BENGALLA MINE

REHABILITATION MANAGEMENT PLAN

SSD- 5170 (as modified), ML 1397, ML 1450, ML 1469, ML 1711, ML 1728, ML 1729 and ML 1796

Summary Table

Name of Mine:	Bengalla Mine
Rehabilitation Management Plan Commencement Date	19/01/2024
Rehabilitation Plan Revisions	
Version	**Date**
1.0	2 July 2022
2.0	30 March 2023
3.0	19 January 2024
Mining Leases	
Lease No.	**Expiry Date**
EL9431	04/07/2028
ML1397	27/06/2038
ML1469	04/06/2042
ML1450	09/06/2043
ML1711	17/12/2031
ML1728	10/02/2037
ML1729	10/02/2037
ML1796	16/12/2031
Name of Lease Holder(s):	ML1397 Bengalla Mining Company Pty Limited ML1469 Bengalla Mining Company Pty Limited ML1450 Bengalla Mining Company Pty Limited ML1711 Bengalla Mining Company Pty Limited ML1728 Bengalla Mining Company Pty Limited ML1729 Bengalla Mining Company Pty Limited ML1796 Bengalla Mining Company Pty Limited
Date of Submission	19 January 2024
Nominated Contact Person	Hayley Frazer Environment Superintendent Bengalla Mine Locked Mailbag 5, Muswellbrook NSW 2333 Ph: 02 6542 9630 Email: Hayley.Frazer@newhopegroup.com.au

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Part 1. Introduction to Mining Project

1.1 History of Operations

1.1.1 Location

Bengalla Mine (Bengalla) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 130 kilometres north-west of Newcastle and four kilometres west of Muswellbrook (**Figure 1**). Bengalla is generally bounded by Wybong Road to the north, Overton Ridge to the east, the Muswellbrook-Ulan Rail Line and the Hunter River Flood plain to the south and Roxburgh Road to the west.

1.1.2 Mine Operator and Proprietors

Bengalla is owned by the Bengalla Joint Venture (BJV) comprising New Hope Bengalla Pty Limited as to 80% and Taipower Bengalla Pty Limited as to 20%. Bengalla Mining Company Pty Limited (BMC) is the appointed operating company of Bengalla on behalf of the BJV.

1.1.3 Development Consent and Approved Life of Mine

BMC was originally granted development consent for Bengalla on 7 August 1995 (DA 211/93), which authorised the construction and operation of a surface coal mine, coal preparation plant, rail loop, loading facilities and associated facilities (**Figure 2**). BMC was granted Mining Lease (ML) 1397 in 1996 and mining operations commenced in 1998. Initially, the mine was approved to extract up to 8.7 million tonnes per annum (Mtpa) of Run of Mine (ROM) coal. DA 211/93 was subsequently modified on various occasions and further mining leases were granted for Bengalla.

DA 211/93 was surrendered following the grant of State Significant Development (SSD) 5170 for the Bengalla Continuation of Mining Project on 3 March 2015. SSD-5170 authorises the continuation of mining to the west for an additional 24 years at a maximum production rate of up to 15 Mtpa ROM coal. Under Schedule 2 Condition 5 of SSD-5170, BMC may carry out mining operations on site until 28 February 2039. SSD-5170 has been modified from time to time. References to SSD-5170 (as modified) in this Rehabilitation Management Plan (RMP) are to the consent as modified at the date of this RMP.

1.1.4 Significant Surface Disturbing Activities

BMC undertakes a range of significant surface disturbing activities within its mining lease areas including exploration, mining operations and ancillary mining activities.

Exploration is conducted ahead of mining and generally involves drilling with borehole spacing of approximately 600 metres (m). These boreholes include a mixture of open and cored holes and provide a broad understanding of the lithology, quality, gas and other properties in future mining areas. As mining progresses, the pre-production drilling targets the area ahead of the mine (approximately two years out from disturbance) ideally with core (diamond) holes completed at 300 m spacing and chip (open) holes at 100 m spacing.

Additional drilling also occurs (which may or may not be for the purposes of prospecting) including to target anomalies uncovered by mining, structures such as faults, or to obtain geotechnical information for the safe management of mine design.

Other types of prospecting operations may be carried out as required to determine the mineral bearing qualities of the land including geophysical surveys, seismic surveys, downhole logging, geological mapping and airborne surveying.

Mining operations are undertaken using a dragline, excavator/shovel mining methods and a truck fleet. Mining commenced in the eastern portion of ML 1397 and continues to progress in a westerly direction based on dragline strips of approximately 60 m. Topsoil is stripped ahead of mining and either stockpiled or spread directly onto shaped overburden in preparation for rehabilitation.

BMC carries out various ancillary mining activities within its mining leases including but not limited to:

- the construction, maintenance or use of various items of infrastructure or equipment including buildings, mining plant, roads, rail infrastructure, water management infrastructure, cables, conveyors, pipelines, bins, magazines and fuel chutes;
- the removal, stockpiling, management and depositing of overburden, coal, rock or tailings; and
- the storage of fuel, machinery, timber or equipment for use in or in connection with mining operations.

1.1.5 Rehabilitation Status

Rehabilitation of land within the mining leases that is disturbed by activities under the mining leases is completed as soon as reasonably practicable after the disturbance occurs. SSD-5170 (as modified) requires Bengalla to rehabilitate land to high density woody vegetation or 10% treed coverage, including natural micro-relief and drainage lines.

Although some demolition of built infrastructure was undertaken during initial mining operations in the late 1990s, rehabilitation activities have primarily focussed on areas no longer required for ongoing mining operations. Progressive rehabilitation of the Overburden Emplacement Area (OEA) has been undertaken as the final landform is achieved as illustrated on **Figure 2**.

A rehabilitation program is also being undertaken to retrofit previous rehabilitation on the eastern and southern slopes of the OEA exposed to Muswellbrook and Denman with high density woody vegetation. This retrofit rehabilitation has focussed on the use of species commensurate with the surrounding native vegetation communities.

Rehabilitation processes are further discussed in **Part 6**.

HB BENGALLA ANNUAL REVIEW Hb1669 F1 Regional Locality 04 03 2017

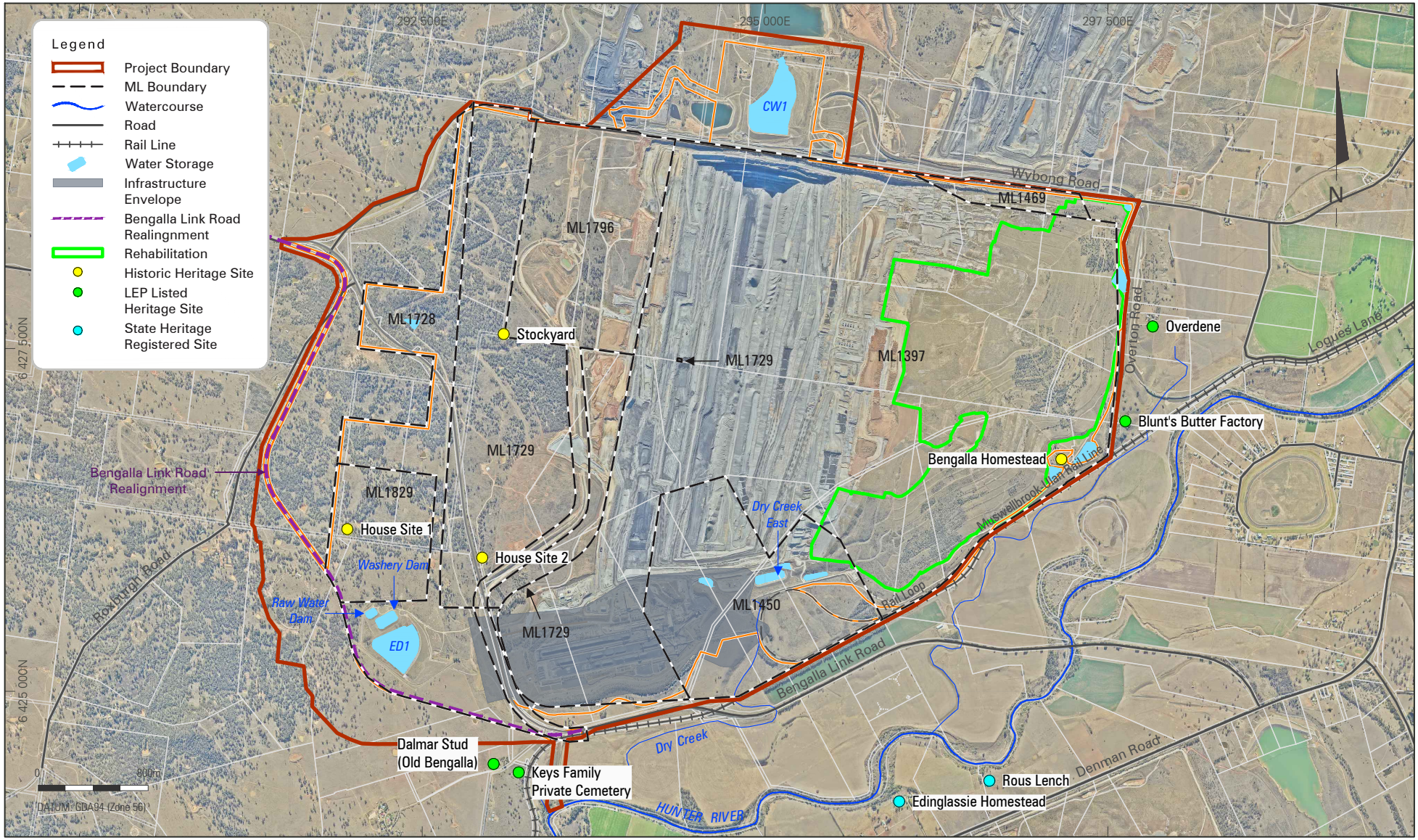
BENGALLA

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

BENGALLA MINE

Regional Locality

FIGURE 1



JBA 2177 - BENGALLA (RR) - F 02 OPERATIONS LAYOUT (17/01/2024)

BENGALLA MINE

Operations Layout

FIGURE 2

1.2 Current Development Consents, Leases and Licences

As described at Section 1.1.3 above, the principal approval for Bengalla is SSD-5170 (as modified) which was granted under the then Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* NSW (EP&A Act) on 3 March 2015 and has since been modified from time to time.

In addition, BMC operates under several other approvals including:

- Approval issued by the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* Cth (EPBC Act);
- Authorisations under the *Mining Act 1992* NSW (Mining Act) issued by the NSW Minister for Resources;
- Environment Protection Licence (EPL) issued by the Environment Protection Authority (EPA);
- Dangerous goods licences issued by SafeWork NSW; and
- Water licences and approvals issued by Water NSW.

Table 1 lists the various development consents, Mining Act authorisations and other approvals, licences and authorities issued by Government agencies relevant to mining operations and rehabilitation at Bengalla.

Table 1: Current Development Consents, Leases and Licences

Approval	Tenement / Licence (Description)	Authority	Issue – Expiry Dates
State Significant Development Consent	SSD-5170 (as modified)	DPE	Issued: 03/03/2015 Expiry: 28/02/2039
Development Consent – Explosives Facility	DA 273/2006	MSC	06/09/2006 – Perpetuity
Mining Lease	ML 1397	MEG	27/06/2017 – 27/06/2038
Mining Lease^	ML 1450	MEG	11/06/1999 – 09/06/2043
Mining Lease^	ML 1469	MEG	05/06/2000 – 04/06/2042
Mining Lease	ML 1711	MEG	29/09/2015 - 17/12/2031
Mining Lease	ML 1728	MEG	10/02/2016 – 10/02/2037
Mining Lease	ML 1729	MEG	10/02/2016 – 10/02/2037
Mining Lease	ML 1796	MEG	30/03/2021 – 16/12/2031
Exploration Licence	EL 9431	MEG	04/07/2022 – 04/07/2028
Environment Protection Licence (EPL)	6538	EPA	Anniversary Date 11 September
EPBC Approval	2012/6378	Commonwealth Department of Climate Energy, Energy the Environment and Water	27/05/2015 – 31/12/2050
Water Access Licence (Hunter River)*	WAL 1106	Water NSW	Tenure Type: Continuing

Approval	Tenement / Licence (Description)	Authority	Issue – Expiry Dates
Water Access Licence (Groundwater) **	WAL 41547	Water NSW	Ongoing
Hunter River Pump	20PE001354	Water NSW	01/05/1997 – Annual
Licence to Store Explosives	XSTR200130	SafeWork NSW	Expiry Date: 07/08/2027
Radiation Management Licence	5061036	EPA	Expiry Date: 08/08/2024

^ Renewal sought.
** Primary WAL for the Hunter Regulated River with 1,449 units (high security). BJV/BMC holds various other WALs for the Hunter Regulated River and other water sources.*
*** WAL with 365 units (category aquifer) for the Sydney Basin-North Coast Groundwater Source (extraction of groundwater from the pit). BJV/BMC holds various other WALs for groundwater sources.*
BMC management plans, system documents and procedures listed in this RMP may be updated from time to time.

1.3 Land Ownership and Land Use

Land Use

The Upper Hunter region has a history of rural land use for agricultural and industrial activities, predominantly grazing and coal mining. The land surrounding Bengalla is largely dominated by mine owned land for various current or proposed mining operations.

Land Tenure

All of the land within the mining lease areas for Bengalla is freehold land owned by the BJV in their respective shares or BMC except for:

- Crown roads, Council roads and parts of the Muswellbrook-Ulan rail line; and
- ML 1711 – the freehold land within this mining lease area is owned by MACH Energy Australia Pty Ltd (MACH) (see further comments below).

Most of the land to the north of Bengalla is owned by MACH for the Mount Pleasant Operation. The land to the south of the Hunter River is held by BHP (Hunter Valley Energy Coal Pty Ltd (HVEC)) for the Mount Arthur Mine (**Figure 3**). Land further to the west of Bengalla is held by Glencore for the Mangoola Mine. There is some privately owned land to the west, south-west and east of Bengalla.

Appendix A contains a schedule of land ownership at Bengalla and surrounding areas, consistently with the land ownership and land use figure referred to at **Section 1.3.1**.

Biodiversity Conservation

There are no stewardship agreements, conservation agreements or similar agreements specific to land within the Bengalla mining leases. **Figure 4** identifies the environmentally sensitive ecology and land use within and surrounding Bengalla.

Relevant Land Access Agreements with MACH

BMC holds ML 1711 over an area of land north of Wybong Road, for the operation and maintenance of its Clean Water Dam 1 and associated infrastructure in connection with the diversion of Dry Creek authorised under SSD-5170 (as modified). The land within ML 1711 is owned by MACH. BMC has an agreement with MACH for the purposes of Part 13 of the Mining Act to enable the exercise of rights on the surface of ML 1711.

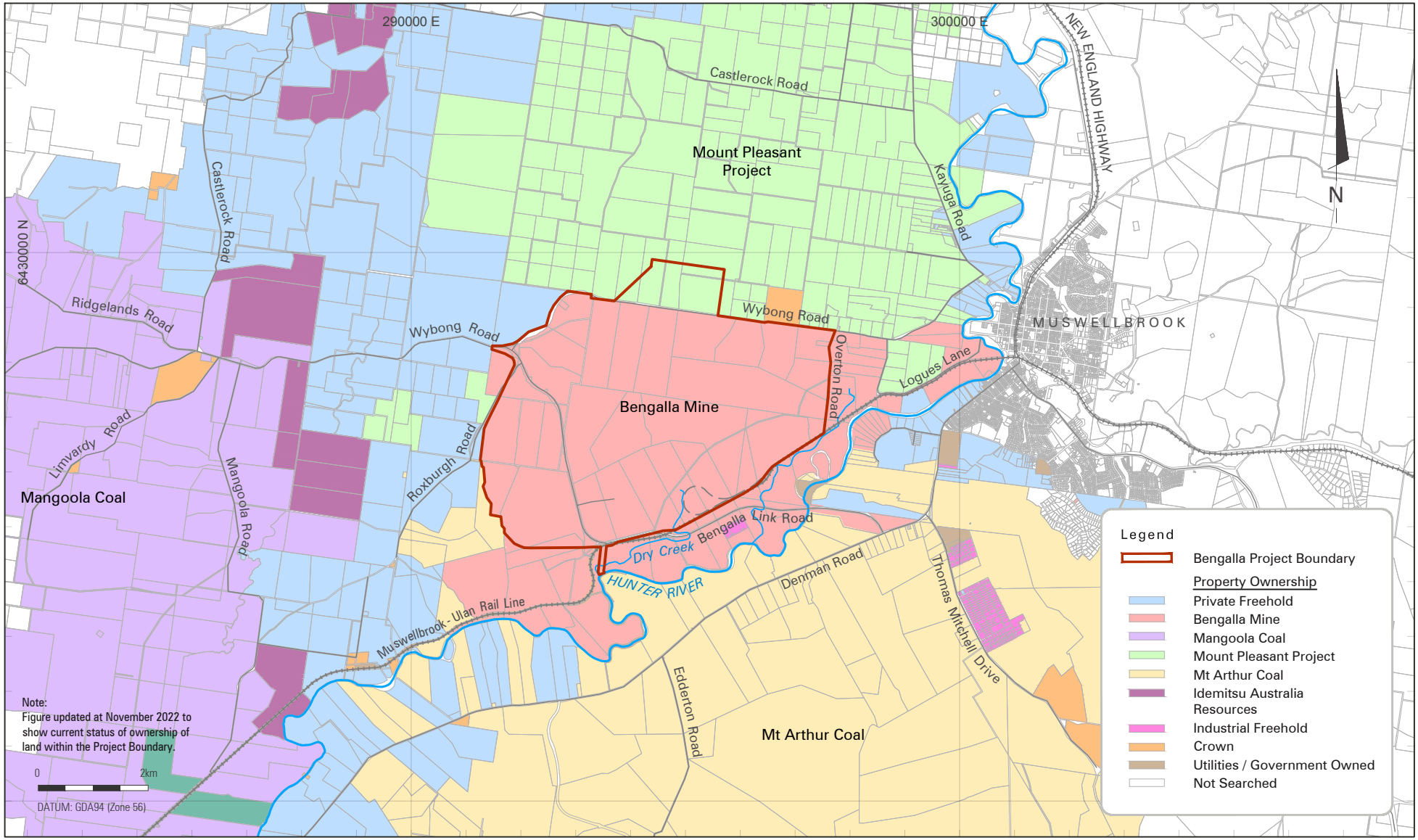
BMC has granted a licence to MACH (which will be replaced by a sublease) over an infrastructure corridor within ML 1711 for an overland conveyor and associated infrastructure for Mount Pleasant. The licence/sublease will remain in place until the earlier of certain events occurring including the closure of Mount Pleasant or the transfer of ML 1711 from BMC to MACH. Final rehabilitation plans for the proposed reinstatement of Dry Creek will be refined in later amendments to this RMP having regard to any relevant tenure arrangements with MACH in respect of the infrastructure corridor within ML 1711.

An approval to transfer part of ML1729 to MACH was approved on 20 July 2023. This area has been registered under ML1829 and covers an area of land to the north and west of the active mining area for construction and operation of a discharge pipeline for Mount Pleasant. MACH may construct alternative water discharge infrastructure in the future on BJV owned land being:

- a replacement discharge pipeline over a similar alignment to the current discharge pipeline (for which an easement would be granted); and/or
- a discharge dam for Mount Pleasant within an area of ML 1829 held by MACH.

