetation will consider a range of species that contribute to each canopy layer such as grasses, herbs, forbs, low shrubs, mid-sized shrubs and trees as per **Table 22**.

Table 22 Indicative Revegetation Species List

Common Name	Scientific Name	Common Name	Scientific Name
Overstorey		**Understorey**	
*** White Box**	*Eucalyptus albens*	*Smooth Darling Pea	*Swainsona galegifolia*
*** Yellow Box**	*Eucalyptus melliodora*	*Barb-wire Grass	*Cymbopogon refractus*
*** Blakely's Red Gum**	*Eucalyptus blakelyi*	* Silk Blue-grass	*Dicanthium sericeum*
Narrow-leaved Ironbark	*Eucalyptus crebra*	* Daises	*Brachysome spp.*
Narrow-leaved Grey Box	*Eucalyptus pilligaenensis*	*Everlasting Daises	*Chrysocephalum spp.*
Inland Grey Box	*Eucalyptus microcarpa*	*Kangaroo Grass	*Themeda triandra*
Dwyer's Red Gum	*Eucalyptus dwyeri*	Wallaby Grass	*Austrodanthonia indutai*
Poplar Box	*Eucalyptus populnea*	*Winter Apple	*Eremophila debilis*
Midstorey		Blue Trumpet	*Brunoniella australis*
***Sticky Hop-Bush**	*Dodonaea viscosa ssp. angustifolia*	Three-awn Speargrass	*Aristida vagans*
***Wilga**	*Geijera parviflora*	Slender Stackhousia	*Stackhousia viminea*
Belah	*Casuarina cristata*	Yellow Burr-daisy	*Calotis lappulacea*
-	*Allocasuarina spp.*	-	*Rostellularia adscendens var. adscendens*
Black Tea-tree	*Melaleuca bracteata*	Plains Grass	*Austrostipa aristiglumis*
Silver Wattle	*Acacia dealbata*	-	*Panicum spp.*
Hickory Wattle	*Acacia implexa*	-	*Austrodanthonia spp.*
White Cypress Pine	*Callitris glaucophylla*	-	*Bothriochloa spp.*
Buloke	*Allocasuarina leuhmanii*	-	*Chloris spp.*

* Specifically associated with the Box-Gum Woodland EEC/CEEC.

In accordance with Condition 23 of EPBC 2011/5923 and Condition 61 Schedule 3 of PA 11_0047, revegetation will include 13 ha of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland EEC. The proposed locations of these revegetation types are presented in the Final Landuse and Rehabilitation Plan (refer **Section 5**).

Cover crops (for example, oats and millet) will be used in in conjunction with native seeds for revegetation, where necessary, to provide for an effective groundcover until the target seed species are established. This will minimise the likelihood for erosion and weed infestation during the initial establishment phase of the rehabilitation Weed and Vertebrate Pest Control.

Ecosystem Establishment includes initial management actions to limit the introduction of weeds and vertebrate pest species in rehabilitation areas. Ongoing weed and pest management and monitoring is considered in the ecosystem and land use development phase (refer **Section 6.3.6**).

Management measures include:

- Treatment of weeds on topsoil stockpiles prior to re-spreading in rehabilitation areas;
- Ensuring all plant and equipment are weed free prior to mobilisation to rehabilitation areas;
- Maximising the retention of ground cover (cover crop stubble) when planting tubestock to minimise opportunities for weed activity; and
- Installation of fauna exclusion fencing and/or tree guards for newly planted tubestock where predation by grazing herbivores represents a risk to establishment.

6.2.6 Ecosystem and Land Use Development

For the purposes of this RMP the ecosystem and land use development phase represents those activities required to develop sustainable ecosystems that have characteristics comparable to similar undisturbed vegetation in the area.

All Domains

Activities associated with the ecosystem and land use development phase of rehabilitation are generally ongoing maintenance, land management activities and rehabilitation monitoring. Maintenance at rehabilitated areas will include, but not be limited to:

- Ongoing environmental management to minimise risks to rehabilitation;
- Comparing specific ecosystem characteristics such as soil profile development, floristic composition and structure, faunal diversity and abundance with the characteristics of appropriate analogue sites; and
- Undertaking adaptive management and remedial works where characteristics of the rehabilitation are not trending toward desired outcomes.

Rehabilitation monitoring will be undertaken throughout the ecosystem and land use development phase until it can be demonstrated that rehabilitation areas have met completion criteria and all conditions for relinquishment. Rehabilitation maintenance activities will be identified by rehabilitation monitoring and ongoing requirements will be reported annually in the Annual Rehabilitation Report and Forward Program.

Rehabilitation Completion (Sign-Off)

Rehabilitated areas will be progressively signed-off by the Resources Regulator as they meet the rehabilitation criteria outlined in **Section 4**, in accordance with the *Guideline: Achieving Rehabilitation Completion (Sign-off).*

6.3 Rehabilitation of Areas Affected by Subsidence

The Tarrawonga Coal Mine is located in an area where no historic underground mining has been undertaken. Subsequently, mine subsidence is not applicable to Tarrawonga.

7 Rehabilitation Quality Assurance Process

A Rehabilitation Quality Assurance Process (RQAP) will be implemented throughout the Rehabilitation process. This will include details of inspections, monitoring and record keeping which will be required to ensure that:

- Rehabilitation is being implemented in accordance with the nominated methodologies; and
- Identified risks to rehabilitation are being adequately addressed at each phase of rehabilitation.

Whitehaven will implement the RQAP through every phase of rehabilitation to confirm that the rehabilitation strategies outlined in this RMP have been completed in accordance with the nominated methodologies (See **Figure 12** - Rehabilitation Quality Assurance Process). The RQAP will also include inspections and documentation to verify that each phase of demolition and rehabilitation has been completed and has met the completion criteria detailed in **Section 4**. Documentation to be maintained would include (but not limited to):

Phase 1 – Active Mining

- Documentation of pre-clearance surveys and LDPs;
- Resource salvage records (soil, rocks, habitat trees)
- Dumping plans and surveys
- Detailed Landform designs

Phase 2 – Decommissioning

- Documentation of boreholes sealing and sign off by RR;
- Inspection and demolition reports to confirm all infrastructure to be demolished has been removed;
- Documentation to identify the future landowner responsible for the ongoing upkeep and management of retained infrastructure; and
- Validation testing to ensure any contamination has been appropriately remediated and/or removed.