1.3.1 Land Ownership and Land Use Figure

Appendix A contains a schedule of land ownership at Bengalla and surrounding areas, which is illustrated in **Figure 3**. Together, **Figures 3**, **Figure 4** and **Figure 5** contain the information required by section 1.3.1 of the *Form and Way: Rehabilitation Management Plan for Large Mines* (NSW Resources Regulator, 2 July 2021).



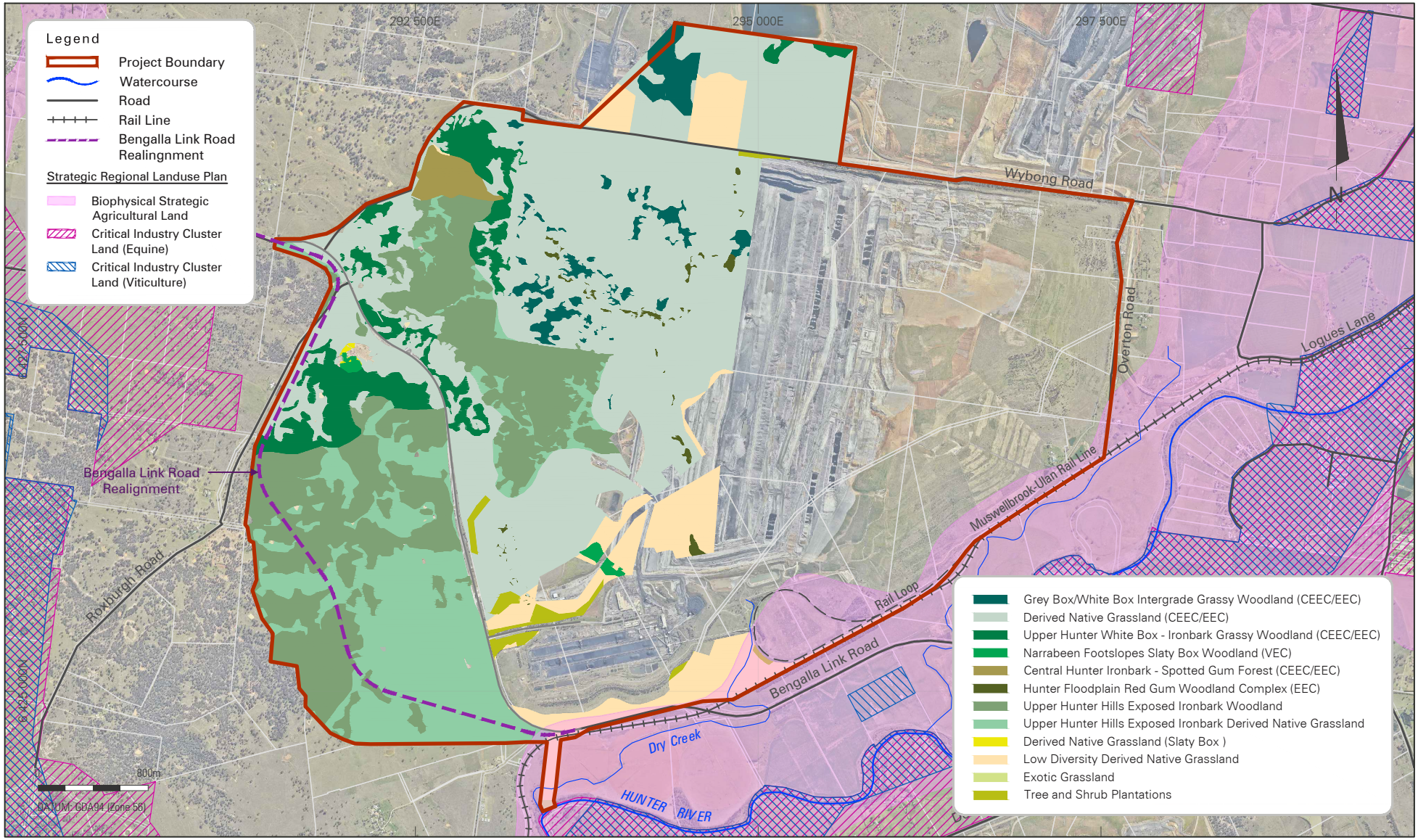
BENGALLA MINE

BENGALLA

JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

Land Ownership

FIGURE 3



JBA 2177 - BENGALLA (RR) - F 04 ENV SENSITIVE AREAS (19/05/2022)

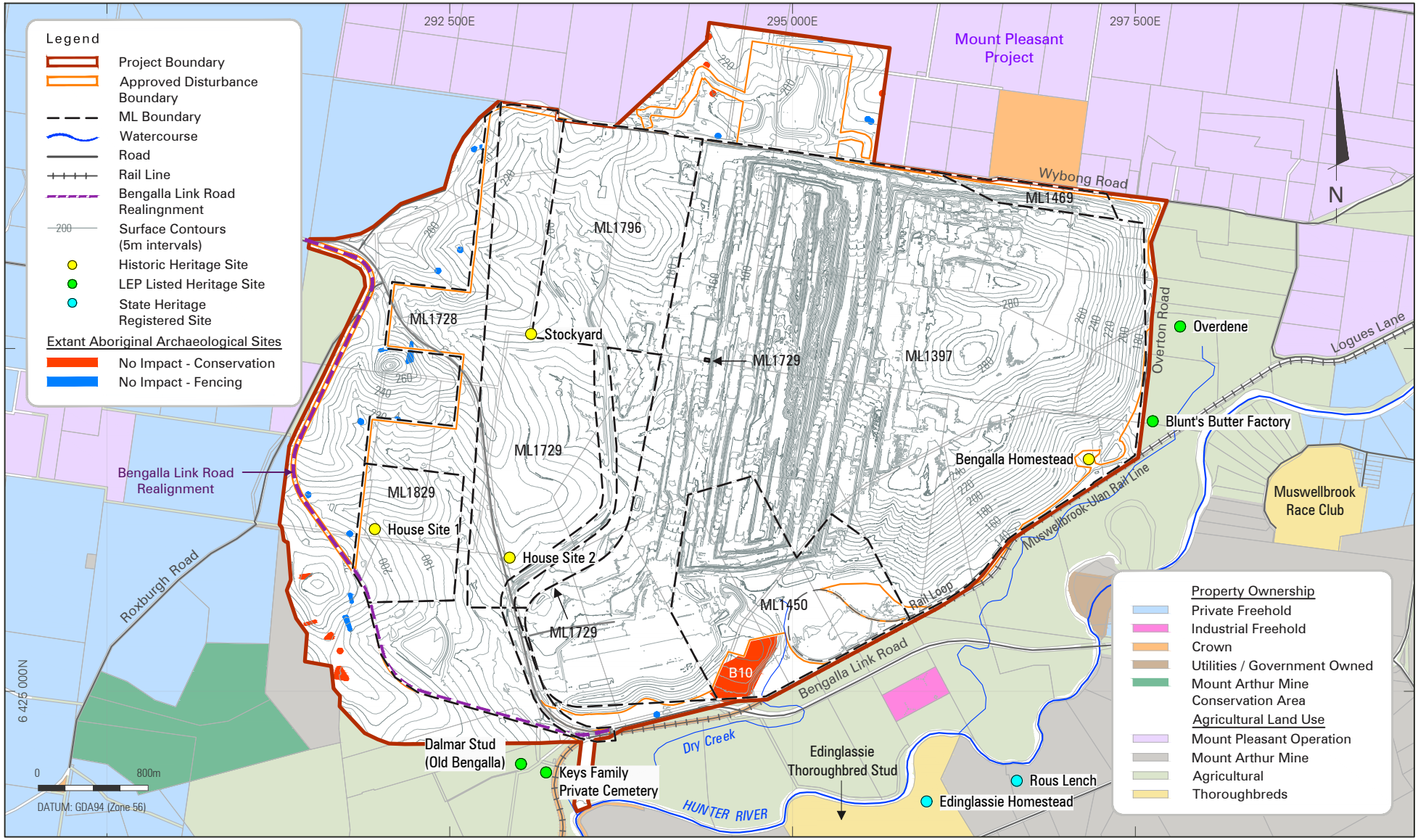
BENGALLA MINE

BENGALLA

JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

Environmental Sensitive Areas

FIGURE 4



BENGALLA MINE

Land Use

FIGURE 5

Part 2. Final Land Use

2.1 Regulatory Requirements for Rehabilitation

The regulatory requirements specific to rehabilitation at Bengalla are summarised in **Table 3** and **Table 4**. These tables also indicate where each requirement is addressed in this RMP and the timing to meet each requirement.

The relevant regulatory requirements arise under the conditions of BMC's mining leases, SSD-5170 (as modified) and approval EPBC 2012/6378. As described at section 2.1.3, the rehabilitation requirements under the EPBC approval re-state the rehabilitation requirements under specified conditions of SSD-5170 (as modified).

The respective mining lease conditions apply to the land within each lease. The conditions of SSD-5170 (as modified) generally apply to the land within the "site" as defined in SSD-5170 (as modified) being the land listed in Appendix 1 to SSD-5170 (as modified).

2.1.1 Mining Lease Requirements

The classification of domains matches the codes listed in the *Guideline: Mine Rehabilitation Portal* (NSW Resources Regulator, 2021) (Portal Guideline). **Table 2** below identifies the new mining and final land use domain codes relevant to Bengalla.

Table 2: Rehabilitation Reform Guideline Domains and Spatial References (Code)

Mining Domains		Final Land Use Domains	
Code	**Domain**	**Code**	**Domain**
1	Infrastructure Area	A	Native Ecosystem
3	Water Management Area	B	Agriculture – Grazing
4	Overburden Emplacement Area	F	Water Management Areas
5	Active Mining Area (Open Cut Void)	G	Water Storage (Excluding Final Void)
7	Beneficiation Facility	H	Heritage Area
		I	Infrastructure
		J	Final Void

From 2 July 2022, the conditions of BMC's mining leases relating to rehabilitation have effectively been replaced by those prescribed under Part 2 of Schedule 8A of the *Mining Regulation 2016* NSW (Mining Regulation) and listed in **Table 3.**

Table 3: Mining Lease Requirements for Rehabilitation

Cond.	Requirement	Domain	Timing	RMP Section
5	**Rehabilitation to occur as soon as reasonably practicable after disturbance** The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs.	All Domains	Ongoing throughout mine life	6.2.3.2
6	**Rehabilitation must achieve final land use** (1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area. (2) The holder of the mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1). (3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1). **Note—** Clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause. (4) In this clause— ***final land use*** for the mining area means the final landform and land uses to be achieved for the mining area— (a) as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and (b) for a large mine—as spatially depicted in the final landform and rehabilitation plan, and (c) if the final land use for the mining area is required by a condition of development consent for activities under the mining lease—as stated in the condition. ***planning approval*** means— (a) a development consent within the meaning of the *Environmental Planning and Assessment Act 1979*, or (b) an approval under that Act, Division 5.1.	All Domains	Mine Closure	2.2 Part 3 Part 4 Part 5 2.1.2

Cond.	Requirement	Domain	Timing	RMP Section
7	**Rehabilitation risk assessment** (1) The holder of a mining lease must conduct a risk assessment (a ***rehabilitation risk assessment***) that— (a) identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease— (i) the rehabilitation objectives, (ii) the rehabilitation completion criteria, (iii) for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan, and (b) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks. (2) The holder of the mining lease must implement the measures identified. (3) The holder of a mining lease must conduct a rehabilitation risk assessment— (a) for a large mine—before preparing a rehabilitation management plan, and (b) for a small mine—before preparing the rehabilitation outcome documents for the mine, and (c) whenever a hazard is identified under clause 6(3)—as soon as reasonably practicable after it is identified, and (d) whenever given a written direction to do so by the Secretary.	All Domains	Ongoing throughout mine life	Part 3
9	**General requirements for documents** A document required to be prepared under this Division must— (a) be in a form approved by the Secretary, and **Note—** The approved forms are available on the Department's website. (b) include any matter required to be included by the form, and (c) if required to be given to the Secretary—be given in a way approved by the Secretary.	All Domains	Noted	This document
10	**Rehabilitation management plans for large mines** (1) The holder of a mining lease relating to a large mine must prepare a plan (a ***rehabilitation management plan***) for the mining lease that includes the following—	All Domains	RMP developed and published by 1 August 2022	This document This document Part 6

Cond.	Requirement	Domain	Timing	RMP Section
	(a) a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area, (b) a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation, (c) a summary of rehabilitation risk assessments conducted by the holder, (d) the risk control measures identified in the rehabilitation risk assessments, (e) the rehabilitation outcome documents for the mining lease, (f) a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored. (2) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document. (3) A rehabilitation management plan is not required to be given to the Secretary for approval. (4) The holder of the mining lease— (a) must implement the matters set out in the rehabilitation management plan, and (b) if the forward program specifies timeframes for the implementation of the matters—must implement the matters within those timeframes.		Ongoing throughout mine life	Part 6 Part 3 Part 3 Part 4 Part 4 Part 4 Forward Program submitted separately
11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows— (a) to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary—within 30 days after the document is approved, (b) as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made, (c) to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment—as soon as practicable after the rehabilitation risk assessment is conducted, (d) whenever given a written direction to do so by the Secretary—in accordance with the direction.	All Domains	Ongoing throughout mine life	Part 11

Cond.	Requirement	Domain	Timing	RMP Section
12	**Rehabilitation outcome documents** (1) The holder of a mining lease must prepare the following documents (the ***rehabilitation outcome documents***) for the mining lease and give them to the Secretary for approval— (a) the ***rehabilitation objectives statement***, which sets out the rehabilitation objectives required to achieve the final land use for the mining area, (b) the ***rehabilitation completion criteria statement***, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives, (c) for a large mine, the ***final landform and rehabilitation plan***, showing a spatial depiction of the final land use. (2) If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.	All Domains	Ongoing throughout mine life	Part 4 Part 4 Part 4 Part 5 Table 4
13	**Forward program and annual rehabilitation report** (1) The holder of a mining lease must prepare a program (a ***forward program***) for the mining lease that includes the following— (a) a schedule of mining activities for the mining area for the next 3 years, (b) a summary of the spatial progression of rehabilitation through its various phases for the next 3 years, (c) a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs. (2) The holder of a mining lease must prepare a report (an ***annual rehabilitation report***) for the mining lease that includes— (a) a description of the rehabilitation undertaken over the annual reporting period, (b) a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period, (c) a report demonstrating progress made towards the achievement of the following— (i) the objectives set out in the rehabilitation objectives statement,	All Domains	The first Forward Program was submitted by 1 August 2022. Forward Program and Annual Rehabilitation Report is due by end of March each year.	Forward Program submitted separately

Cond.	Requirement	Domain	Timing	RMP Section
	(ii) the criteria set out in the rehabilitation completion criteria statement, (iii) for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan. (3) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document. (4) The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary. (5) In this clause— ***annual reporting period*** means each period of 12 months commencing on— (a) the date on which the mining lease is granted, or (b) if the Secretary approves another date in relation to the mining lease—the other date.			
14	**Amendment of rehabilitation outcome documents and forward program** (1) This clause applies to— (a) a rehabilitation outcome document if it has been approved by the Secretary, and (b) a forward program if it has been given to the Secretary. (2) The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless— (a) the Secretary gives the holder a written direction to do so, or (b) the Secretary, on written application by the holder, gives a written approval of the amendment. (3) The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval. (4) Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.	All Domains	Rehabilitation Outcome Documents approved 22 December 2023 and Forward Program submitted by 1 August 2022.	Rehabilitation Outcome Documents submitted separately.
15	**Times at which documents must be prepared and given** (1) The holder of a mining lease must do the following before the end of the initial period— (a) prepare a rehabilitation management plan, and (b) prepare rehabilitation outcome documents and give them, other than the rehabilitation	All Domains	1 August 2022	Rehabilitation Outcome Documents approved 22

Cond.	Requirement	Domain	Timing	RMP Section
	completion criteria statement, to the Secretary for approval, and (c) prepare a forward program and give it to the Secretary. (2) The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before— (a) 60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or (b) a later date approved by the Secretary. (3) A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary. (4) The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before— (a) 60 days after a development consent is modified following an application referred to in clause 20(1)(b), or (b) a later date approved by the Secretary. (5) A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3). (6) The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause. (7) The holder of the mining lease must comply with the direction. (8) In this clause— ***initial period*** means the period commencing when the mining lease is granted and ending— (a) 30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or (b) if this Division applies to the mining lease because of an increase in the required security deposit— (i) when the surface of the mining area is disturbed by activities under the mining lease, or		Forward Program and Annual Rehabilitation Report is due by end of March each year.	December 2023 and Forward Program submitted separately Part 2 Other requirements in clause 15 of Schedule 8A are not yet relevant

Cond.	Requirement	Domain	Timing	RMP Section
	(ii) at a later date approved by the Secretary.			
16	**Certain documents to be publicly available** (1) This clause applies to the following documents— (a) a rehabilitation management plan, (b) a forward program, (c) an annual rehabilitation report. (2) The holder of a mining lease must make a document to which this clause applies publicly available by— (a) publishing it on its website in a prominent position, or (b) if the holder does not have a website—providing a copy of it to a person— (i) on the written request of a person, and (ii) without charge, and within 14 days after the request is received. (3) If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published— (a) for a rehabilitation management plan—within 14 days after it is prepared or amended, or (b) for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended, (4) Personal information within the meaning of the *Privacy and Personal Information Protection Act 1998* is not required to be included in a document made available to a person under this clause.	All Domains	Documents published on the BMC website by 1 August 2022 and maintained throughout mine life	Part 11
17	**Records demonstrating compliance** The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part. **Note—** The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.	All Domains	Ongoing throughout mine life	11.3
18	**Report on non-compliance** (1) The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with— (a) a condition of the mining lease, or	All Domains	Ongoing throughout mine life	11.4

Cond.	Requirement	Domain	Timing	RMP Section
	Note— The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition. (b) a requirement of the Act or this Regulation relating to activities under the mining lease. (2) The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance. (3) The holder of the mining lease must ensure the report— (a) identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and (b) describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and (c) describes the causes or likely causes of the non-compliance, and (d) describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.			
19	**Nominated contact person** (1) The holder of a mining lease must nominate a natural person to be the contact person with whom the Secretary can communicate in relation to the mining lease for the purposes of the Act. **Note—** The Act, section 383 sets out the ways in which notices or other documents may be issued or given to, or served on, a person for the purposes of the Act. (2) The holder of the mining lease must give written notice to the Secretary of— (a) the full name and contact details of the nominated person—within 28 days after the date on which the standard conditions apply to the mining lease under clause 31A of this Regulation, and (b) any change in nomination or in the nominated person's contact details—within 28 days after the change occurs. (3) The holder of the mining lease must ensure that the contact details for the nominated person include the person's phone number and postal and email addresses.	All Domains	Ongoing throughout mine life	Nomination of contact person completed through Resources Regulator Portal

2.1.2 Development Consent Requirements

The specific requirements of SSD-5170 (as modified) related to rehabilitation are provided in Schedule 3, Conditions 44 to 47 and are listed in **Table 4**. **Table 4** also shows where each requirement is addressed within this RMP.

Table 4: Development Consent Requirements for Rehabilitation

Condition	Requirement of Schedule 3 of SSD-5170 (as modified)		Domain	Timing	RMP Section
Schedule 2, Condition 5	**LIMITS ON CONSENT** **Mining Operations** The Applicant may carry out mining operations on the site until 28 February 2039. *Note: Under this consent, the Applicant is required to rehabilitate the site and perform additional undertakings to the satisfaction of either the Secretary or the Resources Regulator. Consequently this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.*		All Domains	Mining Operations until 28 February 2039	Title Block and Section 1.1.3
Condition	**Requirement of Schedule 3 of SSD-5170 (as modified)**				**RMP Section**
44	**Rehabilitation Objectives** The Applicant must rehabilitate the site in accordance with the provisions under the *Mining Act 1992*. The rehabilitation must comply with the objectives in Table 15 and be consistent with the conceptual final landform plan shown in Appendix 9. *Table 15: Rehabilitation Objectives*		All Domains	Ongoing & at closure	This document and Part 6
	Feature	***Objective***			
	Mine site (as a whole)	• Safe, stable and non-polluting • Final landforms designed to incorporate natural micro-relief and natural drainage lines, which, where reasonable and feasible, further avoid straight run drainage drop structures, to integrate with surrounding landforms	All Domains	Ongoing & at closure	6.2.1.3 and 6.2.3.2
	Overburden Emplacement Area – exposed to	• Rehabilitate the entire face with high density woody vegetation comprising of species	A4 B4 F4	Ongoing & at closure	6.2.5

Condition	Requirement of Schedule 3 of SSD-5170 (as modified)		Domain	Timing	RMP Section
	Muswellbrook and Denman	commensurate with the surrounding native vegetation communities as soon as practicable following the completion of mining operations	G4		
	Final void	• Designed as a long term groundwater sink and to maximise groundwater flows across back-filled pits to the final void • Minimise the greatest extent practicable: ○ the size and depth of the final void ○ the drainage catchment of the final void ○ any high wall instability risk ○ risk of flood interaction (flows in and out of the void) • Maximise to the greatest extent practicable the final void landform to be in keeping with the natural terrain features of the surrounding landscape	J5	Ongoing & at closure	Sections 6.2.3.4 and 9.2
	Agricultural land	• Restore or maintain land capability generally as described in the EIS and shown conceptually in Appendix 9	B1 B3 B4 B7	Ongoing & at closure	6.2.5
	Revegetation areas	• Restore a minimum 10% treed coverage at the mine site • Higher density planting along the riparian zone of the Dry Creek reinstatement, and around the final void	All Domains	Ongoing & at closure	6.2.5

Condition	Requirement of Schedule 3 of SSD-5170 (as modified)		Domain	Timing	RMP Section
	Dry Creek reinstatement	• No net loss of creek length • Restore, maintain and/or improve hydrological and ecological function, quality and geomorphic stability • Incorporate erosion control measures based on vegetation and engineering revetments • Revegetate with suitable native species	F4 G3	After Year 15 and prior to Year 24	6.2.3.5
	Surface infrastructure	• To be decommissioned and removed, unless the Resources Regulator agrees otherwise	B1 B7	At mine closure	6.2.2.2
	Community	• Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure	All domains	Ongoing & at closure	6.2.2.1
45	**Progressive Rehabilitation** The Applicant must carry out rehabilitation progressively, that is, as soon as reasonably practicable following disturbance (particularly on the face of emplacements that are visible off-site). Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation. *Note: It is accepted that parts of the site are progressively rehabilitated may be subject to further disturbance in future.*		All domains	Ongoing & at closure	6.2.3.2
46	**Rehabilitation Management Plan** The Applicant must prepare a Rehabilitation Management Plan for the development in accordance with the provisions under the *Mining Act 1992*, and carry out the development in accordance with this plan.		All domains	RMP developed and published by 1 August 2022 RMP is Ongoing throughout mine life	This documen t
47	**Rehabilitation Strategy** The Applicant must prepare a Rehabilitation Strategy for all land disturbed by the development to the satisfaction of the Planning Secretary. This plan must:		All Domains	Due for submission 24 February 2024	Document will be developed.

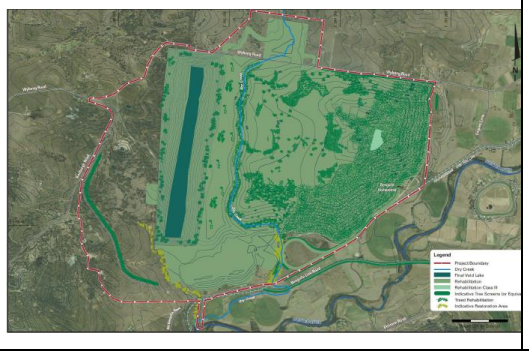
Condition	Requirement of Schedule 3 of SSD-5170 (as modified)	Domain	Timing	RMP Section
	(a) be prepared in consultation with DPE Water, BCD, Council and the CCC; (b) be submitted to the Planning Secretary within 12 months of the approval of Mod 5; (c) build upon the Rehabilitation Objectives in Table 15, describe the overall rehabilitation outcomes for the site, and address all aspects of rehabilitation including mine closure, final landform (including final voids and reinstatement of Dry Creek), postmining land use/s and water management; (d) align with strategic rehabilitation and mine closure objectives and address the principles of the Strategic Framework for Mine Closure (ANZMEC and MCA, 2000); (e) describe how rehabilitation will be integrated with the mine planning process, including a plan to address premature mine closure; (f) investigate opportunities to refine and improve the final landform and final void outcomes over time; (g) include a stakeholder engagement plan to guide rehabilitation and mine closure planning processes and outcomes; and (h) include a program to periodically review and update this strategy at least every three years.			
Appendix 9 Conceptual Final Landform		All Domains	Ongoing & at closure	Part 5

Table 5 lists the requirements from Table 102 in the *Continuation of Bengalla Mine Environmental Impact Statement* (Hansen Bailey, 2013) (EIS). BMC is required by Schedule 2 Condition 2 of SSD-5170 (as modified) to carry out the development generally in accordance with the EIS.

Table 5: EIS Requirements for Rehabilitation

Ref	Commitment	Domain	Timing	RMP Section
51	The existing Rehabilitation Management Plan will be revised for the Project with consideration of the management and mitigation measures described in this EIS.	All domains	Ongoing	This Document
52	Rehabilitation will be designed to permit the reintroduction of relevant agricultural activities into appropriate rehabilitation landform as soon as practicable.	All domains	Ongoing	6.2.5
53	Final rehabilitation completion criteria for mine closure will be developed and agreed in consultation with the relevant government agencies and community and incorporated in the Final Void and Mine Closure Plan (developed as part of the Rehabilitation Management Plan).	B1 B3 B4 B7	Ongoing & Closure	Part 4
54	Should BMC wish to cease operations at Year 24 a Mine Closure Plan will be developed within five years of the scheduled mine closure.	All Domains	5 years prior to closure	Part 5 & Part 6

2.1.3 Environment Protection and Biodiversity Conservation Act Requirements

Bengalla was granted approval EPBC 2012/6378 under the *Environment Protection and Biodiversity Conservation Act 1999* Cth (EPBC Act) on 27 May 2015. The EPBC approval contains the following condition related to rehabilitation:

5. *In order to protect listed threatened species and listed threatened ecological communities, the approval holder must undertake rehabilitation activities in accordance with NSW approval conditions 44, 45 and 46.*

These requirements have been addressed within this RMP as listed in Table 4.

2.2 Final Land Use Options Assessment

This section is not applicable to Bengalla as the final land use is approved under SSD-5170 (as modified) (see further at **Section 2.3** below).

2.3 Final Land Use Statement

BMC is required under Schedule 2, Condition 2 of SSD-5170 (as modified) to carry out the development generally in accordance with the EIS. As outlined further below, the EIS describes the final land use as a mixture of native bushland and cattle grazing excluding the eastern face of the Overburden Emplacement Area (OEA), which will be revegetated with high density woody vegetation.

The final use is spatially depicted on the final landform and rehabilitation plan at **Part 5** of this RMP.

A number of post-mining land use options were considered during the development of the EIS including in consultation with regulators, near neighbours and the local community. Investigations were undertaken to determine feasible land uses on rehabilitated land having regard for land slope, class, water requirements and soil types. The potential land uses identified in the review were then evaluated based on a number of selection criteria, including:

- community and stakeholder acceptance;
- health and safety considerations;
- potential environmental impacts;
- regulatory requirements and legal liability; and
- contribution to the local economy and employment.

After consideration of the above selection criteria and extensive feedback from community consultation, a mixture of native bushland and cattle grazing were identified to be the most suitable post-mining land uses for the majority of land at Bengalla with the exception of the eastern face of the OEA. The eastern face of the OEA is required to be revegetated to contain higher density natural woodland similar to that presently found within undisturbed areas of land within the SSD-5170 (as modified) project boundary. This combination of agricultural (cattle grazing) and conservation land use are the preferred land uses following mine closure.

The conceptual final landform design and land use domains are provided in **Part 5**.

2.4 Final Land Use and Mining Domains

The domains for Bengalla have been determined having regard for the local environment. Final land use domains are land management units characterised by a similar post mining land use objective. Mining domains are land management units within the mine site, usually with unique operational and functional purpose. Final land use domains and mining domains described in this RMP are to be read in conjunction with SSD-5170 (as modified).

The key domains within Bengalla mining leases and further details provided in **Section 2.4.1** and **Section 2.4.2**. These domains are illustrated in the final landform and rehabilitation plan at **Part 5**.

2.4.1 Final Land Use Domains

The final land use domains for Bengalla Mine are presented in **Table 6.** These domains are illustrated in the final landform and rehabilitation plan at **Part 5**.

Table 6: Bengalla Final Land use Domains

Code	Final Land Use Domain	Description
A	Native Ecosystem (HDWV)	This domain relates to the eastern and southern faces of the OEA which are exposed to Muswellbrook and Denman and will consist of HDWV with pasture as required by the final land use approved under SSD-5170 (as modified). This design will allow for both visual amenity of the landform from external viewing locations and a native vegetation corridor over part of the OEA. The seed mix used for this domain can be found in **Section 6.2.5**.
B	Agriculture – Grazing	**Class III Pasture** Class III Pasture is a small domain on the top of the eastern face of the OEA. This domain has minimal slopes and was created from soils

Code	Final Land Use Domain	Description
		recovered from the Southern Overburden Emplacement Area as approved in Modification 4 of former development consent DA211/93 for Bengalla and is approved under SSD-5170 (as modified). **Class IV and V Pasture** Class IV and V Pasture areas will cover the majority of the post-mining landform. Pasture areas will be reconstructed from the pasture species list is found in **Section 6.2.5**. Native vegetation (selected from the HDWV Domain) will be included in the Pasture areas to create biodiversity connectivity through native vegetation corridors.
F	Water Management Areas	This domain refers to the reinstatement of Dry Creek. This work will reinstate Dry Creek through the OEA in a design similar to the original Dry Creek (described in **Section 6.2.3.5**) and establish River Red Gums along the original stretches of Dry Creek (where conditions allow). When Dry Creek is reinstated the characteristics will be similar to the Hunter Valley River Red Gum / River Oak riparian woodland wetland community. Species in the ground to upper stratums may be selected from the below: • Species upper stratum: o Eucalyptus camaldulensis; o Casuarina cunninghamiana subsp. Cunninghamiana (River oak); o Angophora floribunda (Rough-barked Apple); and o Eucalyptus melliodora (Yellow Box); • Species middle stratum: o Nil; • Species ground stratum: o Austrostipa verticillate (Slender Bamboo grass); o Austradanthonia spp. (A Wallaby grass); o Cynonon dactylon (Common Couch); o Einadia trigonos subsp. Trigonos; o Elymus scaber var. scaber (Common Wheatgrass); o Alternanthera sp. A; o Alternanthera denticulata (Lesser Joyweed); o Urtica incisa (stinging nettle); and o Pasture rehabilitation species as listed in **Table 10**.
G	Water Storage (Excluding Final Void)	A number of mine dams will remain following mine closure and be incorporated in the final landform for use as ongoing fresh water storage to support the proposed final land use. Dams will also be installed within rehabilitation areas as required.
H	Heritage Area	One area of European heritage significance within the mining lease areas is the Bengalla homestead (c1877). This area has been included within the Heritage Area domain for the final land use. Heritage items identified in the Historic Heritage Management Plan will be managed according to that plan.
I	Infrastructure	Infrastructure, if any, to remain post mine closure will be identified as part of the mine closure plan.
J	Final Void	The final void is the open pit left at mine closure. Defined by a single void, its modelled long term water level is 70 RL at 1,000 years. It will have sufficient freeboard and as such will not require a spillway as it is not free

Code	Final Land Use Domain	Description
		draining. The final void is scheduled to be created in 2039 being the end of approved mining operations under SSD-5170 (as modified). The void will be aligned generally north-south and will have a strike length of approximately 3.0 km. The Final Void domain includes all aspects of the final void landform including crest, slopes and its floor. The currently approved location of the final void under SSD-5170 (as modified) is at the limit of approved open cut mining and has no alternate location. However, coal reserves have been identified to the west of currently approved mining operations at Bengalla. If BMC determines to apply for and is granted approval to continue mining to uncover these reserves, the location of the final void will change subject to any future approval. All slopes will be battered back to ensure long term geotechnical stability of the final void. Surface water drainage will be minimised through the construction of drainage control structures to divert as much of the catchment as reasonable and feasible away from the final void and back into the surface water system. Further detail is provided in **Section 6.2.3.4**.

2.4.2 Mining Domains

The mining domains for Bengalla Mine are presented in **Table 7.** These domains are illustrated in the final landform and rehabilitation plan at **Part 5**.

Table 7: Bengalla Mining Domains

Code	Mining Domain	Description
1	Infrastructure Area	Infrastructure areas within this domain include those listed below: (a) Fixed and temporary in-pit infrastructure including but not limited to crib and park up amenities, fuel farm, explosives storage, bioremediation farm, hot tyre park up, dragline substations, rock crusher, laydown areas and maintenance pads/hardstands, temporary reject cells, ROM coal stockpiles, topsoil stockpiles, clay stockpiles, rock stockpiles for different rock sizes, waste rock stockpiles rail ballast stockpiles, stock bunds, roads network for providing access to and from the mining areas or infrastructure areas or rehabilitation areas, water management structures and any other infrastructure required to operate Bengalla from time to time. (b) Remnant structures remaining after removal of the Mount Pleasant rail from south of Wybong Road that may include but are not limited to water infrastructure (for example, pipes, dams, drains and other earthworks and former rail cuttings that may convey surface water), rail ballast including stockpiles, cabling, concrete footings, culvert boxes and bridge and associated infrastructure.

Code	Mining Domain	Description
		(c) Administration buildings, bathhouses, electrical infrastructure, access roads and parking facilities, core shed, helipad and ancillary infrastructure. (d) Topsoil and clay stockpiles and areas of temporary stabilisation. (e) Maintenance infrastructure including but not limited to maintenance workshop, wash bays, chemical storage, electrical infrastructure, radio tower, fuel lubricant facility and other infrastructure required for maintenance activities. (f) Areas where exploration or geotechnical studies are carried out within mining leases, including in advance of mining.
3	Water Management Area	Water Management areas include sewage treatment facilities, sediment water dams, mine water dams, clean water dams, diversion drains, levees, pumps, pipelines and associated infrastructure required to operate the mine from time to time. These facilities are used to manage sewerage and clean, sediment laden and mine water.
4	Overburden Emplacement Area	The OEA stores the waste rock and reject material (placed into cells and capped) created during the mining process to uncover coal. The OEA extends in a westerly direction filling the void created by mining. Once the OEA has reached the designed final landform height and there is no longer a need for the space operationally, the rehabilitation process can commence.
5	Active Mining Area (Open Cut Void)	The main active void is defined by the active highwall/extraction area where mining occurs, is aligned generally north-south, has a strike length of approximately 3.0 km and moves westward as mining progresses. The active void includes mining equipment including but not limited to dragline, excavators, loader, dozers, drills, haul trucks, auxiliary equipment, lighting sets, pumps, pipes, bunds, ROM coal stockpiles, rock stockpiles, rail ballast stockpiles and other infrastructure, for example, rock crusher, required to operate the mine from time to time.
7	Beneficiation Facility	This domain includes the Coal Handling Preparation Plant (CHPP) and associated infrastructure including but not limited to rail loop and train load out facility, conveyors, stacker and reclaimer system, transfer stations and gantries, stockpile areas, ROM hopper and surge bins, thickener, reject bin, sewage plant and other infrastructure required to operate the CHPP from time to time.

Part 3. Rehabilitation Risk Assessment

In accordance with clause 7 of Schedule 8A of the Mining Regulation, Bengalla completed a Rehabilitation Risk Assessment (Risk Assessment) in March 2022 to:

- identify, assess and evaluate the rehabilitation related risks to the Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Land Use; and
- identify the measures to be implemented to eliminate, minimise or mitigate those risks.

The risks to achieving successful rehabilitation were assessed to identify and analyse risks to achieving the approved final land uses prescribed in current development consent SSD-5170 (as modified) across all rehabilitation phases described in **Section 6.2**.

Table 8 sets out a list of the risks identified and how each risk and associated control is addressed in this RMP. Individual Bow Tie risk assessment sessions conducted at the workshop included:

- Integration of Rehabilitation into Life of Mine Planning;
- Final Landform;
- Growth Media Development;
- Rehabilitation Materials & Biological Resources; and
- Ecosystem Establishment and Ecosystem Development.

An ongoing assessment of the effectiveness of risk controls, as well as the emergence of any new risks to rehabilitation, is incorporated into the rehabilitation quality assurance process (**Part 7**) and rehabilitation monitoring program (**Part 8**).

Controls identified during the Risk Assessment have been incorporated into the Trigger Action Response Plan (TARP) in **Part 10**. The Risk Assessment contains references to the TARP actions.

Part 10 also includes appropriate management responses in the event that rehabilitation monitoring indicates that risk controls are ineffective or identifies the emergence of previously unidentified risks.

The Risk Assessment will be reviewed and updated as needed in accordance with the triggers listed in **Part 11** or as otherwise required.