Phase 3 – Landform Establishment

- Survey and preparation of as constructed drawings of final constructed slopes, landforms and water drainage structures; and
- Verification reporting to confirm the specified depth of capping has been implemented (i.e., aerial surveys).

Phase 4 – Growth Medium Development

- Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources;
- Site records of re-spread topsoil, ameliorants, fertiliser etc.; and
- Soil testing results to confirm appropriate soil geochemical parameters for plant establishment.

Phase 5 – Ecosystem and Land Use Establishment

- Documentation of reseeding or planting activities undertaken, such as date of planting, weather conditions, seeding rates and/or planting rates; and
- Site inspections and monitoring of rehabilitated areas to allow early identification of any emerging threats to rehabilitation.

Phase 6 – Ecosystem and Land Use Development

- Inspections of temporary and permanent erosion and sediment controls;
- Inspections to identify potential weed infestations;
- Documentation of Rehabilitation Monitoring; and
- Documentation of weed and feral animal management and eradication programs and follow-up inspections.

Whitehaven have developed a Rehabilitation Quality Checklist to be signed off after each phase of rehabilitation prior to proceeding to the next phase (refer **Figure 12** - Rehabilitation Quality Assurance Process).

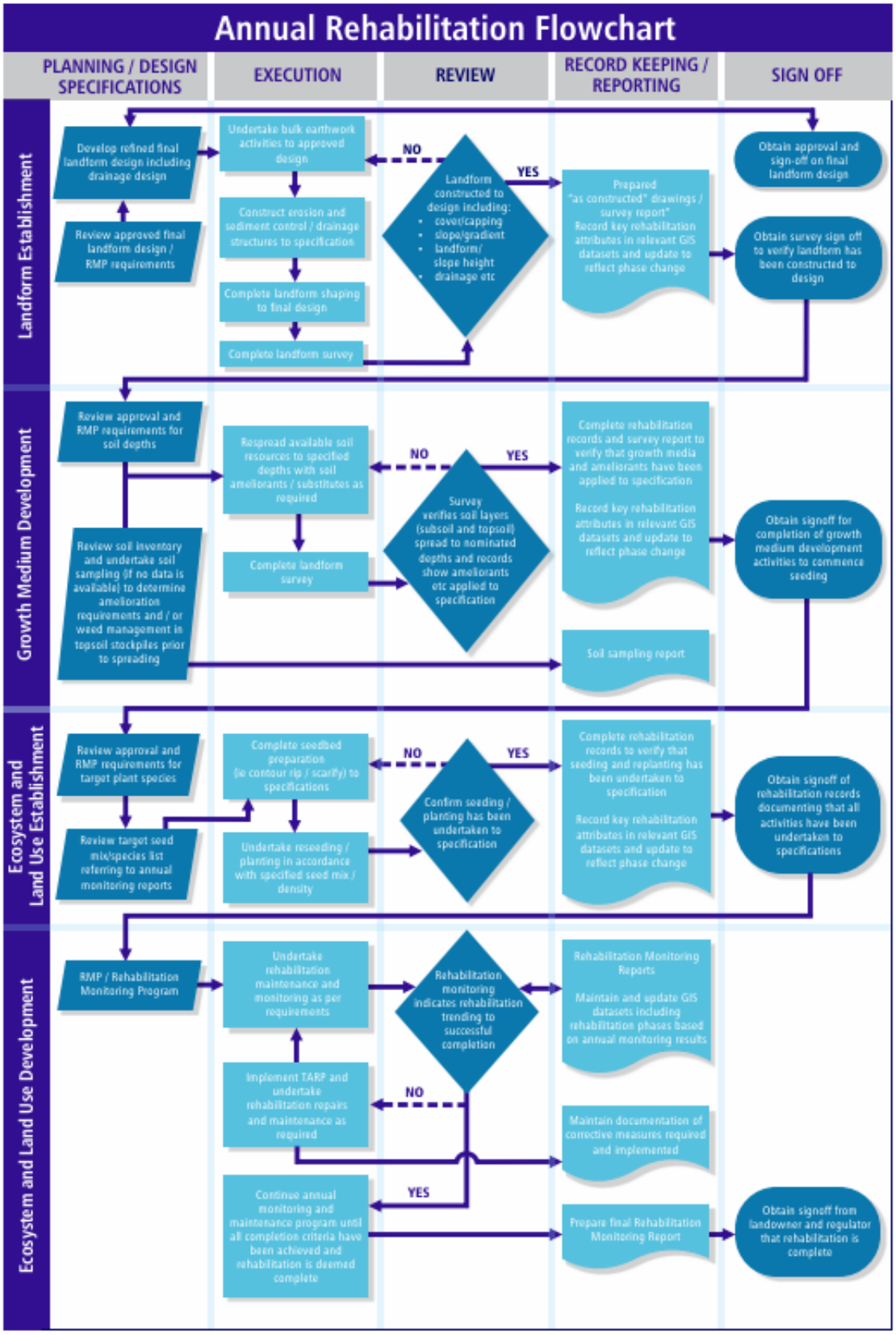

Figure 12 - Rehabilitation Quality Assurance Process

8 Rehabilitation Monitoring Program

Rehabilitation monitoring is undertaken at Tarrawonga to measure and assess rehabilitation performance against the stated rehabilitation and closure criteria outlined in the Whitehaven Standard Annual Rehabilitation Monitoring Methodology (WHC-STD-OC-Rehabilitation Monitoring Method) (RMM). The monitoring results are also used to identify the need for corrective actions for rehabilitation performance. The monitoring program incorporates the most appropriate indicators and methods that:

- Provide a measure of completion criteria to be assessed in accordance with the defined rehabilitation objectives;
- Adequately track changes to rehabilitation phases;
- Are reproducible;
- Utilise scientific recognised techniques; and
- Are cost-effective.

Monitoring is conducted by a suitably skilled and qualified person(s) at locations representative of the range of conditions on the rehabilitating areas and appropriate analogue sites. Monitoring results will inform refinements of rehabilitation methodology as required. Rehabilitation monitoring will be continued until it can be demonstrated that rehabilitation has satisfied all rehabilitation and closure criteria.