Table 8: Analysis of Rehabilitation Threats

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Final Landform		
Failure to implement landform commitments	• Geotechnical assessment of mine plan landforms • Modelling outcomes are used in the design of the landform • Erosion modelling of the existing rehabilitation to validate its long term stability • Construction supervision • Post construction erosion and landforms stability monitoring • Survey 'as built' to verify that the design has been adhered to • Engineered design and analysis	Section 6.2.3 and Part 10
Less than adequate management of Potential Acid Forming (PAF) materials during operations	• Rehabilitation Management Plan • Acid Rock Drainage and Mineral Waste Management Plan • 'As built' landform survey	Section 6.2.1.5
Not meeting the approved final landform profile i.e. dump heights, water catchments, surface water drainage	• Design incorporates landform regulatory requirements • Mine planning to manage dump volumes to meet design • Landform survey during construction • Rehabilitation Management Plan	Part 5 and Section 6.2.3
Premature closure (includes legislation changes, geotech failure, economics) of the mine means the approved landforms cannot be achieved	• Change Life of Mine planning to accommodate • Seek development consent modification	Part 11
Infrastructure not decommissioned and/or contamination not remediated in accordance with Development Consent or Mining Lease	• Rehabilitation Management Plan • Develop Mine Closure Plan	Section 6.2.2
Saline Leachate expressing from the landform	• Mine planning for emplacement of unsuitable materials in accordance with the Acid Rock Drainage and Mineral Waste Management Plan • Mine design allows pit / dump floors to generally drain back towards the void • Water Management Plan monitoring program	Section 6.2.1.5 Section 11.1.3

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Unplanned ponding and slumping in the landforms; particularly as mining moves west	• Micro relief design sheds water from the landform (minimise ponding) • Final landform surface water management design • 'As built' landform survey • Revegetation monitoring and inspections • LiDar information that can be used to review the landform	Section 6.2.3 Section 7.1.1
Large scale landform failure (geotechnical event)	• Principal Hazard Management Plan for Ground or Strata Failure • Design by suitably qualified and experienced engineer • 'As built' landform survey	Section 6.2.3 Part 10
Groundwater recharge in the final void results in final void landform instability /failure or impacts on other users	• Mine Closure Plan to address the final void • Groundwater model indicates that the final void is a long term sink • Groundwater monitoring network • Groundwater model reviewed every 3 years	Section 6.2.3 Part 10
Unable to achieve relinquishment	• Resources available for remediation where required [internal or third party]	Part 10
Impact on the environment	• Incident Response Plan • Resources available for remediation	Part 11
Reputational damage / loss of social licence	• Multi-agency consultation • Implement stakeholder engagement strategy	Part 11
Additional unplanned costs	• Corporate Governance	Rehabilitation Cost Estimate
Growth Media Development		
Topsoil depth is unsuitable for the final land use	• Rehabilitation Management Plan • Suitable equipment and experienced operators • Rehabilitation inspections [testing topsoil depth and soil analytes] • Verification and inspection records	Part 10
Inadequate depth of the sub-soil	• Rehabilitation Management Plan • Suitable equipment and experienced operators • Rehabilitation inspections [testing topsoil depth and soil analytes] • Verification and inspection records	Part 10

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Sodicity and surface crusting	• Timing of growth media application and seed bed preparation • Apply ameliorants • Monitoring and testing • Verification and inspection records	Part 10
Handling practices damage physical properties / soil structure	• Choice of equipment • Mine planning (minimise re handle) • Avoiding smooth seedbeds • Stockpile management (including stockpile height) • Rehabilitation Management Plan	Section 6.2.4
Geochemical properties of growth media	• Testing and monitoring • Apply ameliorants (as required) • Re-testing of past area to inform future rehab and mitigate any issues	Section 6.2.1.5 Section 6.2.1.10 Part 10
Seed bed preparation is inadequate for pasture	• Rehabilitation Management Plan • Use of sub-soil [Class 3] where testing results conclude appropriate • Ripping and harrowing for pasture land use outcomes • Seeding to be undertaken as soon as practicable following the seed bed preparation	Part 10 Section 6.2.4
Seed bed preparation is inadequate for woody veg land use	• Rehabilitation Management Plan • Coarse ripping for the dense woody land use blocks • Seeding to be undertaken immediately following the seed bed preparation	Part 10 Section 6.2.4
Seed bed preparation is inadequate for retro-fit dense woody land use	• Rehabilitation Management Plan • Scalping topsoil to remove competition • Coarse ripping for the dense woody land use outcomes (may include cover crop)	Part 10 Section 6.2.4
Unable to achieve relinquishment	• Resources available for remediation where required [internal or third party]	Part 10 Rehabilitation Cost Estimate
Impact on the environment	• Incident Response Plan • Resources available for remediation where required [internal or third party]	Part 11

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Reputational damage / loss of social licence	• Implement stakeholder engagement strategy • Multi-agency consultation	Part 11
Additional unplanned costs	• Corporate Governance	Part 10 Rehabilitation Cost Estimate
Rehabilitation Materials & Biological Resources		
Lack of topsoil storage space for topsoil that is accessible to the required areas	• Budget Plan and Rehabilitation Management Plan • Ground Disturbance Permit process requires consideration of the topsoil stripping requirements • Life of Mine topsoil balance	Section 6.2.1.1
Stripping methods results in contamination or loss of resource [including use of sub-soil]	• Ground Disturbance Permit • Appropriate equipment with a dedicated experienced crew • Soil colour used as a guide to stripping • Survey stockpile location and volume • Rehabilitation Management Plan	Section 6.2.1.1
Topsoil weed contamination	• Ground Disturbance Permit • Spray weeds before stripping • Scalping weeds before stripping in HDWV • Scalping stockpiles before spreading • Seeding stockpiles to inhibit weeds • Inspection and weed management • Rehabilitation Execution Plan	Section 6.2.1.1 Section 6.2.1.10 Section 6.2.4
Insufficient topsoil available to effect rehabilitation	• Assessment of areas where alternates to topsoil can be used [direct deeding] • Life of Mine topsoil balance	Part 10
Insufficient topsoil and clay for Dry Creek reinstatement	• Topsoil / clay characterisation • Materials mass balance for rehabilitation materials required for Dry Creek • Mine planning to minimise • Designated clay stockpile area • Rehabilitation Management Plan	Part 10

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Failure to characterise soils (and ameliorates if required)	• Soil testing and characterisation • Apply ameliorants at the time of spreading on rehabilitation areas • Rehabilitation Management Plan	Section 6.2.1.1 Part 10
Failure to recover suitable habitat features	• Rehabilitation Management Plan • Fit for purpose salvaging equipment • Storage locations for salvaged habitat resources • Ground Disturbance Permit	Section 6.2.4
Lack of suitable rock (grading, size, competency) to enable key structures to be built	• Identify suitable rock in the mining process • Stockpile mixed size rock • Life of Mine rock budget [estimated at present] • Rock can be purchased locally if required • Rock testing to ensure meets required properties	Section 6.2.3.2 Part 10
Poor quality seed	• Purchase seed • Viability testing (purchased or collected seed) • Biodiversity Management Plan requires seed collection for use in rehabilitation (when available)	Section 6.2.5 Part 10
Less than adequate quantity of seed / tubes tock for rehabilitation outcomes (availability)	• Suitably experienced suppliers • Notify suppliers to source the correct seed • Notify suppliers so that they have sufficient tubes tock available	Section 6.2.5 Part 10
Inappropriate equipment and skilled operators with suitable availability to execute the rehabilitation	• Access to external contractor • Pit Services Team	Part 7 Part 10
Failure to identify and manage Acid Forming Material (e.g. handle waste rock, washery waste or general carbonaceous material, etc)	• Acid Rock Drainage and Mineral Waste Management Plan	Section 6.2.1.7 Part 10
Unable to achieve relinquishment	• Resources available for remediation where required [internal or third party]	Part 10 Rehabilitation Cost Estimate
Impact on the environment	• Incident Response Plan • Resources available for remediation where required [internal or third party]	Part 11
Reputational damage / loss of social licence	• Implement stakeholder engagement strategy • Multi-agency consultation	Part 11

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Additional unplanned costs	• Corporate governance	Rehabilitation Cost Estimate Part 10
Integration of Rehabilitation into Life of Mine Planning		
Inadequate resources to complete rehab requirements	• Rehabilitation planning is part of the business planning • Site Rehabilitation Committee • Budget - allocation of funds to execute rehabilitation implementation • Out of budget spend - funding not allocated	Rehabilitation Cost Estimate Part 10
Operational constraints mean plans not achieved	• Life of Mine Plan • Mine planning [Budget Plan and Rehabilitation Plan]	Section 6.1
Inadequate records to demonstrate rehabilitation success and that risks are managed	• Rehabilitation Management Plan • Annual Rehabilitation Review • Ongoing rehabilitation inspections and post closure monitoring • Verification records • Annual Rehabilitation Plan • Rehabilitation risk assessments • Annual Rehabilitation Report	Part 9 Part 10 Part 11
Ineffective scheduling of rehabilitation inside mine planning systems	• Rehabilitation Management Plan • Mine planning [Budget Plan and Rehabilitation Plan] • Medium term mine planning [22 week plan] • Site Rehabilitation Committee • Short term planning [weekly planning]	Section 6.1 Part 10
Rehabilitation execution not clearly defined	• Rehabilitation scope of works provided to contractor • Short term planning [weekly planning] • Site inspections by site Environment Department and/or consultant and/or contractor	Section 6.1 Part 10
Lack of governance regarding mine closure and related financial obligations (i.e. corporate standards)	• Rehabilitation Management Plan • Rehabilitation Cost Estimate • Development Consent in place that prescribes mine closure plan timing	Rehabilitation Cost Estimate Part 10

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Inappropriate management/disposal of non-mineral waste during operations	• Waste management procedures [including tyres] • Control that requires action	Section 6.2.1.8
Less than adequate management of spontaneous combustion in overburden areas	• Spontaneous combustion management procedure • Dump procedure which describes the requirements	Section 6.2.1.6
Less than adequate management of Potential Acid Forming (PAF) materials during operations	• Acid Rock Drainage and Mineral Waste Management Plan	Section 6.2.1.7
Less than adequate management of cultural and heritage sites during operations/lack of awareness of cultural heritage obligations.	• All known sites have been removed within the existing disturbance area • Any retained sites are fenced, mapped and managed • Historical Heritage Management Plan	Section 6.2.1.12
Less than adequate rehabilitation of exploration activities	• Ground Disturbance Permit	Section 6.2.1.10
Final voids, highwalls and low walls pose a risk to public safety impacts land available future final land uses	• Rehabilitation Management Plan • Mine Closure Plan [Development Consent requirement]	Section 6.2.1.1 Part 10
Contamination resulting from operational activities (e.g. storage and use of hydrocarbons/chemicals, drilling fluids, spillage of dirty water, saline water, brine and sewage)	• Incidents Register [reports contamination]	Section 6.2.2.4
Hazards associated with retained infrastructure (e.g. dams, site services)	• Rehabilitation Management Plan	Section 6.2.2
Lack of detail around final void management strategy (e.g. water balance, water quality, geotechnical assessments, future water licensing requirements)	• Development consent and Environmental Impact Statement describes the approved void • Life of Mine Plan	Section 6.2.3.4 Section 6.1
Unable to achieve relinquishment	• Resources available for remediation where required [internal or third party]	Part 10
Impact on the environment	• Incident Response Plan • Resources available for remediation where required [internal or third party]	Part 11
Reputational damage / loss of social licence	• Implement stakeholder engagement strategy • Multi-agency consultation	Part 11

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Additional unplanned costs	• Corporate governance	Part 11 Rehabilitation Cost Estimate
Ecosystem Establishment and Ecosystem Development		
Pasture seeding methodology unsuitable to achieve adequate germination	• Employ broadcast seeding methods • Sow temporary cover crop • Inoculated legumes with rhizobia and lime pelleting • Include ant deterrent seed coating • Include DAP fertiliser with pasture seed mix • Time seeding for appropriate seasonal conditions • Inspection program • Maintain verification and inspection records	Section 6.2.5 Part 10
Native seeding methodology unsuitable to achieve adequate germination	• Sow temporary cover crop • Inoculated legumes with rhizobia and lime pelleting • Include ant deterrent seed coating • Include DAP fertiliser with pasture seed mix • Time seeding for appropriate seasonal conditions • Inspection program • Maintain verification and inspection records	Section 6.2.5 Part 10
Ineffective native tubestock planting methodology to achieve the final land use	• Time tubestock planting for appropriate seasonal conditions • Apply herbicide to planting lines generally 2 weeks prior to ripping • Deep rip and seed • Plant tubestock with water crystals and fertiliser pellets • Deep watering until tubestock established • Inspection program • Maintain verification and inspection records.	Section 6.2.5 Part 10
Predation of juvenile vegetation	• Install hare guards (tubestock) • Monitor and record vertebrate pest numbers • Vertebrate pest culling programs • Stock exclusion fencing	Section 6.2.5 Part 7 Part 10
Bushfire damage	• Bushfire Management Plan	Part 10

Risk/Cause/Consequence	Summary of control measures to be implemented	Where addressed in this RMP
Rehabilitation areas are not on a trajectory to meet the approved completion criteria for the final land use	• Rehabilitation Management Plan • Rehabilitation Monitoring and TARPS • Maintain verification and inspection records	Part 10
Inadequate resources available to meet rehabilitation requirements following the cessation of coal mining	• Internal provision for the rehabilitation maintenance • Conceptual Mine Closure Plan	Part 10 Rehabilitation Cost Estimate
Inappropriate post mining land management practices for mature rehabilitation areas	• Covenants on land that transfers with sale where appropriate • Land management plans implemented until tenement relinquishment / land sale where appropriate	Section 6.2.6 Part 10
Monitoring of rehabilitation does not show the trajectory towards approved completion criteria	• Rehabilitation Management Plan • Rehabilitation monitoring and TARPS • Maintain verification and inspection records.	Part 7 Part 10
Failure to demonstrate that the approved end land use has been achieved	• Rehabilitation trials and research • Rehabilitation monitoring and TARPS • Maintain verification and inspection records.	Part 7 Part 10
Unable to achieve relinquishment	• Resources available for remediation where required [internal or third party]	Part 7 Part 10
Impact on the environment	• Incident Response Plan • Resources available for remediation where required [internal or third party]	Part 11
Reputational damage / loss of social licence	• Implement stakeholder engagement strategy • Multi-agency consultation	Part 11
Additional unplanned costs	• Corporate governance	Part 11 Rehabilitation Cost Estimate

Part 4. Rehabilitation Objectives and Rehabilitation Completion Criteria

4.1 Rehabilitation Objectives and Rehabilitation Completion Criteria

Rehabilitation Objectives and Rehabilitation Completion Criteria have been developed for the final land use domains described in **Section 2.4.1** in accordance with the *Guideline: Rehabilitation Objectives and Rehabilitation Completion Criteria* (NSW Resources Regulator, 2021a).

The approved Rehabilitation Objectives and preliminary Rehabilitation Completion Criteria are presented in **Appendix B**. The Spatial References in **Appendix B** correspond to the areas shown in **Figure 7**.

The Rehabilitation Objective Statement was submitted to the NSW Resources Regulator via the Regulator Portal for assessment on 1 August 2022. The Rehabilitation Objectives Statement and the Final Landform and Rehabilitation Plan were approved by the NSW Resources Regulator on the 22 December 2023.

Rehabilitation at Bengalla is undertaken progressively and as discussed in **Section 4.2.3,** the final Rehabilitation Completion Criteria will be submitted for approval from the Resource Regulator no later than three years before rehabilitation of the whole (or identified part of) a mining area is completed. The Rehabilitation Completion Criteria identified in **Appendix B** are considered preliminary. Rehabilitation Completion Criteria may be further defined throughout the rehabilitation phases of each associated mining domain.

4.2 Stakeholder Consultation

4.2.1 Stakeholder Consultation required by SSD-5170 (as modified)

The Development Consent requirement for a RMP was revised following the determination of Modification 5 on 24 February 2023. As such, Schedule 3 Condition 46 of SSD-5170 (as modified) now requires BMC to prepare a RMP for the development in accordance with the provisions under the *Mining Act 1992* (this document). This has aligned the consultation required under **Section 4.2.1** with the consultation required under **Section 4.2.3** and is discussed further below.

Schedule 3, Condition 47 of SSD-5170 (as modified) requires BMC to prepare a Rehabilitation Management Strategy in consultation with DPE Water (Water Group within the Department), Biodiversity & Conservation Division (BCD), Muswellbrook Shire Council and the Community Consultative Committee (CCC). BMC will submit the strategy by 24 February 2024 following consultation with relevant stakeholders.

4.2.2 Stakeholder Consultation undertaken for previously approved MOP

Prior to the commencement of the rehabilitation requirements in Schedule 8A of the Mining Regulation on 2 July 2022, the approved Mining Operations Plan 2017 – 2022 Amendment D (MOP) for Bengalla functioned as a RMP for the purposes of the now amended Consent Condition.

The Rehabilitation Objectives and Rehabilitation Completion Criteria have been drawn from and are consistent with the previously approved MOP. The Stakeholders (including MACH as operator of the

adjoining Mount Pleasant Operation and HVEC as operator of the nearby Mt Arthur Mine) were provided with the draft MOP 2017-2022 Amendment D before it was submitted to the resources Regulator. **Table 9** summarises the responses received.

Table 9: Summary of Stakeholder Comments on MOP 2017-2022 Amendment D

Agency	Comments	Form of Consultation	Where Addressed in this RMP
DPE	DPE indicated by letter dated 7 October 2021 that MOP D is consistent with the requirements of the consent - SSD-5170 MOD 4.	NSW Planning Portal and associated email correspondence	NA
Crown Lands	No comment received.	Email	NA
Water NSW	No comment received.	Email	NA
EPA	EPA indicated by letter dated 5 October 2021 that it does not approve or endorse these documents.	Email	NA
MSC	No comment received.	Email	NA
MACH Energy	MACH Energy indicated by email dated 7 October 2021 that Mount Pleasant Mine should be amended to Mount Pleasant Operation.	Email	Throughout the document.
HVEC	No comment received.	Email	NA
CCC	No comment received.	Email	NA

4.2.3 Stakeholder Consultation Required the Mining Regulation

The RMP Form and Way and Rehabilitation Objectives Statement and Rehabilitation Completion Criteria Guideline require consultation with relevant stakeholders.

Consultation required provisions under the *Mining Regulation 2016* was undertaken during the preparation of the Rehabilitation Outcome Documents. A workshop with key personnel from the NSW Resources Regulator was undertaken on 15 August 2023 to discuss feedback from previous submissions of spatial files associated with the Rehabilitation Outcome Documents. The Rehabilitation Objectives Statement, and Final Landform Rehabilitation Plan were approved by the Secretary for Regional NSW on 22 December 2023.

The Rehabilitation Completion Criteria statement is required to be submitted to the Resources Regulator for approval no later than when a forward program is submitted which relates to the completion of rehabilitation covered by that forward program. It is intended that submission of the final rehabilitation completion criteria is approved by the Resources Regulator no later than three years before rehabilitation of the whole (or identified part of) a mining area is completed.