8.1 Analogue Site Baseline Monitoring

Analogue sites in 'best-on-offer' vegetation are used to determine if the appropriate characteristics are developing or being achieved. For benchmarking purposes, there are replicate sites within each vegetation community target, and repeat monitoring to capture seasonal variation. As per RMM

8.2 Rehabilitation Establishment Monitoring

Annual Rehabilitation monitoring is undertaken each year as sites are established in rehabilitation that has been seeded since the previous monitoring event. Annual Rehabilitation Monitoring of the newly established sites will identify issues and success within developing rehab.

Annual Rehabilitation monitoring results will link with the TARP management system in **Section 10** if issues are identified during the monitoring period.

The data yielded from the monitoring program allows an adaptive management approach by providing information to inform the type and implementation of management activities and determining the status of rehabilitation performance in relation to completion criteria. This facilitates the continual improvement and refinement of rehabilitation techniques.

8.3 Measuring Performance against Rehabilitation Objectives and Rehabilitation Completion Criteria

Annual Rehabilitation Walk Over Inspections

Annual walk-through of all rehabilitated areas is undertaken internally by a suitably qualified person(s) in Spring to assess the general progress of completed rehabilitation and to identify areas where corrective action is necessary. This assessment has simple objectives relating to vegetation establishment, weeds, erosion presence, surface water management and erosion and sediment control structures.

Any issue identified during the walk over will be recorded and the *Annual Site Rehabilitation Plan* which is updated to include remediation or monitoring activities on the issues.

Annual Rehabilitation Monitoring

Annual Rehabilitation Monitoring is undertaken during spring each year when species are generally flowering, and more species diversity can be identified in rehabilitation areas. Annual rehabilitation monitoring is undertaken in accordance with the RMM.

The monitoring provides detailed (transect-based) scientific data and trends on vegetation community establishment and development and is based on the Biodiversity Assessment Methodology (BAM).

Additional monitoring sites are established as rehabilitation progresses. Periodic or standalone monitoring projects are commissioned as required, and may include targeted fauna, soil, and trial studies.

Detailed analysis of the monitoring data generated by the annual rehabilitation monitoring program is undertaken to determine the trajectory rehabilitation is tracking towards to achieve the final land uses detailed above. The analysis and monitoring outcomes are documented in annual monitoring reports.

Regular visual inspections of all phases of rehabilitation are also undertaken. These informal assessments facilitate early management intervention, and include:

- Success of initial germination after seeding;
- Success of tree and shrub plantings;
- Adequacy of drainage controls;
- Presence/absence of weeds; and
- General stability of the rehabilitation site.

Any issue identified during rehabilitation inspection and documented in the annual rehabilitation monitoring report is actioned in the *Annual Site Rehabilitation Plan*.

Rehabilitation Performance

Outcomes of monitoring results as described in **Section 8.3** are incorporated within the *Annual Site Rehabilitation Plan* which is developed every year by the end of June to align with the budget period. The *Annual Site Rehabilitation Plan* provides additional specific detail, maps and statistics on planned rehabilitation activities and schedules for the next 12-month period. Notwithstanding this, planned activities are consistent with those in the Forward Program/LOM Plans. The *Annual Site Rehabilitation Plan* will provision for rehabilitation activities depending on the phase of rehabilitation at a particular area. The *Annual Site Rehabilitation Plan* will be the key document for tracking the progress of rehabilitation through rehabilitation phases.

9 Rehabilitation Research, Modelling and Trials

9.1 Current Rehabilitation Research, Modelling and Trials

Current rehabilitation research, modelling and trials include:

- Aspect's study on the understorey on the SOEA: Further details required.

The nearby Whitehaven Coal mine, Maules Creek coal mine has a requirement to undertake a $1M research program into rehabilitation of Box Gum Grassy Woodland upon mine rehabilitation, the findings will be considered by TCM.

In addition, rehabilitation monitoring and rehabilitation methodology records are shared among Whitehaven operations to inform decision making regarding future rehabilitation campaigns.

9.2 Future Rehabilitation Research, Modelling and Trials

Future rehabilitation research, modelling and trials proposed include:

- Ground flora rehabilitation study: Further details required.

10 Intervention and Adaptive Management

Where rehabilitation performance is not trending toward the nominated completion criteria this may indicate that there is a potential threat to long term rehabilitation success. Threats to rehabilitation may include events such as extended periods of drought, bushfire events, or pressures from weeds and feral/pest animals.

A Rehabilitation and Closure Trigger Action Response Plan (TARP) has been developed to provide a framework to manage potential key risks to rehabilitation. The Rehabilitation and Closure TARP includes:

- Identification of the principal contributing factors and impacts for each major risk to rehabilitation;
- Identification of upper limits (trigger values) for causes and impacts that are considered to represent an unacceptable level of risk; and
- Identification of appropriate responses to mitigate or remediate the causes and impacts, including a notification protocol.

The Rehabilitation and Closure TARP provides management responses for rehabilitation trigger values. First tier trigger (lower) values identify opportunities for closer monitoring or early intervention that may mitigate potential impacts before notable impact to rehabilitation occurs. Second (upper) tier trigger values identify when indicators have reached a threshold that requires more substantive or widespread remedial actions to remediate or mitigate rehabilitation failure.

Should any trigger conditions be met resulting in the requirement for intervention or adaptive management, actions will be reported in the Annual Rehabilitation Report. Whitehaven will notify the Resource Regulator and other relevant stakeholders of any incident (such as bushfire or disease) that results in major impacts to rehabilitation that are likely to significantly impact the potential to achieve rehabilitation success.