Part 5. Final Landform and Rehabilitation Plan

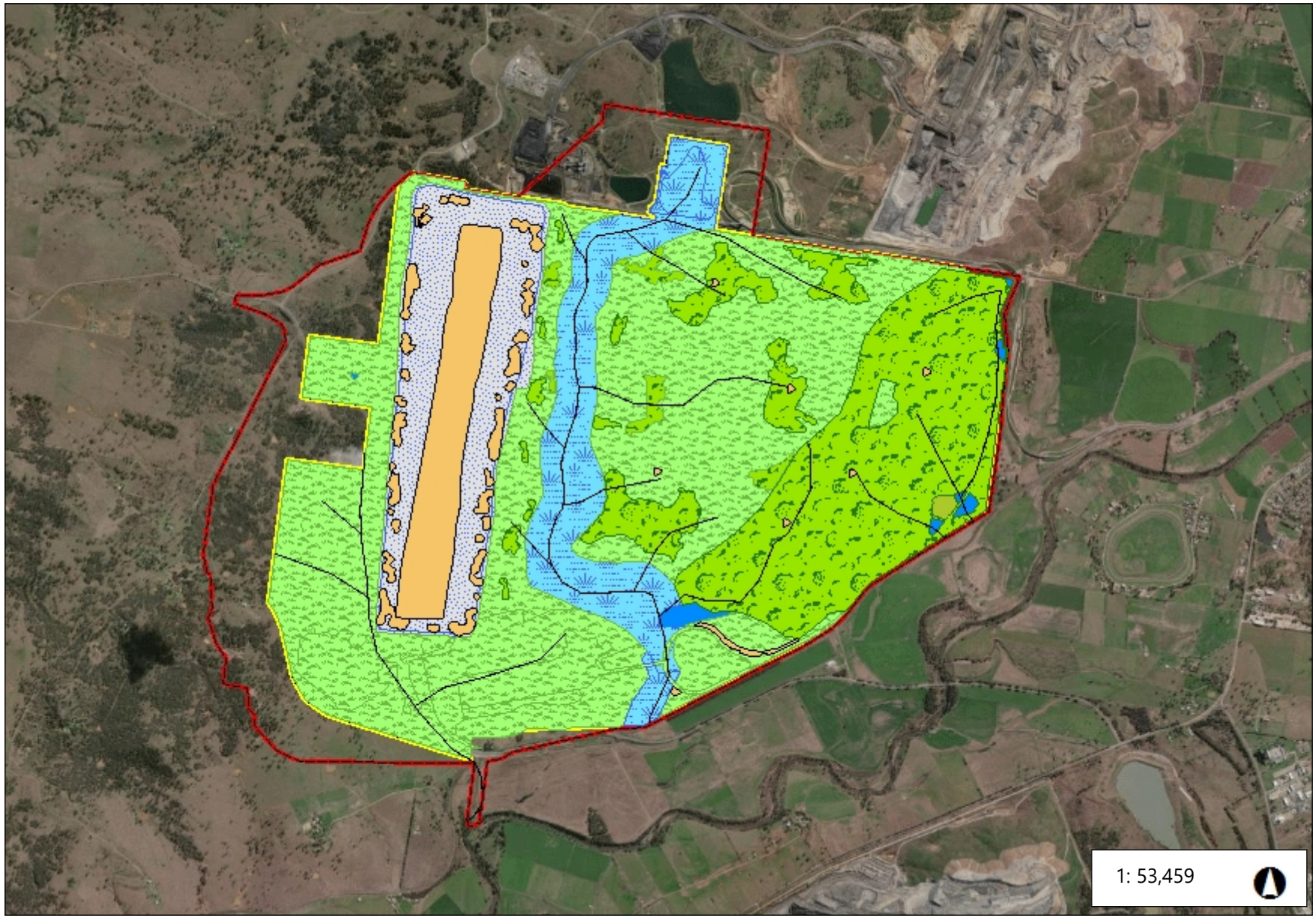
The final landform and rehabilitation plan defines the proposed final land use and final landform at the completion of rehabilitation, as approved under SSD-5170 (as modified). The original final landform has been modified and the current approved conceptual final landform is contained in Appendix 9 of SSD-5170 (as modified). Schedule 3, Condition 44 of SSD-5170 (as modified) requires rehabilitation of the site to be consistent with this conceptual final landform.

The final land use domains described at **Section 2.4.1** of this RMP exist over the majority of the mining lease areas. However, if the land has not been disturbed for the purposes of mining it will not require rehabilitation and accordingly there are no associated Rehabilitation Completion Criteria for undisturbed land for the purposes of this RMP.

5.1 Final Landform and Rehabilitation Plan – Electronic Copy

Figure 6 presents the proposed Final Landform and Rehabilitation Plan and **Figure 7** illustrates the Final Landform Contours. These plans were approved by the NSW Resources Regulator on 22 December 2023. It has been prepared using theme data submitted to the mine rehabilitation portal in accordance with Section 5.1 of the *Form and Way: Rehabilitation management plan for large mines* (NSW Resources Regulator, 2021b) and the *Guideline: Mine Rehabilitation Portal* (NSW Resources Regulator, 2021c). **Figure 6** illustrates the domains described in **Section 2.4** and uses the spatial references provided in the Rehabilitation Objectives and Rehabilitation Completion Criteria in **Section 4.1**.

Figure 6 Final Landform Rehabilitation Plan



Legend

- Final Landform Features
- Final Landuse
  - Agricultural – Cropping
  - Agricultural – Grazing
  - Rehabilitation Biodiversity Offset Area
  - Final Void
  - Heritage Area
  - Industrial
  - Infrastructure
  - Native Ecosystem
  - Water Management Areas
  - Water Storage (Excluding Final Void)
  - Other
- Project Approval Boundary
- Mine Operations Area
- World Imagery
- Low Resolution 15m Imagery
- High Resolution 60cm Imagery
- High Resolution 30cm Imagery
- Citations

Notes

2,715.7 0 1,357.86 2,715.7 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Figure 7 FLRP Plan 2: Final Landform Contours

Legend

- Final Landform Contours
- Project Approval Boundary
- MINERALS - CURRENT TITLES
- COAL - CURRENT TITLES
- PETROLEUM-CSG - CURRENT TITL
- World Imagery
- Low Resolution 15m Imagery
- High Resolution 60cm Imagery
- High Resolution 30cm Imagery
- Citations

1,086.3 0 543.15 1,086.3 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere

Notes

Bengalla Mine FLRP Plan 1: Final Landform Contours
Submission Date 24 November 2022
Submission ID 3684

Part 6. Rehabilitation Implementation

This Part 6 describes the rehabilitation of the site from the commencement of this RMP until lease relinquishment, including the rehabilitation schedule and the phases of rehabilitation and general methodologies for each phase.

6.1 Life of Mine Rehabilitation Schedule

The mining schedule is generally discussed in Section 4.3 of the EIS. Year 1 of the Project (as approved under SSD-5170 (as modified)) commenced in 2015. Mining operations may be carried out on site until 28 February 2039.Modification 2 to SSD-5170 (as modified) (approved 1 July 2016) allowed changes to the height of the landfill, providing for improved visual amenity from primary viewing locations. **Figure** 8, **Figure 9** and **Figure 10** illustrate the proposed mine layout and sequence of progressive rehabilitation, including the approved landfill modification, at Years 8, 15 and 24 of the Project respectively.

Biodiversity and Rehabilitation Considerations

Schedule 3 of SSD-5170 (as modified) contains sections titled Biodiversity and Rehabilitation. The conditions contained within each section in part require management plans. These management plans inform disturbance and rehabilitation at Bengalla.

Disturbance and rehabilitation at Bengalla are undertaken in accordance with the Biodiversity Management Plan (BMP) and Biodiversity Offset Management Plan (BOMP). The BOMP has been developed in accordance with the requirements of:

1. SSD-5170 (as modified) Schedule 5, Condition 29; and
2. *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval 2012/6378 Conditions 2 and 3.

The BOMP provides a framework for the implementation of the biodiversity impact mitigation and offset measures proposed for the Project in *the Bengalla Continuation of Mining Project Biodiversity Offset Strategy* (Cumberland Ecology, 2014).

A separate, approved BMP provides the framework for the environmental management, reporting and auditing of ecological issues across all BJV/BMC owned land within the Project Boundary. Both documents combined meet the requirements of Schedule 5, Condition 29 of SSD-5170 (as modified) and Conditions 2 and 3 of EPBC Approval 2012/6378.

The establishment of native vegetation corridors and habitat linkages across site will be reviewed, and an installation plan developed at the conclusion of the HDWV installation over existing rehabilitation areas.

Life of Mine Assumptions

The following assumptions and principles are relied on for the development of the Bengalla life of mine rehabilitation schedule to ensure that rehabilitation is undertaken progressively as soon as reasonably practical:

- The Rehabilitation program during active mining is focussed on the Overburden Emplacement Areas (OEAs) which have been designed in accordance with the approved Conceptual Final Landform;

- Temporary rehabilitation of disturbed areas is undertaken where practicable for example around infrastructure areas and long term water management structures;
- A High Density Rehabilitation program is also being undertaken to establish high density woody vegetation comprising of species commensurate with the surrounding native vegetation communities on the face of the OEA exposed to Muswellbrook and Denman;
- A final void will remain as part of the final landform. It is predicted that the final void will partially fill with water and behave as a long-term hydraulic sinks; and
- An additional coal resource is known to occur beyond the Disturbance Boundary. It is anticipated that subject to market factors and resource confirmation, BMC will seek the relevant approval for the extraction of these resources in the future.

Construction and Decommissioning

Surface infrastructure is generally required for the operational life of the mine and as such infrastructure will not be progressively removed and rehabilitated. Some key items of infrastructure will be removed or replaced during the mine life including the following:

- Construction of the new Bengalla Link Road is proposed to commence around Year 13 of the Project (i.e. 2029) subject to operational requirements. Following construction of the new road, the existing road which is within the Project area and mining lease areas will be mined through;
- Dry Creek (which was diverted to facilitate mining operations at Bengalla in accordance with SSD-5170 (as modified)) will likely be reinstated after Year 15 and prior to Year 24 (end of mine life being 2039) subject to operational requirements. Infrastructure associated with the Dry Creek diversion will be decommissioned or handed over to MACH in accordance with an agreement between Bengalla and MACH (as may be varied from time to time); and
- The former rail line for the Mount Pleasant Operation (which was within Bengalla mining leases south of Wybong Road) was removed in 2022 subject to some items remaining in situ. This area will be used by BMC for various activities ahead of mining and will be mined through.

6.2 Phases of Rehabilitation and General Methodologies

The conceptual phases of rehabilitation at Bengalla comprise the stages and sequences of actions required to achieve the Rehabilitation Objectives, including the final land use. These phases are:

- Active Mining;
- Decommissioning;
- Landform Establishment;
- Growth Medium Development;
- Ecosystem and Land Use Establishment;
- Ecosystem and Land Use Development; and
- Rehabilitation Completion.

The following sections summarise the risks and opportunities for rehabilitation associated with each rehabilitation phase across the mining domains described in section 2.4.2 and demonstrate that relevant controls nominated in the Risk Assessment (refer to Part 3) have been incorporated into the relevant activities.

6.2.1 Active Mining Phase

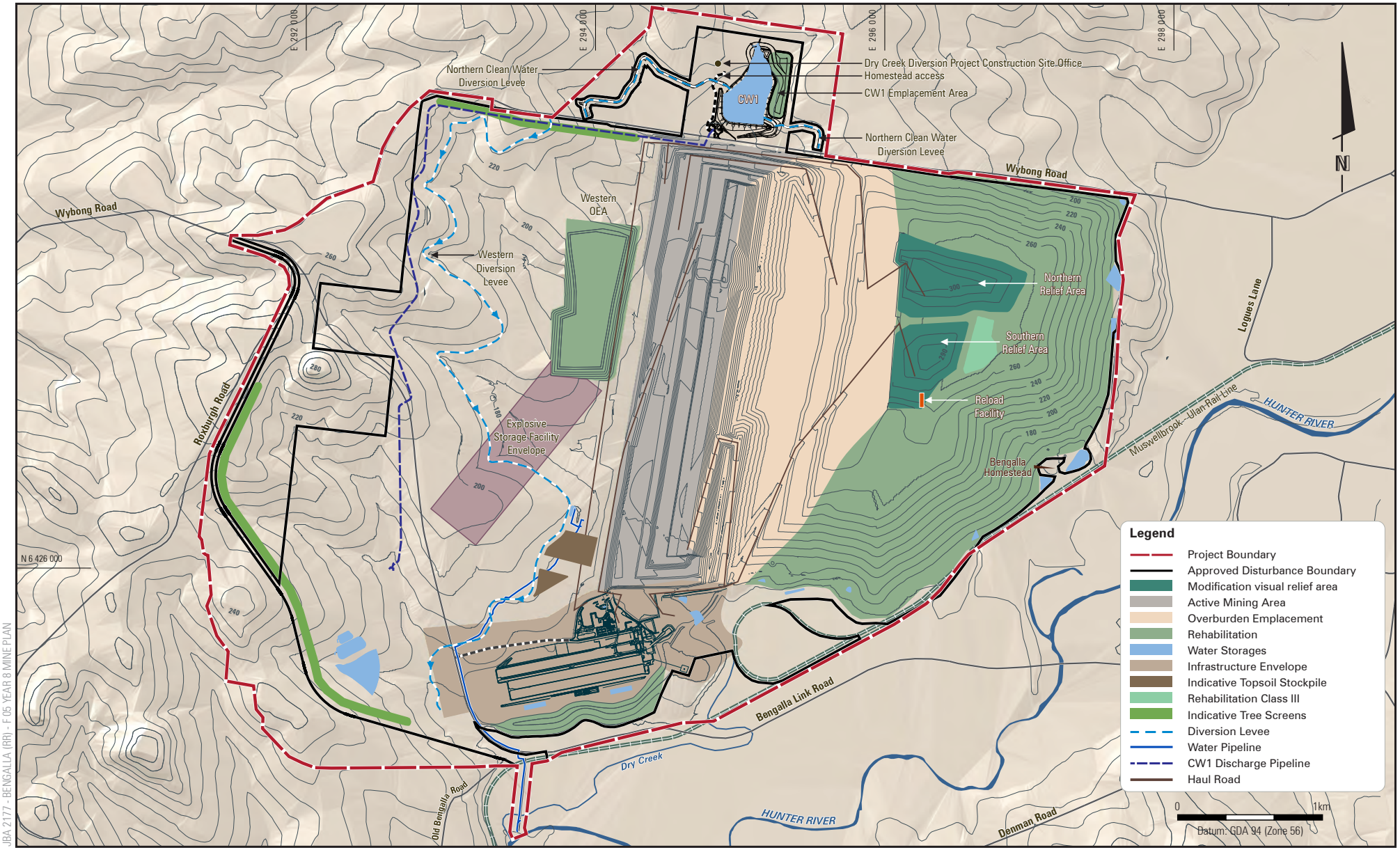
This section summarises the risks and opportunities for rehabilitation associated with the active mining phase across the mining domains.

6.2.1.1 Soils and Materials

A soil and land capability impact assessment was completed as part of the EIS. This assessment described soil types, suitability and recommended stripping depths and how these vary across site. The soils at Bengalla have a moderate erosion risk and require careful management. The subsoils are undesirable for topsoil use due to physical and/or chemical limitations; however their use may be considered where weed infestation affects the use of topsoil material. The recommended topsoil stripping depths vary from 0 – 0.6 m. Further information about topsoil tripping practices and management of topsoil and clay stockpiles is provided below.

The overburden varies in physical and geochemical properties, in accordance with the geology of the area and exposure to weathering. Chemical analyses of Bengalla spoil materials indicate that, in general, the overburden is slightly sodic and alkaline, but within acceptable ranges for use as a plant growth medium.

BMC as part of the EIS completed a Soils and Land Capability Impact Assessment. That assessment did not anticipate that there will be a soil and/or materials deficit for life of mine rehabilitation. Implementation of geofluv as required by SSD-5170 (as modified) where rock is required is anticipated to be sourced on-site. Where suitable rock is not identified that rock will be imported to site.