The Rehabilitation and Closure TARP is provided in **Table 23**, and will be revised as conditions at Tarrawonga change or new risks to rehabilitation are identified

Table 23 Trigger Action Response Plan

Aspect/ Category	Key Element	Element Number	Trigger Response	1st Level Trigger	2nd Level Trigger
Landform stability	Slope gradient	1	Trigger	Monthly survey data indicates that the landform is not built to the Geofluv design.	<55% of the rehabilitation area has slopeswithin the limits stipulated in the final the RMP.
			Response	Check machinery guidance system on dozers and update if required. Check site datum and update if required. Undertake regrading as required	Undertake a review of the landform design and make an assessment of the stability of the landform including material characterisation. Undertake stability enhancement works including revegetation if required. Consider regrading to achieve stability.
	Erosion control	2	Trigger	Minor gully or tunnel erosion present and/or minor rilling (rilling up to 200 mm indepth or width).	Slumping and / or active gully or tunnel erosion present and / or rilling >200mm, which is compromising landform stability.
			Response	An inspection of the site will be undertakenby a suitably trained person. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Engage suitably qualified person(s) to assist with the management of erosion andsedimentation at the site and provide recommendations to appropriately remediate the erosion. Remediate as soonas practicable.
	Water management Structures	3	Trigger	Water management structures (sediment dams, channels, contour banks) minor erosion and/or scouring as determined bymonitoring.	Water management structures fail or display significant scouring / erosion asdetermined by monitoring.
			Response	An inspection of the site will be undertakenby a suitably trained person. Identify remedial actions such as amelioration, re- vegetation or alternative scour protection	Engage a suitably qualified person to develop a site-specific remediation plan and review water management structure design criteria. Provide for physical works onthe basis of design review.
Soil/spoil Quality	Salinity	4	Trigger	Increasing trend in soil/water salinity levels	Presence of salt scalds
			Response	Undertake soil/spoil testing to verify ECand recommend further soil / spoil amelioration	Engage a specialist consultant suitably qualified person to develop a site-specific management report to be implemented to remediate salinity scalds. Undertake works as required.
	Spoil surface layers chemical characteristics	5	Trigger	Increasing trend in soil dispersivity (EAT)	Soils are moderately to highly dispersive
			Response	Undertake testing to determine requiredamelioration and undertake ameliorationas required.	Review material handling practices toconfirm that non-dispersive spoil is selectively dumped at final RL where possible and /or dispersive spoils emplaced at surface are appropriatelyameliorated. Ameliorate dispersive spoils (for examplewith coarse gypsum) to a depth of 300 mm. Re-vegetate if required.
	Soil biophysical and chemical characteristics	6	Trigger	Soil biophysical and chemical characteristics not able to sustain vegetation growth for required vegetation community	Soil physical, chemical and biological characteristics continues to illustrate signs of not able to sustain the desired final land use.
			Response	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and re-vegetation in accordance with the consultant recommendations.	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and re-vegetation in accordance with the consultant recommendations.
	Topsoil depth	7	Trigger	Topsoil is not reinstated to, at least, the minimum depth specified for the proposed final land use. As identified in the quality assurance process	Sufficient suitable topsoil cannot be identified for reinstatement at the minimum specified depth for the proposed final land use i.e., 150 to 200mm (agriculture areas) and200mm (other disturbance areas).

Aspect/ Category	Key Element	Element Number	Trigger Response	1st Level Trigger	2nd Level Trigger
			Response	Spread additional topsoil to achieve required depth	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and re-vegetation in accordance with the consultant recommendations.
Biodiversity (native vegetation areas)	Native Species Richness	8	Trigger	Less than 50% of species sown recorded.	Less than 25% of species sown recorded.
			Response	Undertake a field survey to identify which species are not present in revegetation areas. Re-seed or maintenance planting of revegetation areas with unsatisfactory species richness. Review viability results and modify seed species as required	Undertake a field survey to identify which species are not present in revegetation areas. Engage an independent specialist to review seed viability and others causes for revegetation failure and recommend remedial actions. Implement appropriate management actions including revising rehabilitation procedures if required.
	Native Groundcover	9	Trigger	Less than 50% of groundcover species sown recorded.	Less than 25% of groundcover species sown recorded.
			Response	Undertake a field survey to identify likely causes of unsatisfactory germination rates. Re-seed areas with unsatisfactory cover. Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.	Undertake a field survey to identify which species are not present in revegetation areas. Engage an independent specialist to review seed viability and others causes for revegetation failure and recommend remedial actions. Implement appropriate management actions including revising rehabilitation procedures if required.
	Exotic Plant Cover (Weeds)	10	Trigger	Increasing number and cover of exotic species and/or occurrence of newly identified exotic species.	20% more weed presence than that of analogue site
			Response	Engage weed management contractor to remove / spray introduced weed species.	Engage weed management contractor to remove introduced weed species. Investigate management measures to improve native plant establishment and weed suppression. Implement recommendations as appropriate.
Water Quality	Water quality	11	Trigger	Water quality exceeds baseline values	Long term trend outside Water Quality Guidelines (2018) limits values
			Response	Review and investigation of water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Specialist to review sampling and climate data and review likely cause(s). If mine related, undertake an assessment to identify sources of water quality degradation and recommend remedial actions Implement specialist recommendations
	Discharge water quality at licence discharge points	12	Trigger	Sediment basin discharge exceeds EPL criteria for pH, TSS and/or oil/grease	Long term trend outside Water Quality Guidelines (2018) limits
			Response	Re-sampling will be undertaken during the next discharge event to confirm results exceed limits and investigate potential causes.	Review sediment basin maintenance and discharge procedures, and sediment basin capacity requirements. Undertake required corrective actions.
REA – Landform Stability	Reshaping of coarse rejects stockpile with dozers	13	Trigger	Material becomes wet/soft resulting in possible loss of traction or bogging	N/A
			Response	Based on investigation, remediate area if possible or determine alternate course of action in consultation with MEM.	N/A
			Trigger	Surveyor/OCE identifies non-compliance with design surface.	N/A

Aspect/ Category	Key Element	Element Number	Trigger Response	1st Level Trigger	2nd Level Trigger
			Response	OCE/MEM/Surveyor to investigate reason for non-compliance and make any necessary adjustments to implementation process.	N/A
			Trigger	Hot zone exposed by dozer	N/A
			Response	Determine possible extent of hot zone and remediation plan. A JHA must be performed in conjunction with remediation plan.	N/A
	Dumping of inert Overburden Material over reshaped rejects	14	Trigger	Cracks appear on live tip head	N/A
			Response	Determine if cracking likely to deteriorate and extend to the 5m offset rear dump windrow. If so, cut this section of dump down with dozer and re-establish tip-head. If not, continue to monitor by dozer operator.	N/A
			Trigger	Rejects stockpile toe slumps.	N/A
			Response	Establish survey monitoring of slumped area and monitor for movement. MEM to contact a geotechnical expert to undertake investigation and determination of remedial actions.	N/A
REA – Monitoring of Landform	Stability of establishing landform	15	Trigger	Survey or remote sensing of the rehabilitated landforms indicates settlement or slumping that could compromise stability.	Survey or remote sensing of the rehabilitated landforms indicates major settlement or slumping.
			Response	Undertake a review of the landform design to assess risks to stability and free draining design.	Engage a specialist to assist with the management of settlement and slumping and provide recommendations to appropriately remediate. Consider rehandling material and/or regrading if required.
	Monitoring of final landform	16	Trigger	Survey or remote sensing of the rehabilitated landforms indicates settlement or slumping that could compromise stability.	Survey or remote sensing of the rehabilitated landforms indicates major settlement or slumping.
			Response	Undertake a review of the landform design to assess risks to stability and free draining design.	Engage a specialist to assist with the management of settlement and slumping and provide recommendations to appropriately remediate. Consider rehandling material and/or regrading if required.
Adverse weather conditions	Adverse weather conditions experienced during landform or rehabilitation activities	17	Trigger	Intense rainfall received (>20mm) over a period less than 2 hours.	Intense rainfall received (>20mm) over a period less than 1 hour.
			Response	Walk around and/or drone inspection required on currently./recently rehabilitated areas to ensure no significant erosion events	

11 Review, Revision and Implementation

Review and Revision of the Plan

The Plan will be reviewed and if required revised in the event of the following:

- An amendment to the rehabilitation objectives, completion criteria or proposed final land use;
- Changes to risks, risk control measures or rehabilitation strategies being identified during the completion of rehabilitation risk assessment or additional investigations;
- When directed to by the RR Secretary; and
- When triggered by consent conditions (Annual Reviews, Independent Environmental Audits, Incident Reports, Modifications).

Implementation

The process for ensuring that mining and rehabilitation are conducted in accordance with the RMP is the preparation and implementation of an Annual Rehabilitation Plan. The Annual Rehabilitation Plan is prepared and managed by the site Environmental Superintendents and approved by the Operations/Mine Manager.

ACCOUNTABILITIES

Role	Accountability
General Manager	▪ Ensure adequate resources are available to the Operations Manager to complete required rehabilitation activities according to the forward plan; ▪ Ensure adequate resources are available to enable the Environment Manager/Supt to complete the required monitoring and quality control activities in this plan.
Operations Manager	▪ Complete rehabilitation activities according to the schedule put forward in the Forward Plan. ▪ Ensure adequate resources are made available to monitor and assure the quality during the rehabilitation process.
Environmental Mgr/Supt	▪ Monitor the progress of the rehabilitation completed against completion criteria and objectives. ▪ Monitor and report on any risks to rehabilitation success and communicate those risks effectively. ▪ Provide advice to the Operations Manager on all rehabilitation matters.
All Workers	▪ Complete any rehabilitation activities according to procedures and protocols. ▪ Advise the Environmental Supt or delegate of any issues or risks encountered during rehabilitation activities.

SUPPORTING DOCUMENTATION

The following supporting documentation which includes associated training materials may need to be consulted and, where appropriate, used when applying this Standard and/or any subordinate procedures:

- *WHC-PRO-GOC-Annual Rehabilitation Planning Process*

Revisions	Revision Description	Who Consulted	Date
1	Document Developed	Environmental Manager, Ops Mgr, Env Supt, Env Officer	28/7/22
1.1	Consultation with FCNSW, BCS, DPIE Water, LLS and Council as per Cn 64 Sch 3 PA11_0047.	FCNSW, BCS, DPIE Water, LLS and NSC.	Dec 2022
2	Transfer to new template, revision of Rehabilitation objectives and update of TARP	Environmental Manager, Env Supt, Env Advisor	Jan 2025

APPENDIX A – LAND OWNERSHIP

Tenure Type	Lot Number	Deposited Plan Number
Freehold	A	367991
Freehold	156	455004
Freehold	1	622375
Freehold	1	748046
Freehold	2	748046
Freehold	3	748046
Freehold	5	754940
Freehold	6	754940
Freehold	10	754940
Freehold	11	754940
Freehold	12	754940
Freehold	15	754940
Freehold	16	754940
Freehold	17	754940
Freehold	21	754940
Freehold	22	754940
Freehold	24	754940
Freehold	25	754940
Freehold	26	754940
Freehold	27	754940
Freehold	28	754940
Freehold	29	754940
State Forests of NSW	30	754940
Freehold	31	754940

Freehold	37	754940
State Forests of NSW	38	754940
Freehold	44	754940
Freehold	59	754948
Freehold	60	754948
Freehold	18	754953
Freehold	33	754953
Freehold	68	754953
Freehold	69	754953
Freehold	80	754953
Freehold	83	754953
Freehold	88	754953
Freehold	105	755470
Perpetual Lease	159	755475
Freehold	203	755475
Freehold	262	755475
State of NSW	263	755475
Freehold	1	970060
Freehold	1	1015797
Freehold	5	1018347
Freehold	2	1038308
Freehold	3	1038308
Freehold	1	1131282
Freehold	2	1131282
Freehold	3	1131282
Freehold	5	1131282
Freehold	3	1145592

Freehold	4	1145592
Narrabri Shire Council	Goonbri Road	N/A
Narrabri Shire Council	Dripping Rock Road	N/A
Narrabri Shire Council	Athol Lane	N/A
Narrabri Shire Council	Bollol Creek Corridor	N/A
Narrabri Shire Council or Department of Lands (Crown)	Other roads located within, between or adjacent to the above parcels of land	N/A
Part NSW State Forest (Leard State Forest)	N/A	N/A
Part Road Reserve within Gunnedah Shire Council (for water pipeline and associated infrastructure)	Blue Vale Road	N/A
Part Road Reserve within Gunnedah Shire Council (for water pipeline and associated infrastructure)	Braymont Road	N/A