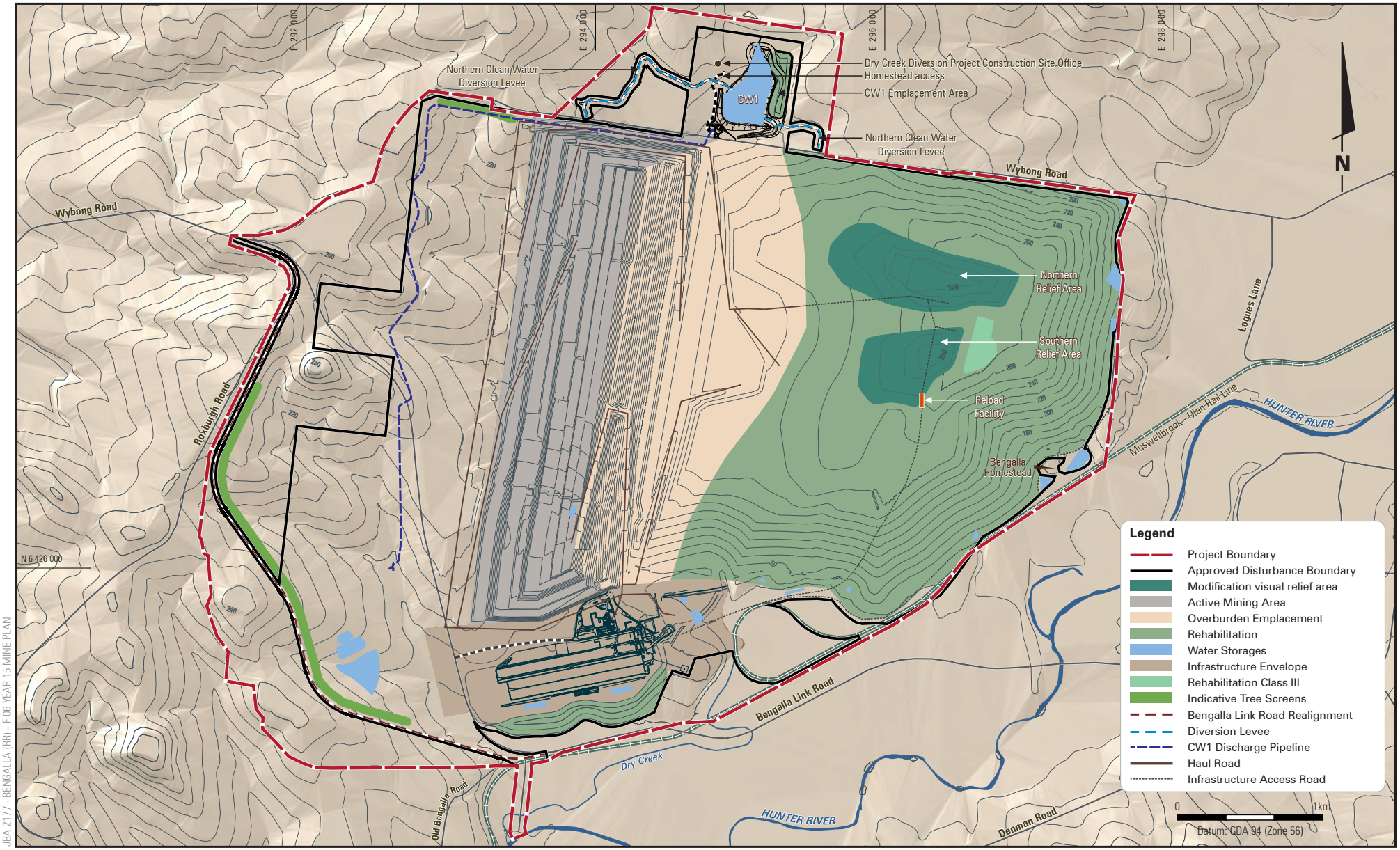


JBA 2177 - BENGALLA (RR) - F 05 YEAR 8 MINE PLAN

BENGALLA MINE

Conceptual Year 8 Mine Plan

FIGURE 8

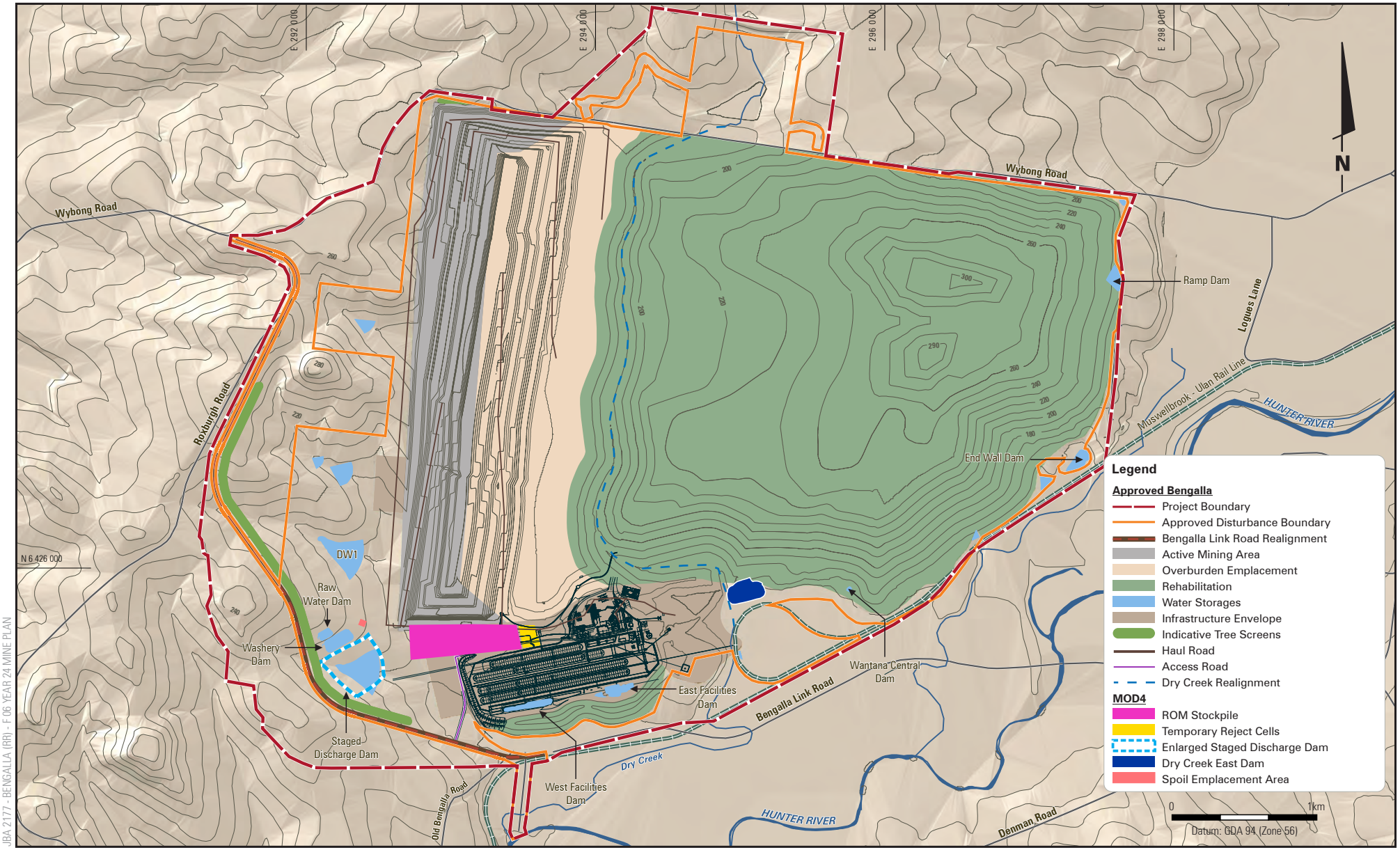


JBA 2177 - BENGALLA (RR) - F 06 YEAR 15 MINE PLAN

BENGALLA MINE

Conceptual Year 15 Mine Plan

FIGURE 9



JBA 2177 - BENGALLA (RR) - F 06 YEAR 24 MINE PLAN

BENGALLA MINE

Conceptual Year 24 Mine Plan

BENGALLA

JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

FIGURE 10

Topsoil Stripping

Topsoil stripping occurs ahead of the active mining area or where infrastructure is to be constructed. Topsoil stripping is undertaken by a bulldozer and available topsoil is removed by truck and loader for rehabilitation purposes. Whenever practical, topsoil stripping is undertaken under slightly moist conditions to maintain soil structure and minimise dust. If it is too wet compaction can occur, and if it is too dry then dust can be produced.

Where possible, topsoil is stripped to clay or secondary horizons and either directly placed on available rehabilitation areas or stockpiled for later use. In the event that rehabilitation areas are not immediately available, topsoil is stockpiled within designated areas such as on the unshaped areas of the overburden emplacement (i.e. on the 270 m RL and the 240 m RL) or in areas ahead of mining. Topsoil stockpiling alongside areas waiting to be rehabilitated allows the topsoil to be readily pushed without the need for rehandling.

Topsoil Stockpiles

Topsoil stockpiling will continue to be necessary at Bengalla to ensure adequate topsoil for rehabilitation, and the success of the final land use. BMC aims to minimise topsoil stockpiling through progressive rehabilitation of the final shaped landform as it becomes available.

Where topsoil stockpiles are required, the following will be adopted:

- Stockpiles will be located outside of proposed mining areas and away from slopes and drainage lines where possible;
- Where possible, stockpiles will be up to approximately 3 metres high in order to minimise issues with anaerobic conditions;
- Stockpiles will be located to prevent sediment water runoff leaving the site and will have sediment controls installed on the downslope sides to collect and filter any sediment laden runoff from the stockpile where there is potential for the sediment to discharge off-site;
- All topsoil stockpiles will be loose and uncompacted to provide for aeration, water and nutrient infiltration, microbial activity to prevent further deterioration to the soil structure, but shaped with a shallow slope towards downslope sides for even sheet flow off the top of the stockpile;
- Topsoil stockpile top and batters will be left rough and uncompacted and batters will be graded up to approximately 3 (V):1 (H);
- Stockpiles should be sown with suitable short or long-term pasture species depending on the duration of storage, i.e. ≤12 months or >12 months, to establish a protective vegetative cover and maintain biological activity to preserve the topsoil resource's qualities. Rhodes grass (Chloris gayana) and kikuyu (Cenchrus clandestinus) will not be used for the seeding of topsoil stockpiles;
- Topsoil storage locations will be demarcated with signage identifying the stockpile by name, soil unit type and soil unit location;
- All appropriate information will be recorded, e.g. date of location creation, coordinates of stockpile location, stockpile name (e.g. Topsoil Stockpile Z (TSZ)), soil unit name (e.g. Deep Sodosol) and location, maximum height of stockpile, surface area of location, maximum volume to be stored at location and tracking of additions (volumes) by month);
- Stockpiles will be inspected when accessible and as required following significant rainfall events that are likely to have produced runoff on the topsoil stockpile areas for signs of sheet, rill, tunnel and/or gully erosion. Where erosion is identified, works will be undertaken as soon as practicable to stabilise the stockpile and prevent further erosion, degradation and loss of the topsoil resource;

- Topsoil stockpiles stored for >12 months will be:
    - Inspected annually to assess whether vegetative cover is >90% and mulch cover of the soil surface is >90%. Where deficient, appropriate treatments will be applied, such as additional seed or mulch to the deficient areas; and
    - Sampled and analysed annually for appropriate parameters to ensure the topsoil resource is being maintained within completion criteria or ameliorated where results demonstrate that quality is deteriorating;

- Weed control strategies will be implemented particularly for noxious weeds. This may include:
    - Application of selective and/or non-selective herbicide (dependent on species that colonise the stockpiled material);
    - Scalping of the top approximate 100mm of the stockpiled material to remove the weed seed load prior to handling / placement on rehabilitated areas; and
    - Stockpiles will be inspected monthly, or more frequently where specific weed species have lifecycles that produce seeds in less than a month for weed growth and sprayed accordingly to prevent weed species from flowering and seeding.

Clay Stockpiles

Dry Creek will be reinstated towards the end of mine life being 2039. Approximately 450,000 m³ of clay will be borrowed from the existing Dry Creek area ahead of mining and stockpiled for later use in the reinstatement of Dry Creek.

The clay stockpiles required for the reinstatement of Dry Creek will be established and managed for the duration of the stockpiling period in accordance with the following management measures:

- Stockpiles will be up to approximately 10 m high;
- Stockpile slope faces will be up to approximately 1 (V) : 3 (H);
- Stockpiles will be left in a non-smoothed (rough) condition to minimise initial compaction, allow rainfall infiltration and minimise runoff;
- A rapid growing perennial pasture mix will be sown on all stockpiles to provide sufficient competition to minimise the emergence of undesirable weed species;
- Regular (monthly) inspections of the stockpiles will be made as soon as practicable following significant rainfall events. The following features will be checked:
    - Integrity of erosion control measures;
    - Integrity of sediment controls;
    - Effectiveness of drainage;
    - Pasture growth; and
    - Weed infestation.

- Remedial measures will be undertaken as necessary. Emphasis will be placed on controlling weeds prior to flowering and revegetating to reduce degradation of the clay stockpile and/or loss of clay;
- All vehicle traffic and grazing stock animals will be excluded, unless unavoidable, from traversing the stockpiles/windrows for the duration of the subsoil storage period to prevent compaction, damage to the subsoil structure, damage to the pasture sward and minimise the potential for erosion of the subsoil stockpile; and
- Clay stockpiles will be signposted, surveyed and treatment records maintained.

6.2.1.2 Flora and Fauna

BMC manages flora and fauna consistent with the BMP approved under SSD-5170 (as modified). The BMP was developed in accordance with the requirements of SSD-5170 (as modified) Schedule 3, Condition 29 (part) and EPBC Act Approval 2012/6378 Condition 2 to provide a framework for the Environmental Management, reporting and auditing of ecological issues across all BMC owned land within the Project Boundary.

The BMP sets out the procedures for biodiversity management, reporting and auditing of ecological issues within the Bengalla Project Boundary. The objective of this BMP is to provide for the management of biodiversity within the Project Boundary. The BMP describes the process for clearing at Bengalla to include:

- Minimising human disturbance to native flora and fauna;
- Minimising impacts to threatened species and communities;
- Controlling threats to remnant native vegetation at Bengalla;
- Managing the impacts of feral animals and weeds;
- Seed collection and harvest in accordance with EPBC 2012/6378 Condition 2(c) to enable the use of native, locally sourced seed for propagation on rehabilitation areas;
- Vegetation disturbance / clearing including a description of the clearance procedure;
- Salvage of habitat features if possible, such as suitable hollow-bearing trees, hollow-bearing logs and rocks are available for reuse in rehabilitation areas; and
- Monitoring and adaptive management.

6.2.1.3 Rock/Overburden emplacement

The OEA has been developed to the east of the active pit and fills the void that has been created from mining. Mineral waste from mining overburden and interburden is hauled by truck or placed directly by the dragline onto the OEA.

As each dragline strip finishes, the trucks begin to dump on the spoil peaks behind the dragline and begin as soon as reasonably practicable to develop the approximate 7 m lifts that allow for reject emplacement within the truck dump section of the OEA. Each lift allows for 1-2 m of reject and 5-6 m of overburden for encapsulation, where rejects will either be dumped prior to or during encapsulation.

The production of reject material is discussed in **Section 6.2.1.8**. Reject material is either placed directly within cells developed in the existing OEA or is stored in temporary reject cells and then rehandled to final emplacement within the existing OEA. Reject material is typically benign. **Section 6.2.1.6** discusses the management of material prone to spontaneous combustion.

As the OEA is filled to final design it is progressively shaped and rehabilitated.

There is a western OEA (currently not constructed) that is approved to be constructed pending operational requirements. It is described in the EIS and is on the western side of Dry Creek and has a capacity of 15 Mbcms.

The EIS contains a modelled production schedule detailing, total overburden, ROM coal and product coal ate certain years. BMC does not anticipate that there will be a materials deficit for life of mine rehabilitation.

6.2.1.4 Waste Management

Non-Mineral Waste Management

BMC produces non-mineral waste such as scrap steel, oil and general waste as a result of its activities. Non-mineral waste that cannot be recycled and is considered non-hazardous is disposed of at appropriate landfill facilities. Hazardous non-mineral waste that cannot be re-used or recycled is collected and sent off site for treatment and specialised disposal.

BMC operates a non-mineral waste management system. This includes the day-to-day management of waste streams. Waste at Bengalla is handled, stored, segregated, recycled and reused.

Sewage Waste

BMC has a sewage treatment plant where sewage is passed through a series of aeration dams into a settling dam to allow settlement of solids. The liquid is then passed through a weir and into a contact chamber as it is dosed with Sodium Hypochlorite to disinfect the water. This water is then released into the Facilities Dam. Water testing is undertaken prior to and after the release of this water into the water management system.

Contaminated Soil

Land contamination may occur as a result of hydrocarbon or other chemical spills. BMC minimises risk to the environment from contaminated land with the implementation of procedures. Control measures include:

- A chemical approval process;
- Focus on waste management and recycling;
- Prompt spill response and remediation;
- Bunding and containment;
- Site contaminated land register;
- Use of external contaminated land consultants to decommission contaminated sites; and
- Operation of a bioremediation facility where soil contaminated with hydrocarbons is placed for remediation.

6.2.1.5 Geology and Geochemistry

The approved mining area contains a multi-seam coal deposit consisting of eight economically viable open-cut mineable coal seams. BMC currently extracts coal from the Warkworth seam to the Wynn seam (previously to the Edderton) which form part of the Whittingham Coal Measures. Bengalla is situated on the western limb of the Muswellbrook Anticline with the coal seams generally dipping to the west at approximately 5 degrees. The average strip ratio at Bengalla is approximately 3.5 bank cubic metres (bcm) of overburden to each ROM tonne (t) of coal recovered. Faulting and igneous intrusion are not significant influences on the Bengalla mine design, although they do have a localised impact on scheduling, wall stability, groundwater and coal quality. Most faulting is high angle normal faults trending in a westerly to north-westerly direction.

A summary of the geochemical characteristics of Bengalla is below:

- All overburden apart from the Wynn Interburden (Archerfield Sandstone Sequence (ASS)) has negligible (<1%) sulphur content, excess Acid Neutralising Capacity (ANC) and is classified as Non-Acid Forming (NAF);

- All overburden material, apart from the ASS located above the Wynn seam, has a high factor of safety with respect to potential acid generation. Current management methods for ASS materials at the open cut are sufficient to minimise the risk of any significant impact to the environment (**Section 6.2.1.7**);
- The concentration of total metals in overburden (and coal reject materials) is well below applied guideline criteria for soils and is unlikely to present any environmental issues associated with revegetation and rehabilitation;
- The concentration of trace metals and sulphate in run-off and seepage from overburden will be low;
- Overburden will generate alkaline run-off and seepage with low salinity values following surface exposure. The salinity of run-off and seepage from overburden materials is likely to decrease over time;
- Some overburden material may be sodic and have structural stability problems related to potential dispersion and erosion;
- Coal reject contains elevated sulphur content however the only material that is classified as Potentially Acid Forming (PAF) is from the Wynn seam;
- The concentration of trace metals and sulphate from most coal rejects will be low. However, Wynn coal reject materials have the potential to generate elevated concentrations of some metals (Al, Cd, Co, Cu, As, Ni, Se and Zn) if exposed to oxidising conditions; and
- Current management methods for Wynn coal reject and other coal reject materials at the open cut are sufficient to minimise the risk of any significant impact to the environment (**Section 6.2.1.8**).

The geology and geochemical risks are measured via several procedures at Bengalla. For example, SYS-00019 PHMP Ground or Strata Failure manages the prevention, detection and control of ground or strata failure by ensuring the appropriate processes and systems are in place to minimise risk. PRO-0459 ARD and Mineral Waste Management ensures any potentially hazardous mineral waste materials (rejects, waste) are identified and managed appropriately.

6.2.1.6 Material Prone to Spontaneous Combustion

Coal and other carbonaceous materials can react with oxygen in the atmosphere to produce heat. In some cases, heat can be trapped and the temperature of the material rises. This may lead to conditions that result in spontaneous combustion.

The Vaux2 and Warkworth1 seams have the greatest risk of spontaneous combustion. Historically, spontaneous combustion in the Vaux2 has occurred in isolated areas in the dragline low-wall when wasted sections of the seam (deteriorating quality) are blasted through as part of an interburden horizon and exposed to oxygen for several months. Management of spontaneous combustion in this seam consists of removing any wasted coal in the previous strip that is exposed at the top of the interburden and burying it as deep as reasonably practicable in the OEA, which has been shown to be effective mitigation.

The Warkworth1 coal is the highest seam in the coal measures at Bengalla and is prone to spontaneous combustion when it is both oxidised by the weathering zone and blasted through as part of the overburden blast. If the Warkworth1 coal seam is observed to experience spontaneous combustion during operations, it is generally removed by truck and excavators and buried as low in the OEA as reasonably practicable from the available dumps active at the time, encapsulated with inert material and located well below the final surface.

The placement of reject and carbonaceous material is planned at least 5 m below the final landform in order to minimise the possibility of spontaneous combustion.

6.2.1.7 Material Prone to Generating Acid Mine Drainage

Conditions favourable to producing Acid Rock Drainage (ARD) may occur when pyritic material is exposed to the atmosphere and water which react to produce acidic surface water or groundwater flows. The Archerfield Sandstone mined during the Wynn Interburden has been identified as being potentially acid generating.

The Archerfield Sandstone is mostly mined by dragline and is generally placed adjacent to the low wall low in the pit and is subsequently covered with overburden from the final pass of the dragline operation as well as material hauled into position by the truck fleet. The portion of ARD material mined by excavator and truck is dumped as low in the dump as reasonable and feasible below the final surface.

The management of dumping and encapsulating this material results in Bengalla reducing the potential for acid mine drainage influencing rehabilitation outcomes.

6.2.1.8 Ore Beneficiation Waste Management (Reject and Tailings Disposal)

Coal is transported via haul trucks from the mine to the temporary ROM coal stockpiles and/or the ROM hopper. The first stage of coal processing involves crushing ROM coal to less than 250 mm in size. The crushed coal is then transported along a conveyor to a secondary crushing station where it is reduced to less than 50 mm. After crushing, coal can be bypassed to product, direct fed into the CHPP or transported and stockpiled on the raw coal stockpile via conveyors.

The CHPP is a two-stage plant that can change from single stage to two stage washing when required. A combination of dense medium cyclones and single stage spirals are utilised to process coal. After processing, the product coal is centrifuged for the purpose of moisture reduction and then stacked onto one of the two product coal stockpiles.

Bengalla does not have any tailings dams, so the fine reject material is thickened and dewatered and then combined with other coarse reject streams generated from the processing and conveyed to a 400 t capacity reject bin. Reject is then managed as discussed in **Section 6.2.1.3.** Rejects are co-disposed in the OEA. The disposal of rejects is undertaken in accordance with BMC procedures, with some procedures listed below:

- SYS-0019 PHMP – Ground or Strata Failure.
- PRO-0217 Waste Dump Design and Construction.
- PRO-0219 Management of Dump Designs to Achieve Final Rehabilitation Surfaces.

The overall purpose of these procedures is to:

- ensure that the prevention, detection and control of ground or strata failure by ensuring the appropriate processes and systems are in place to minimise risk;
- waste dump designs are designed and constructed according to plan; and
- that the rehabilitation surfaces comply with BMC's regulatory commitments.

6.2.1.9 Erosion and Sediment Control

There is potential for erosion and sedimentation on rehabilitated areas at Bengalla. Sediment mobilisation and erosion will be minimised on rehabilitation areas where reasonable and feasible by:

- Progressively rehabilitating disturbed land;
- Shaping rehabilitated land to minimise sheet flows and to direct water to sediment dams;
- Topsoil cultivation during the rehabilitation process, where required, to promote infiltration;

- Installation of rock riprap, geotextile fabric sediment filters or other suitable measures on steep gradients, as required;
- Where necessary, application of a temporary cover crop;

Temporary rehabilitation of disturbed areas is undertaken where practicable to minimise erosion and sedimentation potential, for example around infrastructure areas and long term water management structures.

6.2.1.10 Ongoing Management of Biological Resources for Use in Rehabilitation

Land preparation for mining at Bengalla consists of weed management and vegetation removal. Bengalla has a history of grazing prior to mining and as such there is a heavier weed seed content in the topsoil than would be found in a native plant community where historic land disturbance has not occurred. Consequently, where required weed management is undertaken prior to topsoil stripping to minimise the presence of weeds in the topsoil. This is more successful and cost effective than controlling weeds once they have established in rehabilitated areas.

The Bengalla pre-clearing and clearing procedures are described in the approved BMP. Prior to disturbing new areas, the BMP requires a Ground Disturbance Permit (GDP) to be completed by the Environment Superintendent (or delegate) to identify environmental issues associated with the works.

Habitat trees and salvage materials identified during the pre-clearing survey are recovered and either used directly on rehabilitation areas or stockpiled for later rehabilitation works.

Section 6.2.1.1 describes the management of topsoil and topsoil stockpiles.

6.2.1.11 Mine Subsidence

Bengalla is not located within a mine subsidence district and no underground mining activities have been carried out by BMC or are proposed or authorised under current approvals for Bengalla. As such, mine subsidence is not relevant to this RMP.

6.2.1.12 Management of Potential Cultural and Heritage Issues

Historic Heritage

The Historic Heritage sites surrounding Bengalla are described in the EIS. The management of these sites is detailed in the Historic Heritage Management Plan (Bengalla 2017b) (HHMP) approved under SSD-5170 (as modified). The Bengalla Homestead is located within the ML boundaries and will remain post mining.

Aboriginal Heritage

Aboriginal objects are managed in accordance with the Aboriginal Cultural Heritage Management Plan (Bengalla 2017c) (ACHMP) approved under SSD-5170 (as modified). The ACHMP sets out the procedures for the care and salvage of Aboriginal objects.

Options for the management of cultural and heritage items following mine closure will be investigated during the development of final closure plans.

6.2.1.13 Exploration Activities

Following any exploration activity undertaken as described in **Section 1.1.4**, any prospecting activities will be rehabilitated if required in accordance with relevant standards and guidelines published by the

NSW Resources Regulator applicable from time to time and the BMC GDP. Disturbance will be minimised as far reasonably practicable during prospecting activities and there will be no unrehabilitated exploration areas following mine closure.

Where exploration is conducted directly ahead of mining in an area scheduled for disturbance within a reasonable timeframe, rehabilitation may not be required. Any requirements will be identified as part of the GDP process.

6.2.2 Decommissioning

This section outlines the proposed decommissioning and demolition activities required for mine closure. This section will become more detailed as the operation nears cessation of mining.

6.2.2.1 Site Security

The security measures currently in place at Bengalla which ensure public safety include:

- A site perimeter fence;
- Regular security checks;
- Closed and locked gates where necessary around the site with automatic gate in the infrastructure area with a pass required to operate the automatic gate; and
- Signposts on the perimeter fence and gates.

These measures will be continued during decommissioning.

Security of the Bengalla Homestead will continue to be undertaken during decommissioning activities as described within the approved HHMP.

6.2.2.2 Infrastructure to be Removed or Demolished

All demolition work will be carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures* (Standards Australia, 2001) (AS) as amended or replaced from time to time. It is noted that under clause 2.13 of *State Environmental Planning Policy (Resources and Energy) 2021* NSW, the demolition of a building or structure that is carried out in accordance with the AS is exempt development, but only if the building or structure is not, or is not part of, a heritage item or in a heritage conservation area identified by an environmental planning instrument and provided that it is of minimal environmental impact and is on land that is the site of an approved mine.

Subject to comments at **Section 6.1**, it is currently proposed to decommission and remove all mine related infrastructure at closure to achieve the final land use. This will include:

- CHPP, including ROM hopper, rejects bin and thickener;
- Administration buildings and associated infrastructure such as potable water tanks, pipework, sewerage system;
- Stockpiles and associated conveyor infrastructure;
- Bathhouse and workshop buildings;
- Car parks;
- Refuelling bays;
- Rail loop, conveyor and rail loading facilities;
- Radio towers and powerlines;
- Explosives storage building; and
- Water management infrastructure including mine water dams, pipework and pumps.

Figure 2 gives an overview of the current mine infrastructure for Bengalla.

6.2.2.3 Buildings, Structures and Fixed Plant to be Retained

The Bengalla Homestead will be retained as a Historic Heritage item following mine closure. Infrastructure such as power lines, water and sewerage connections, roads, and fences to support the running of the Bengalla Homestead will also be retained.

Other items of infrastructure may be retained as required, including items to support the final land use (such as water management structures). This will be further refined closer to mine closure.

6.2.2.4 Management of Carbonaceous/Contaminated Material

The identification and removal of contaminated soils and other materials will generally be undertaken during the decommissioning phase and prior to rehabilitation occurring. Potentially contaminated materials will also be identified throughout the active mining phase for future contaminated areas.

A preliminary site investigation will be undertaken using a suitably qualified consultant as part of the Mine Closure Plan, which will include at a minimum a desktop assessment of the area and site history, incidents etc. in accordance with the *National Environmental Protection (Assessment of Site Contamination) Measure Phase 1 assessment* or similar approved and recognised measure. It is anticipated that investigations will concentrate on areas with potentially contaminated materials, including (but not limited to) the mine infrastructure area, including workshops, fuel, CHPP and coal stockpiles, and rail loading facilities, and may extend to areas such as out of pit temporary stockpiles.

The results of this site investigation will inform further investigation where necessary. Depending on the type, level and volume of contamination, the contaminated soil will either be remediated in situ or removed and placed in a dedicated bioremediation area. Where necessary, clean soil or overburden would be used to reshape the area and rehabilitation would continue as outlined in the sections below.

6.2.2.5 Hazardous Materials Management

Hazardous substances will be identified and removed. BMC currently manages hazardous waste materials using specialised waste removal companies and will continue to utilise a similar approach during decommissioning.

Hazardous materials will be managed in accordance with the relevant Safety Data Sheets (SDSs), as well as applicable management plans, procedures and legislation. All remaining hazardous materials on site at closure including hydrocarbons (e.g. hydrocarbons and chemicals) will be disposed of at an authorised facility. Any storage tanks will be removed and depending on their condition, either sold or disposed of at an authorised facility.

6.2.2.6 Underground Infrastructure

No underground mining activities have been carried out by BMC or are proposed or authorised under current approvals for Bengalla. As such, there is no underground mining infrastructure and this section is not relevant to this RMP.

6.2.3 Landform Establishment

This section provides an overview of the key characteristics of the final landform as shown in **Part 5**, and describes any modelling or other work undertaken to achieve the final landform.

6.2.3.1 Water Management Infrastructure

The Bengalla water management system is described by reference to four water types (consistently with the Water Management Plan (Bengalla 2019) (WMP) approved under SSD-5170 (as modified)) which are listed below.

- Clean Water - Water pumped from the Hunter River into the Hunter River Raw Water Dam or run-off from a catchment that is undisturbed by mining and associated activities. Runoff from fully rehabilitated mined out areas where the rehabilitation area has been relinquished.
- Mine Water - Water that accumulates within, or drains from, active mining and infrastructure areas and any other areas where run-off may have come into contact with coal or carbonaceous material (synonymous with 'dirty water').
- Sediment Water - Runoff from areas disturbed by mining and associated activities that has not come into contact with coal or carbonaceous material. Includes water from non-relinquished rehabilitation areas.
- Contaminated Water - Associated with water used by the vehicle wash bay and bathhouse that is captured and processed to enable its transfer and reuse in the mine water system.

In accordance with the WMP, water management at Bengalla is based on the following key principles (which are generally followed except where circumstances dictate that there is an overall environmental advantage to do otherwise):

- Minimise use of clean water from external sources;
- Where possible, divert clean water away from areas disturbed by mining and associated activities;
- Collect sediment water in catch drains and direct to sediment traps and settling dams, and where required reuse in the Bengalla water management system;
- Collect runoff from industrial areas (mine water) in catch drains and transfer to storage dams for reuse, where required, in the Bengalla water management system;
- Transfer of open cut pit water (mine water) to storage dams and where required re-use in the Bengalla water management system; and
- Minimal off-site discharge of surplus mine water.

The existing water management structures at Bengalla (as at January 2019) are listed in Table 5 of the WMP (illustrated on **Figure 2**) (subject to the Notes below Table 5). The indicative location of water management infrastructure as at 2019 is shown on Figure 3 of the WMP and described in Section 3.3 of the WMP.

The proposed Final Landform and Rehabilitation Plan conceptually illustrates the retention of certain water management infrastructure for use as part of the final land use. Further details in relation to the retention of specific water management infrastructure will be determined during development of the Mine Closure Plan consistent with SSD-5170 (as modified). Retained infrastructure will be modified as required to ensure it is suitable for the purposes of the final land use.

6.2.3.2 Final Landform Construction: General Requirements

The OEA is developed as discussed in **Sections 6.2.1.3**, **6.2.1.6** and **6.2.1.7**, with potentially hazardous material being buried at least 5 m below surface. Material that is to be placed near the final surface is reviewed for its chemical and physical properties (e.g. sodic materials, large rocks and visual aesthetic) and whether further action is required to achieve the desired rehabilitation outcomes.

The landform is initially dumped to design in lifts of approximately 7 m in height to allow for encapsulation of rejects and for cut and fill to establish the final surface. Once a section is available for rehabilitation, the surface is bulk shaped using dozers to a final landform design.

Once bulk reshaping is completed, the landform may be deep-ripped and overburden materials ameliorated (as required). The ripping loosens near surface layers within the landform that has been compacted during placement, aiding root penetration during vegetation establishment. Then final trim is undertaken which smooths out wash-outs and gullies, rough edges, temporary access tracks, local steep slopes and prepares the surface for revegetation.

Where reasonable and feasible, rehabilitation will no longer use contour banks and straight line drop structures to manage water but will incorporate fluvial geomorphology design influences (Geofluv). The implementation of fluvial geomorphology design principles assists with the long term management of water from the landforms to minimise the potential for erosion and landform stability issues. **Figure 11** below is a conceptual example of the Geofluv landform surface that is a design showing natural micro-relief and natural drainage lines.

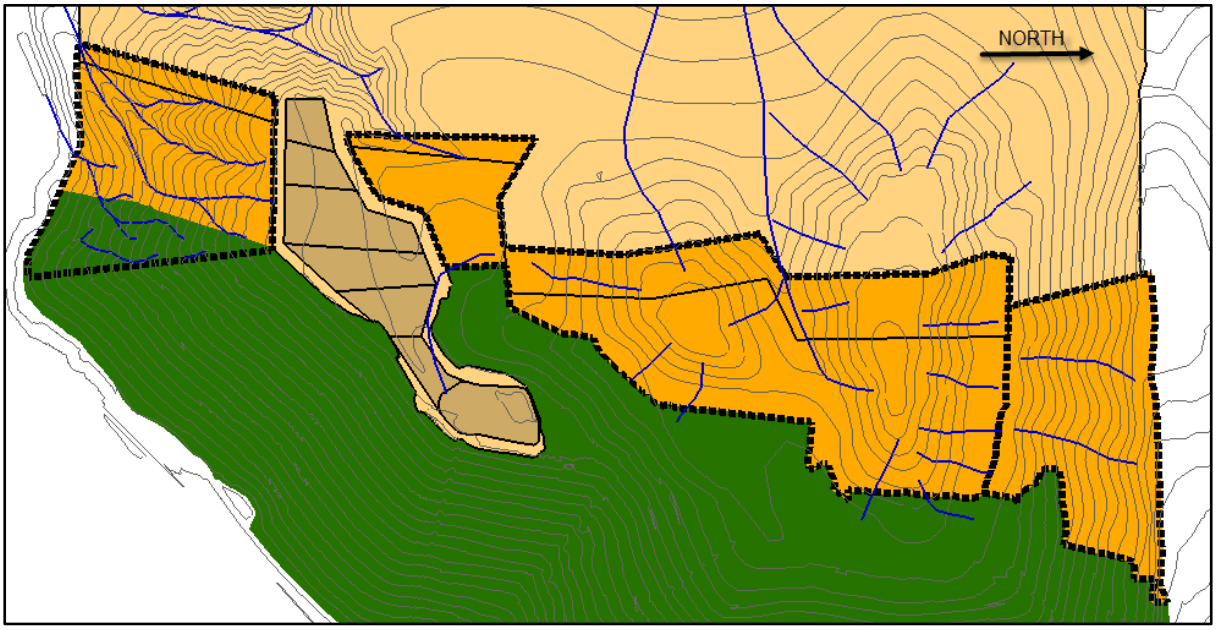


Figure 11 Conceptual example of Geofluv landform

Rock-raking is then undertaken. Rocks greater than 200 mm in diameter may be removed, left or grouped on the surface as fauna habitat. Raking generally leaves a cultivated surface that minimises the risk of erosion until vegetation can be established.

6.2.3.3 Final Landform Construction: Reject Emplacement Areas and Tailings Dams

Reject material (i.e. both coarse reject and partially dried fine tailings) is co-disposed with overburden material within the OEA as discussed in **Section 6.2.1.8**. Bengalla has no designated reject emplacement area or tailings dam.

6.2.3.4 Final Landform Construction: Final Voids, Highwalls and Low Walls

The general design of the final void is discussed in **Section 2.4.1,** with key completion criteria presented in **Section 4.1**. As described in the EIS, Bengalla will use the 'blast and doze' method in combination with backfilling to shape the slopes of the final void. This would entail blasting and dozing of highwalls and endwalls and dozing material from the low wall to achieve the required slope angles. Waste would

also be backfilled into the void to raise the final base of the void. Erosion on the low wall would be controlled by limiting the length of the slope through the use of contour and graded drains and by establishment of suitable vegetation.

Bengalla geology comprises three distinct units being the Permian strata, Permian basement (regolith), and a Quaternary alluvium. The alluvium is generally located on the floodplain of the Hunter River and is thicker adjacent to the Hunter River and comprises the Hunter River alluvial aquifer. The Permian coal seams also act as aquifers and interconnect with the Hunter River alluvium at depth. The regolith at Bengalla is generally unsaturated with minor ephemeral drainage.

Groundwater seeps from the Permian strata and overburden areas into the pit. The final void at the end of mining is predicted to act as a groundwater sink, with a lake level predicted to develop below the regional water table. Therefore, any saline water within the final void will not flow into surrounding groundwater systems. Groundwater and surface water modelling for the EIS indicate that the final water level will reach up to RL 70 m over 1,000 years, which is significantly below the crest of the final void. Salinity in the final void is likely to stabilise at approximately 20,000 µS/cm.

Water management structures will be designed to direct rainfall runoff away from the final void.

Coal resources are known to exist beyond the footprint of the currently approved mining operations at Bengalla. As discussed in **Section 9.2**, in the event that approvals are not sought and subsequently granted for ongoing mining operations, BMC has completed a thorough assessment of the final void landform design assessed within the EIS. BMC will continue to conduct ongoing investigations in relation to the optimisation of the final void landform to ensure it can address the rehabilitation objectives for this domain at the completion of approved mining operations.

6.2.3.5 Construction of Creek/River Diversion Works

Dry Creek is an ephemeral stream which previously flowed to the south through the mine site and discharges to the Hunter River to the southwest of Bengalla. The alignment of Dry Creek has been disturbed as mining operations have progressed. Any surface water flows to the Dry Creek catchment are currently diverted to the west of the current extent of mining and back into the Hunter River catchment using the Dry Creek diversion infrastructure approved under SSD-5170 (as modified).

Bengalla proposes to reinstate 4.5 km of Dry Creek in the location shown in **Part 5** as approved under SSD-5170 (as modified). A preliminary design (PB, 2013) was completed as part of the EIS and generally includes:

- A 2 m thick clay layer for the length of the alignment;
- Stabilisation of the top 300 mm of clay fill with 2% gypsum;
- A two stage flow channel capable of conveying events up to the two year ARI event and up to the 100 year ARI event, consistent with good practice flood management guidelines;
- Development of a channel cross section and roughness that allows opportunity for environmental rehabilitation and enhancement;
- Provision of a channel with a horizontal and vertical alignment that minimises flow velocities and erosion potential and allows opportunities for environmental enhancement;
- Provision of a stable channel that would resist erosion and scour under flood events up to and including the 50 year ARI flood event; and
- The reinstated Dry Creek to be topsoiled, seeded and hydro mulched to the extents of the select clay fill.

The design will incorporate channel meanders to maximise the control of flows and replicate existing conditions.

The reinstated creek will be monitored periodically to ensure objectives are being met and that sustainable vegetation and long-term landform sustainability is achieved (Hansen Bailey, 2013).

In accordance with the Bengalla EIS, a Dry Creek Reinstatement Management Plan will be developed within five years of the proposed construction in consultation with relevant regulators to ensure effective management measures are employed during construction. BMC is conducting ongoing investigations and detailed design work to optimise the EIS design in consideration of the current status of mining operations. Further details of this ongoing work will be presented in future revisions to this RMP.

6.2.4 Growth Medium Development

6.2.4.1 Soil Characterisation

The geochemical nature of the substrate and associated materials was determined during the preparation of the EIS as described in **Section 6.2.1.1**).

6.2.4.2 Soil Ameliorants

Some soil may require amelioration to:

- Reduce potential dispersion and improve drainage qualities;
- Increase nutrients and organic matter within the soil; and/ or
- Change the soil pH.

Soil analysis as required will be undertaken prior to use to determine suitable ameliorants for revegetation. Soil amelioration and treatment requirements may include the use of gypsum, bio solids or similar to improve soil condition.

6.2.4.3 Erosion and Sediment Controls and Mechanical Treatments

The growth medium will be spread across the final landform to the appropriate coverage, at approximately 100 mm depth. The area may then be cultivated to assist in seed germination and water infiltration. Where reasonable and feasible, deep ripping will be undertaken, generally along the contour at intervals less than 0.5m apart to a depth of approximately 400 mm or deeper.

There is potential for erosion and sedimentation on rehabilitated areas at Bengalla. Maintenance for erosion control can sometimes be required around the edges of new rehabilitation areas where the current dump is intersected and in drainage structures that have not stabilised with vegetation. Sediment mobilisation and erosion will be minimised on rehabilitation areas where reasonable and feasible by:

- Progressively rehabilitating disturbed land;
- Shaping rehabilitated land to minimise sheet flows and to direct water to sediment dams;
- Topsoil cultivation during the rehabilitation process, where required, to promote infiltration; and
- Installation of rock riprap, geotextile fabric sediment filters or other suitable measures on steep gradients, as required.

Rock raking allows rocks greater than approximately 200mm to be removed or re-used on the surface as fauna habitat (may not be applied to HDWV areas). Raking generally leaves cultivated surface that minimises the risk of erosion until vegetation can be established. Evidence of erosion including rills and gullies is monitored to determine any required repairs or additional controls required to ensure the landform is safe, stable and non-polluting.

Rehabilitation, where reasonable and feasible, will no longer utilise contour banks and straight line drop structures to manage water but will incorporate fluvial geomorphology design influences (Geofluv).

6.2.4.4 Weed Control

The BMP sets out the procedures for biodiversity management, reporting and auditing of ecological issues within the Bengalla Project Boundary. Topsoils stockpiles are actively managed to minimise any potential weed infestations. Weed control strategies will be implemented particularly for noxious weeds. This may include:

- Application of selective and/or non-selective herbicide (dependent on species that colonise the stockpiled material);
- Scalping of the top approximate 100mm of the stockpiled material to remove the weed seed load prior to handling / placement on rehabilitated areas; and
- Stockpiles will be inspected monthly, or more frequently where specific weed species have lifecycles that produce seeds in less than a month for weed growth and sprayed accordingly to prevent weed species from flowering and seeding.