APPENDIX B – STANDARD MINING LEASE CONDITIONS

Refer to website: https://legislation.nsw.gov.au/view/pdf/asmade/sl-2021-360

APPENDIX C - REGULATORY REQUIREMENTS FOR REHABILITATION

Regulatory Requirements Rehabilitation

Condition	Requirement	Domain	Timing	Section Addressed
Mining Lease (ML) 1579, Mining Lease (ML) 1685, Mining Lease (ML) 1693, Mining Lease (ML) 1749				
Part 2 Standard Conditions Division 1 Condition 4	Prevent or minimise harm to the environment.	All	Ongoing	Section 3
Part 2 Standard Conditions Division 1 Condition 5	Rehabilitate land and water as soon as reasonably practicable after disturbance occurs.	All	Ongoing	Section 6.1
Part 2 Standard Conditions Division 1 Condition 6	Achieve the approved final land use for the mining area as set out in the: • rehabilitation objectives statement; • rehabilitation completion criteria statement; and • final landform and rehabilitation spatial plan (large mines only).	All	Prior to relinquishment	Section 2.3
Part 2 Standard Conditions Division 2 Condition 7	Undertake a rehabilitation risk assessment and implement measures to eliminate, minimise or mitigate risks to achieving the final land use.	All	Complete/ Ongoing	Section 3
Part 2 Standard Conditions Division 3 Condition 10	Prepare and implement a rehabilitation management plan (large mines only).	All	Complete	This document
Part 2 Standard Conditions Division 3 Condition 13	Prepare an annual rehabilitation report which describes the progress of rehabilitation over the annual reporting period.	All	Ongoing	Section 6
Part 2 Standard Conditions Division 3 Condition 13	Prepare a forward program which includes the schedule of mining and rehabilitation activities for the next three years demonstrating how rehabilitation will occur as soon as	All	Ongoing	Section 6

<table>
<tr><th>Condition</th><th>Requirement</th><th>Domain</th><th>Timing</th><th>Section Addressed</th></tr>
<tr><td></td><td>reasonably practicable after disturbance.</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Project Approval PA 11_0047</td></tr>
<tr><td>Schedule 3, Condition 34</td><td>The Proponent shall ensure that the project has no greater environmental consequences than predicted in the EA and complies with the performance objectives in Table 12 (labelled as Table 8 in the Notice of Amendment), to the satisfaction of the Secretary.

Table 8: Goonbri Creek and Alluvial Aquifer Performance Objectives

<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>Upper Namoi alluvial aquifer</td><td>No direct disturbance to the alluvial aquifer, or mining operations (excluding flood bund construction) within 10 metres of the aquifer.

No more than negligible environmental consequences to the alluvial aquifer, including: negligible change in groundwater levels; negligible leakage to the mining pit and workings;

negligible change in groundwater quality; negligible stability and erosion risks; and negligible impact to other groundwater users.</td></tr>
<tr><td>Goonbri Creek</td><td>Hydraulically and geomorphologically stable.

Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity).

Riparian vegetation, habitat, energy management and dissipation, bedload transport, biophysical maintenance and pool holding capacity that is the same or better than existed prior to mining</td></tr>
</table></td><td>Native Ecosystem</td><td>Life of Mine</td><td>Section 4.4.2

6.3.3

Water Management Plan</td></tr>
</table>

Condition	Requirement	Domain	Timing	Section Addressed
	Flood bund (if required): Hydraulically and geomorphologically stable. Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity). Provides suitable protection for flood events up to and including the Probable Maximum Flood.			
Schedule 3, Condition 39	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must: (c) in addition to the standard requirements for management plans (see condition 3 of schedule 5),include a: (ii) Surface Water Management Plan, that includes: ▪ detailed plans, including design objectives and performance criteria for: ▪ design and management of final voids; ▪ design and management for the emplacement of reject materials, sodic and dispersible soils and acid or sulphate generating materials; ▪ the Goonbri Creek flood bund, based on additional 2-dimensional flood modelling; o reinstatement of drainage lines on the rehabilitated areas of the site; and ▪ control of any potential water pollution from the rehabilitated areas of the site	All Domains	Life of Mine	Section 6.3.1, 6.3.3
Schedule 3, Condition 44	For all threatened species on site, the Proponent shall ensure that the Biodiversity Offset Strategy and Rehabilitation Strategy are focused on protection, rehabilitation and long-term maintenance of viable stands of	Native Ecosystem	Life of Mine	Section 4

<table>
<tr><th>Condition</th><th>Requirement</th><th>Domain</th><th>Timing</th><th>Section Addressed</th></tr>
<tr><td></td><td>suitable habitat for these species.</td><td></td><td></td><td></td></tr>
<tr><td>Schedule 3, Condition 61</td><td>The Proponent shall rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the development under the Mining Act 1992. This rehabilitation must be generally consistent with the proposed Rehabilitation Strategy described in the EA (and depicted conceptually in Appendix 8) and comply with the objectives in Table 14 (labelled as Table 10 in the Notice of Amendment).

Table 10: Rehabilitation Objectives
<table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Mine site (as a whole)</td><td>Safe, stable and non-polluting

Constructed landforms drain to the natural environment

Landforms fully integrated with the final landform for the Boggabri coal mine as per the EA</td></tr><tr><td>Final void</td><td>Minimise the size and depth of the final void as far as is reasonable and feasible

Minimise the drainage catchment of the final void as far as is reasonable and feasible

Negligible high wall instability risk

Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood level</td></tr><tr><td>Surface infrastructure</td><td>To be decommissioned and removed, unless the</td></tr></table></td><td>Native Ecosystem</td><td>Life of Mine</td><td>Section 6.3.2

Section 1.4.3 and 6.3.2

Section 1.4.3

Section 6.3.5, 4.1 and 4.3</td></tr>
</table>

Condition	Requirement		Domain	Timing	Section Addressed
		Resources Regulator agrees otherwise			
	Agricultural land	Establish a minimum of 257 hectares of Class 3 agricultural suitability land, including 160 hectares suitable for grazing			Section 4.1
	All land – excluding the 257 ha of agricultural land and the final void	Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: ▪ local native plant species (particularly Box Gum Woodland EEC); and ▪ a landform consistent with the surrounding environment			
	Goonbri Creek and Upper Namoi Alluvium	See Schedule 3, Condition 34 above			
	Community	Ensure public safety Minimise the adverse socio-economic effects associated with mine closure			
Schedule 3, Condition 62	The Proponent shall in consultation with the LLS: ▪ develop a detailed soil management protocol that identifies procedures for: comprehensive soil surveys prior to soil stripping; assessment of topsoil and sub-soil suitability for mine rehabilitation; and annual soil balances to manage soil handling including direct respreading and stockpiling; ▪ maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for		Native Ecosystem	Life of Mine	Section 6.3.1 and 3.2.2

Condition	Requirement	Domain	Timing	Section Addressed
	rehabilitation of disturbed areas within the site and for enhancement of biodiversity offset areas; and ▪ ensure that coal reject, or any potentially acid forming interburden materials, are not emplaced at elevations in the pit shell where they may promote acid or sulphate species generation and migration beyond the pit shell.			Section 6.3.1 (h)
Schedule 3, Condition 63	The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim revegetation or dust minimisation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated. Note: It is accepted that the parts of the site where interim revegetation or dust minimisation strategies have been implemented may be subject to further disturbance in future.	Native Ecosystem	Life of Mine	Sections 2.1, 4.2, 6.3.1, 9 and Appendix B
Schedule 3, Condition 64	The Proponent shall prepare and implement a Rehabilitation Management Plan in accordance with the conditions imposed on the mining lease(s) associated with the development under the Mining Act 1992. This plan must: ▪ be prepared in consultation with the Department, Forests NSW, DPIE Water, BCS, LLS and Council; ▪ describe how the rehabilitation of the site would be integrated with: ▪ o the implementation of the biodiversity offset strategy; and ▪ o the final landform for the Boggabri coal mine; ▪ include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final	All Domains	Life of Mine	This Document Section 4.4.2 Section 6.6.3 Section 2.3 and 6 Section 4

Condition	Requirement	Domain	Timing	Section Addressed
	landform and final land use; ▪ include interim revegetation or dust mitigation strategies where necessary to minimise the area exposed for dust generation; ▪ include a program to monitor, independently audit and report on the effectiveness of the rehabilitation measures, and progress against the detailed performance and completion criteria; ▪ include a coal rejects disposal procedure and monitoring program for potential acid generation; and build to the maximum extent practicable on the other management plans required under this approval. Note: The Biodiversity Management Plan and Rehabilitation Management Plan require substantial integration to achieve biodiversity objectives for the rehabilitated mine site.			Section 6.3.5 Section 8 Section 6.3.1
Schedule 3, Condition 65	The Proponent shall prepare and implement an updated Final Void and Mine Closure Plan (as a component of the overall Rehabilitation Management Plan required under condition 64 of schedule 3), following consultation with the Secretary. A draft plan must be prepared and submitted to Resources Regulator by the end of December 2019, and a final plan must be prepared and submitted to Resources Regulator by the end of December 2024. Each version of the plan must: (a) be subject to independent review and verification by suitably qualified, experienced and independent person/s (including a groundwater expert) whose appointment has been approved by the Secretary; (b) identify and consider: ▪ options for continued mining beyond current project life; ▪ interactions with the final landform of adjoining mines (including any direct or indirect interaction between final voids);	Final Void	December 2024	Section 6.3.3 (d)

Condition	Requirement	Domain	Timing	Section Addressed
	▪ opportunities for integrated mine planning with adjoining mines to minimise environmental impacts of the mines' final landforms; ▪ all reasonable and feasible landform options for the final void (including filling); ▪ predicted stability of the proposed landforms; and ▪ predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality); (c) include a detailed proposed landform design; and (d) demonstrate that the proposed final landform: ▪ satisfies the relevant objectives in Table 15 (*labelled as Table 10 in Cn 34 above*); ▪ minimises the extent of any resulting pit lake; ▪ avoids salt scalding; ▪ maximises the capacity of emplaced spoil to drain to the natural environment; and ▪ ensures that drained waters do not adversely affect the downstream environment.			
EPBC Approval 2011/5923				
Condition 3	The person taking the action must submit to the Minister for approval within three months of commencement of construction, an approach that: ▪ limits the maximum disturbance (in hectares) specified for each of the years 5, 10, 15 and 17 from the date of this approval of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the habitat or potential habitat for the regent honeyeater, swift parrot and greater longeared bat; ▪ incorporates an analysis, undertaken by independent ecological experts approved by the Department, that demonstrates the maximum	Native Ecosystem	Completed	Section 2.4.1, 4.2, 4.3, 6.3.1, 6.3.5 and 6.4.1

Condition	Requirement	Domain	Timing	Section Addressed
	disturbance limits which will minimise any impacts on relevant matters of national environmental significance; ▪ demonstrates collaboration with the person taking the action to develop and operate the Boggabri Coal Project (EPBC 2009/5256) and the person taking the action to develop and operate the Maules Creek Coal Project (EPBC 2010/5566), in order to minimise progressive project area disturbance limits across all three sites. The progressive disturbance limits are to be reflected in the development of the Leard Forest Mining Precinct Biodiversity Strategy.			Section 4.4.1
Condition 23	To mitigate the impacts to the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland and the habitat of the regent honeyeater, swift parrot and greater long-eared bat, the person taking the action must, within six months of the date of this variation to conditions of approval, submit to the Minister for approval a *Mine Site Rehabilitation Plan* for the progressive rehabilitation and revegetation of no less than 752 ha of native forest and woodland in the Project area including 13 ha using species consistent with a White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community. This approved *Mine Site Rehabilitation Plan* must be implemented.	Native Ecosystem	Life of Mine	Section 1.4.3 and 6.3.5
Condition 24	The person taking the action must rehabilitate the site to be consistent with the proposed rehabilitation strategy as provided in the Environmental Assessment and, as required under the NSW State Government approval dated 22 January 2013 (Application 11_0047).	Native Ecosystem	Life of Mine	This Document Section 4.2 and 4.3
Condition 25	The mine site rehabilitation plan must include, at a minimum, the following information: ▪ targets and performance indicators to achieve effective restoration of potential habitat for the regent honeyeater, swift parrot and greater long-eared bat and White Box—Yellow Box—Blakely's	Native Ecosystem	Life of Mine	Section 4 and Forward Program

Condition	Requirement	Domain	Timing	Section Addressed
	Red Gum Grassy Woodland and Derived Native Grassland ecological community, including weed management; ▪ details of the vegetation communities to be rehabilitated and the timing of progressive rehabilitation (commencing as soon as practicable following disturbance); ▪ detailed soil depth surveys and analysis to inform the effective placement and restoration of soils underlying the proposed rehabilitation sites; including mapping of soils across the disturbance sites and soil sampling at no less than one sample point per 20 ha of each soil type identified. Sampling must identify; type, depth, water holding capacity, structure and physio-chemical properties of each of the soil and subsoil layers; ▪ processes and methodologies for the removal, storage and re-layering of the topsoil and sub soil layers underlying the disturbed sites being prepared for rehabilitation. These processes and methodologies must ensure the replacement of topsoil and sub soil layers as provided in the Environment Assessment. ▪ a process to report annually to the department the rehabilitation management actions undertaken and the outcome of those actions, and the mechanisms to be used to identify the need for improved management; ▪ a description of the potential risks to successful management and rehabilitation on the project site, including weed invasion, and a description of the contingency measures that would be implemented to mitigate these risks; ▪ details of long-term management and protection of the mine site, including details of the commitment of funds to achieve this.			Section 6.3.4 Section 6 Section 6 Section 10 and Forward Program Section 3 Section 6
Condition 26	The mine site rehabilitation plan must be subject to an	Native Ecosystem	Life of Mine	This Document

Condition	Requirement	Domain	Timing	Section Addressed
	independent review by a qualified ecologist prior to being submitted to the Minister for approval. The findings of the independent review must be published on the website of the person taking the action at the same time as the approved *Mine Site Rehabilitation Plan* is published. Note: for consistency, the person taking the action may develop a single mine rehabilitation plan to align with the requirements, including timing of reporting, of the NSW State Government approval dated 22 January 2013 (Application 11_0047) and this approval. The Offset Management Plan and the Rehabilitation management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.			
Condition 28	The person taking the action must undertake rehabilitation to ensure the final landform provides the optimum opportunity for the successful restoration of native forest and woodland including the critically endangered White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.	Native Ecosystem		Section 6.3.3
Condition 29	The person taking the action must undertake rehabilitation to ensure the final void and landform minimises the extent of any resulting pit lake, avoids salt scalding and ensures that drained waters do not adversely affect the downstream environment and avoids any impacts on matters of national environmental significance. Note: the State approval conditions for project 11_0047 require the preparation and implementation of a Final Void and Mine Closure Plan that considers interactions with the adjoining mines, including interaction between final voids, opportunities for integrated mine planning with adjoining mines to minimise environmental impacts, all reasonable and feasible landform options for the final void (including filling) and predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality).	Native Ecosystem		Section 6.3.3 (d)
Tarrawonga Coal Project EA Statement of Commitments				
Low Permeability	TCPL Commitment	Not Applicable	Not Applicable	Section 6.3.3

Condition	Requirement	Domain	Timing	Section Addressed
Barrier	TCPL commits to construction of the low permeability barrier to meet the following design objectives: ▪ minimise the potential for local drainage of alluvial groundwater into the open cut during operations and post-mining; ▪ minimise the potential for future instability of the open cut batters formed in the alluvium; ▪ maintain the hydraulic character of Goonbri Creek by minimising the potential loss of baseflow; and ▪ maintain the value of alluvial groundwater, by minimising potential interactions with the mine final void, post-mining area's flora and fauna values. In addition, TCPL will augment the existing piezometer network with additional sites to validate the performance of the low permeability barrier.			
Permanent Goonbri Creek Alignment and Associated Flood Bund	TCPL Commitment TCPL commits to the design, construction and implementation of the permanent Goonbri Creek alignment to meet the following design objectives: ▪ construct a low flow channel that approximates the existing section of Goonbri Creek upstream of the Project in terms of stream geometry, hydrology and geomorphology; ▪ mimic the meandering path of the existing alignment of Goonbri Creek, such that the length of the permanent Goonbri Creek alignment is approximately the same length as the section of Goonbri Creek being removed; ▪ minimise the disturbance to the reaches of Goonbri Creek upstream of the permanent Goonbri Creek alignment; and ▪ provide a stable transition back to the existing Goonbri Creek alignment which results in no	Not Applicable	Not Applicable	Section 6.3.3

Condition	Requirement	Domain	Timing	Section Addressed
	detectable change to the hydraulic conditions in the reaches of Goonbri Creek or the Bollol Creek floodplain area downstream. In addition, TCPL commits to the design and construction of the permanent flood bund to a height that will provide protection against the peak flood height associated with a Probable Maximum Precipitation rainfall event. TCPL will develop and implement a Goonbri Creek Management Plan prior to the commencement of construction activities associated with the low permeability barrier, permanent Goonbri Creek alignment and flood bund.			
Rehabilitation Objectives and Final Landform	TCPL Commitment The Project final landform and revegetation program will provide for a combination of approximately 752 ha of native woodland/forest and some 210 ha of Class 3 agricultural suitability land. The agricultural land will be capable of being used for pasture production for grazing and occasional cropping. Revegetation of woodland/forest areas will include the planting of species characteristic of the local vegetation communities, including species from the Box-Gum Woodland endangered ecological community. In addition, TCPL commits to a riparian vegetation enhancement program on a 3.2 km section of Goonbri Creek downstream of the Project open cut, through measures such as revegetation and stock exclusion. A Rehabilitation Management Plan will be developed and implemented for the Project, including a rehabilitation monitoring program designed to track the progress of	Native Ecosystem and Agricultural - Grazing	Life of Mine	Sections 1.4.3, 4.3 and 6.3.5 N/A see Section 6.3.1 This Document

Condition	Requirement	Domain	Timing	Section Addressed
	rehabilitation and revegetation.			
Management of the Project Final Void	TCPL Commitment TCPL commits to installing permanent perimeter bunds and/or diversion channels to limit the catchment area of the final void. In addition, TCPL will design and construct the final void to minimise the long-term drawdown and potential water quality effects on local groundwater aquifers. This will be achieved by adjusting the final void batter angles and/or placing additional waste rock backfill in the final void such that a permanent water body will form and reach an equilibrium level close to, but below, the local pre-mining groundwater level in the coal measures. TCPL will adopt an adaptive management approach to the final void design and mine closure planning for the Project. Final void design and mine planning will be undertaken by TCPL in consultation with relevant government agencies as a component of the Rehabilitation Management Plan.	Final Void	Life of Mine	Section 6.3.3 (d)

Regulatory Requirements Relating to Land Management

Condition	Requirement	Section Addressed
Environment Protection Licence EPL 12365		
Section 3 Condition L3.3	Reject material from the Whitehaven CHPP can be disposed of at the premises in accordance with the disposal method outlined in the Environmental Assessment titled 'Tarrawonga Coal Project – Environmental Assessment', prepared by Resources Strategies, or as modified, or as otherwise approved by the EPA.	Section 6.4