Additional weed control techniques are described in **Section 6.2.5.3.**

6.2.4.5 Seasonal Considerations and Adverse Conditions

Rehabilitation at Bengalla is undertaken progressively and as soon as practicable after the completion of surface preparation. Inert capping material and topsoil is spread over areas to be rehabilitated as soon as possible, to maintain topsoil quality and take advantage of native seed banks if present. This minimises the areas of disturbed land; reduces future rehabilitation liabilities; minimises visual impacts and helps suppress the potential for wind-blown dust and erosion.

Seeding of a rehabilitation area commences as soon as practical after scarification, if required, tube stock may be planted. Seeding and tube stock planting is preferably sown in Autumn when there is reliable seasonal rain with cooler growing conditions. A cover crop may be applied if meteorological or seasonal conditions are not conducive to rehabilitation species seeding or the pasture rehabilitation species seed is unavailable.

6.2.4.6 Habitat Augmentation

Habitat trees and salvage materials identified during the pre-clearing survey are recovered and either used directly on rehabilitation areas or stockpiled for later rehabilitation works.

Where available, stockpiled habitat features will be spread across the rehabilitation area following the Growth Medium Development phase and prior to seeding. The habitat features will be placed in loose piles to create habitat mounds.

6.2.5 Ecosystem and Land Use Establishment

6.2.5.1 Pasture Classes IV and V

Revegetation Methodology

Pasture areas (Classes IV and V) will be fertilised and sown with the selected seed as soon as reasonably practicable after the completion of Growth Media Development.

During Ecosystem and Land-Use Establishment, cattle may be introduced to these pasture areas to enhance nutrient cycling via consumption of grown feed, production of manure and the trampling and incorporation of plant material (green and dead) into the surface layer.

Seasonal Considerations

Pasture is preferably sown in Autumn when there is reliable seasonal rain with cooler growing conditions. A cover crop may be applied if meteorological or seasonal conditions are not conducive to pasture rehabilitation species planting or the pasture rehabilitation species seed is unavailable.

Vegetation Species

A typical species list for the establishment of pastures for a post-mining grazing land use is provided in **Table 10**. This species list aims to establish a vegetation cover for surface stability and to reduce the risk of erosion whilst providing a plant community suitable of sustaining cattle. This mix may be subject to change due to seed availability, success rate or monitoring data from Bengalla and the wider industry.

Table 10: Pasture Rehabilitation Species

Species	Rate (Kg/ha)
Native grass mix (including all or a combination of: *Austrostipa scabra*, *Bothriochloa macra*, *Chloris ventricosa*, *Microlaena stipoides* and *Themeda australis*)	0.5
Couch	2
Phalaris	4
Ryegrass	4
Green Panic	5
Sub clover	6
Haifa white clover	2
Woolly Pod Vetch	4
Barrel medic	5
Lucerne	5
Millet (around September to January) or Oats (around March to July) – cover crop	20
Fertiliser – Starter 15 (or equivalent) – cover crop	125

Tree coverage may be installed (seeding or tubestock planting) as scattered tree plots throughout the pasture domain for the creation of wind breaks and shelter for stock and as vegetation corridors to connect with the surrounding landscape. The species mix for the treed areas will be consistent with that used for Domain A: Rehabilitation Areas – HDWV as listed in **Table 12**.

6.2.5.2 High Density Woody Vegetation

Revegetation Methodology

HDWV is installed by either direct seeding or tubestock planting as described below:

- Seeding:
  - Seeds are to be sourced with generally known quality, viability and germination rates;
  - Suitable seed management procedures (i.e. seed treatment, handing, storage, etc.) are to be followed;
  - Seeds are spread (around September – October) using a rear-mounted spreader unless otherwise specified (e.g. pozi track, tractor or tracked challenger). In areas where salvaged timber has been placed, or where slopes are too steep, hand seeding is undertaken where reasonable and feasible;
  - When seeding into topsoil seeds from the HDWV species mix (**Table 12**) is supplemented by 'Kitty Litter' at a rate of up to approximately 65 kg/ha;
  - When seeding into overburden seeds from the HDWV species mix (see **Table 12**) is supplemented by fertilizer, for example, Croplift 15 at a rate of up to approximately 100 kg/ha;
  - An inert bulking agent may be included in the species mix to assist in the even distribution of seed; and
  - The HDWV species mix and nominated application rates may be subject to change due to seed availability, success rate, monitoring data and trial outcomes. The HDWV species mix is shown in **Table 12**.

- Tubestock Planting:
  - For areas of tubestock planting of HDWV, rip lines (which may vary in separation distance) are established at a spacing that generally allows for vehicle access between each rip line for planting and maintenance activities;
  - Additional herbicide application may be undertaken as required. Tubestock planting mix (see **Table 12**) is generally undertaken in the cooler months (around May – July) using an auger or speed spade;
  - Tubestock plants are to be sprayed with animal deterrent, anti-transpirant and frost protectant prior to planting;
  - At the time of planting, each plant receives a mix of native fertilizer and water crystals placed in the hole;
  - Tubestock species planting occurs randomly within the planting area;
  - Tubestock planting will not occur within rehabilitation drainage lines (swales) on tracks or other inaccessible areas, for example habitat feature locations;
  - Follow-up watering (which may include a diluted wetting agent) applied at a rate of approximately 1 litre per tree per event will be undertaken as required until the majority of the HDWV tubestock plantings establish; and
  - Periodic slashing as required by machine, for example, tractor slasher to reduce competition from pasture and/or weed species will be undertaken as required until the HDWV tubestock plantings are established.

Table 11: Tree Density / Spacing Guide

Stems per ha	Tree spacings (m)
2,000	2.4
1,800	2.4
1,600	2.7
1,400	2.9
1,200	3.1
1,000	3.4

Swales capture water and soil during rain events and provide favourable growing conditions. Deep rooted trees and shrubs are generally not desirable on the swales as their root system can create pathways for water infiltration through the banks. Swales will be sown with the pasture mix listed in **Table 13**.

Vegetation Species

The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities and utilises species that are known to grow on post mined lands in the Hunter Valley. The preferred method of revegetation is direct seeding and/or tube stock planting (excluding track and drains).

To prepare rehabilitation areas for HDWV installation, some or all of the following methods will be used as required and where reasonable and feasible:

- Vegetation preparation and management, for example, slashing and treatment with a non residual herbicide;
- Scalping to remove vegetation prior to HDWV installation into the topsoil or overburden;
- Soil analysis as required will be undertaken prior to use to determine suitable soil ameliorants for revegetation. Soil amelioration and treatment requirements may include the use of gypsum, biosolids or similar to improve soil condition;
- The use of organic amendments will be considered for all future rehabilitation programmes; and
- Deep ripping generally along the contour at intervals generally less than 0.5 m apart to a depth of approximately 400 mm or deeper.

Table 12: Direct Seeding Mix and Tubestock Mix – High Density Woody Vegetation

Species	Rate in kg / ha
Corymbia maculata (Spotted gum)*	0.8
Eucalyptus crebra (Narrow-leaved ironbark)*	0.8
Eucalyptus fibrosa (Broad leaf ironbark)*	0.2
Eucalyptus moluccana (Grey box)*	0.8
Eucalyptus tereticornis (Forest red gum)* or *E. blakelyi* (Blakely's redgum)*	0.2
Acacia decora (Western silver wattle)	0.3

Species	Rate in kg / ha
Acacia decurrens (Black Wattle)*	0.2
Acacia falcata (Sickle wattle)*	0.2
Acacia parvipinnula (Silver-stemmed Wattle)*	0.2
Acacia implexa (Hickory wattle)*	0.2
Acacia salicina (Native willow)*	0.5
Daviesia ulicifolia (Gorse bitter pea)* or *D. genistifolia* (Broom Bitter Pea)*	0.2
Dodonaea viscosa (Sticky hop-bush)*	0.3
Hardenbergia violaceae (False Sarsaparilla)*	0.1
Native grass mix (including all or a combination of: *Austrostipa scabra*, *Bothriochloa macra**, *Chloris ventricose**, *Microlaena stipoides** and *Themeda australis**)	0.5
Cynodon dactylon (Couch)	0.5
Total	**6.0**
Millet or Oats	5.0

**Denotes Tubestock planting mix and may include Angophora spp., Brachychiton spp. and Casuarina spp.*

Seasonal Considerations

If an area becomes available for Ecosystem and Land-Use Establishment out of season, the area will be initially sown with a temporary cover crop of either Millet (September to January) or Oats (March to July) or similar. When the conditions are suitable for the HDWV species the cover crop will be cultivated into the growth medium or scalped then seeds from the HDWV species mix will be sown.

The seed mix as provided in **Table 13** is to be used on contour crests and banks in the HDWV Domain.

Table 13: Seeding Mix – Swales

Species	Rate (Kg/ha)
Couch	5
Green Panic	4
Sub clover	3
Barrel medic	3
Millet (September to January) or Oats (March to July)	20

6.2.5.3 Weed and Feral Animal Management

Weeds on rehabilitated areas can limit native plant growth. Where weeds establish in rehabilitation areas remedial work may be required. Infested areas may be incorporated into targeted programs to reduce the impact of weeds and achieve rehabilitation objectives. Noxious weeds will be controlled using a combination of mechanical, biological and chemical controls. BMC also undertakes feral animal management and control as required.

The success of weed management activities will be monitored during regular inspections and during the annual rehabilitation monitoring program. The findings will inform improvement of weed control on site.

6.2.6 Ecosystem and Land Use Development

Rehabilitation monitoring begins once initial rehabilitation works are complete and is undertaken through to lease relinquishment to ensure the successful progression of rehabilitation through the rehabilitation phases. Rehabilitation monitoring is discussed further in **Part 8**.

Rehabilitation maintenance is a function of either the rehabilitation methodology or is triggered through the monitoring program. The TARP, discussed in **Part 10**, details mitigation and maintenance measures for responding to unexpected variations or impacts to rehabilitation. Typical maintenance activities at Bengalla focus on erosion control, weed and pest management and revegetation progress.

6.2.6.1 Weed and Feral Animal Control

The Bengalla BMP describes the ecological monitoring program designed to reduce the potential for weed introduction and spread, and details relevant control methods. Similarly pest animals are also identified and controlled as required.

Weed species density and distribution is assessed as part of the monitoring program. A weed management program will be initiated in any infested areas in accordance with the requirements of the *Noxious Weeds Act 1993*. Where there is presence of damage from pest species a targeted pest management program will be initiated. Where reasonable and feasible vegetation will be regenerated in affected areas if required.

6.2.6.2 Erosion and Sediment Control

Additional erosion and sediment control works may be undertaken as required. A management and maintenance program will be implemented based on the outcomes of the rehabilitation monitoring program detailed in **Part 8**.

6.2.6.3 Re-seeding / Planting

Direct seeding or tubestock planting using a broad species base is undertaken to rapidly establish groundcover vegetation in rehabilitated areas. If required a revegetation plan will be developed identifying areas which require re-sowing or supplementary tube stock planting

Revegetation maintenance may also be undertaken because of realignment between existing and new secondary domains that have changed due to the approval of SSD-5170 (as modified), or where HDWV has not established in sufficient densities.

6.2.6.4 Environmental Management

Environmental management at Bengalla occurs in accordance with BMC authorities (see **Section 1.2**). Environmental management plans and procedures have been established for mining related activities that have a potentially significant impact on the environment including surface water, groundwater and biodiversity. Procedures provide details of operation and maintenance of facilities, equipment and machinery where required. BMC management plans and procedures can be accessed by employees and contractors via Sharepoint (an internal database).

The environmental monitoring program will continue to be undertaken as required within rehabilitation areas as well as non-mined areas to demonstrate rehabilitation has satisfied the completion criteria. This program will be continued as required to ensure there are no adverse impacts on the neighbouring environment.

6.2.6.5 Agricultural Productivity

The overarching goal of the Bengalla rehabilitation program is to develop a safe, stable and non-polluting landscape that aligns to the mine's approvals. This will be achieved by the development of an undulating, free draining post mining landform (excluding final void) that is consistent with the surrounding environment. The majority of the post mining landform will support a mixture of native woody vegetation and pastures suitable for grazing. There are currently no areas of rehabilitation at Bengalla that have progressed to this phase. When a suitable area is available a review will be undertaken as part of the annual monitoring program to assess the suitability of any areas for future grazing and where required identify any further works that may be required to support agricultural productivity. BMC will also undertake general land related management activities such as the repair of fence lines and access tracks.

Grazing Trials on Rehabilitated Lands

To demonstrate the capability of rehabilitated land to achieve final land use objectives, BMC commenced a cattle grazing trial within established rehabilitation on the Eastern OEA in June 2015. The trial area was stocked with local breeding stock at a rate of approximately three cattle per hectare.

The trial ran for three months, with the cattle removed in August 2015. At the conclusion of the trial period, all the calves from the trial site were in a marketable weight and condition and were sold in October 2015.

The 2015 rehabilitation monitoring results indicated that the grazing trial may have contributed to improved growth in pasture species and to the removal of litter. Weed coverage also appeared reduced after completion of the trial. No active erosion was identified within the vicinity of the monitoring site located in the trial area following the trial.

6.3 Rehabilitation of Areas Affected by Subsidence

Bengalla lies within a Mine Subsidence District, however the operation conducts open cut mining only, and no subsidence issues have been detected throughout the life of mining. Accordingly, no subsidence remediation is expected to be required at Bengalla.

Part 7. Rehabilitation Quality Assurance Process

Rehabilitation objectives and rehabilitation completion criteria have been prepared for each mining and final land use domain as described in **Part 4** and are subject to approval by the Secretary. The annual rehabilitation audit and transect based monitoring described in **Part 8,** evaluates the progress of rehabilitation towards fulfilling the rehabilitation objectives and rehabilitation completion criteria. Management plans, procedures and processes have been developed for each phase of rehabilitation.

7.1 Phase 1 – Active Mining

Validation methods during active mining include:

- GDPs, survey and pre-clearing surveys as required;
- Mine plans including OEA designs and survey;
- Landform design – where reasonable and feasible incorporating fluvial geomorphology design (geofluv). Survey is undertaken to verify the design; and
- Topsoil movement records.

7.2 Phase 2 - Decommissioning

Validation methods during decommissioning include:

- Contamination reports as required;
- Records of waste material movements; and
- Decommissioning report for the removal of infrastructure, services and equipment (excluding those required post-mining i.e. dams to remain for agricultural land use etc).

7.3 Phase 3 - Landform Establishment

Validation methods during the landform establishment phase include:

- Rehabilitation monitoring program;
- As built survey of landform, water management structures, slope and micro-relief;
- Visual inspection of landform to confirm appropriate water management structures have been constructed, landform is free-draining, surface rocks are a suitable size and to identify any visible risks to successful rehabilitation; and
- Visual inspection of the final void to confirm slope, barrier present along the length of the final highwall to restrict access.

7.4 Phase 4 - Growth Medium Development

Validation methods during the growth medium development phase include:

- Soil testing by NATA-accredited laboratory to confirm growth medium characteristics and any required soil ameliorants;
- Visual inspection to identify any potential hazardous materials, confirm surface cultivated (along contour to a depth of ≥ 300mm, topsoil and subsoil thickness); and
- Topsoil inventory providing details of soils being reused on rehabilitation areas.

7.5 Phase 5 - Ecosystem and Land Use Establishment

Validation methods for the ecosystem and land use establishment phase include:

- Rehabilitation monitoring and reporting as described in **Part 8**;
- Geotechnical inspections / monitoring to confirm no visible signs of instability (slumping/ cracks, erosion);
- Visual Inspections to confirm vegetative cover per hectare (ground cover, species diversity and tree coverage), water storages and quality, evidence of erosion and any visible evidence of hazardous or problematic materials;
- Weed control records focussing on noxious species and on those species that are not deemed as preferred, palatable and productive pasture species; and
- Geographic Information System (GIS) / aerial photography interpretation to confirm presence of higher density plantings around void crest (ground cover, species diversity and tree coverage), establishment of HDWV, presence of higher density plantings around the Dry Creek reinstatement.

7.6 Phase 6 - Ecosystem and Land Use Development

Validation methods for this phase include:

- Rehabilitation monitoring and reporting as described in **Part 8**;
- Weed control records focussing on noxious species and on those species that are not deemed as preferred, palatable and productive pasture species;
- Feral pest surveys to confirm any increase in feral pest population and species diversity;
- GIS / aerial photography interpretation to confirm presence ground cover, species diversity and tree coverage;
- Visual inspection to ensure suitable presence of habitat features (e.g. nest boxes, boulders and large logs);
- Visual inspection of to confirm the suitability of any potential areas for future grazing, confirm any grazing trials required and identify any further works that may be required to support agricultural productivity; and
- Water quality testing to confirm it is suitable for stock watering purposes;

7.7 Responsibilities for Implementation

The following table identifies the personnel who are responsible for rehabilitation.

Table 14: Responsibilities for Implementation of the Quality Assurance Processes

Title	Responsibility
Production / Mine Manager	• Provide training as required. • Provide resources and support as to implement rehabilitation and prepare and implement bulk shape areas for landform establishment.
Technical Services Manager	• Provide training as required. • Provide resources as required and support to implement rehabilitation. • Forward planning to prepare and bulk shape areas for landform establishment.

Title	Responsibility
Environment Superintendent	• Implement, monitor and review the programmes and processes linked to this RMP. • Consult with regulatory authorities as required. • Rehabilitation installation. • Undertake monitoring as required. • Undertake maintenance as required. • Provide measures for continual improvement to this RMP and processes. • Provide training as required. • Report as required in the Annual Rehabilitation Report.

Part 8. Rehabilitation Monitoring Program

BMC undertakes an annual rehabilitation monitoring program to evaluate the progress of rehabilitation towards fulfilling the Rehabilitation Objectives and Rehabilitation Completion Criteria defined in **Part 4**. The purpose of the rehabilitation monitoring program ensures:

- Early identification of actual or emerging issues that have the potential to delay revegetation establishment;
- Confirm if any triggers have been met (refer **Part 10**) and recommend appropriate response control measures; and
- Provide data that may inform continuous improvement of rehabilitation methods.

The annual rehabilitation monitoring program is undertaken through the implementation of both transect-based monitoring and a rehabilitation review/audit:

- The transect-based monitoring was first implemented in 2009 and has been undertaken annually since 2011; and
- The rehabilitation audit consists of a reconnaissance level walkthrough assessment, including opportunistic observations of rehabilitation performance. The rehabilitation audit report provides recommendations for remedial works.

Further detail on the methodologies and approaches adopted for the rehabilitation monitoring program are provided below. The rehabilitation monitoring program will be revised as required to:

- Incorporate industry accepted techniques and/or expert recommendations to address any emerging issues; and
- Assess any new or refined rehabilitation completion criteria that are proposed as a result of rehabilitation and/or analogue site monitoring.

8.1 Analogue Site Baseline Monitoring

The results from annual rehabilitation monitoring will be reviewed by a suitably qualified expert. The monitoring program may be refined, as required, and that may include additional transect-based monitoring sites based on advice from the expert.

8.1.1 Transect-Based Monitoring

The transect-based monitoring relies on quantitative data that is collected in a consistent and repeatable manner to allow multi-year comparison of trends and assessment of changes occurring over time. The outcomes and results of the monitoring indicate whether the rehabilitated lands meet the relevant Rehabilitation Objectives and Rehabilitation Completion Criteria or if further management actions are required to achieve the criteria.

8.1.2 Monitoring Transects

The transect-based approach is suitable for assessing rehabilitation performance against the Rehabilitation Completion Criteria as the transects are readily established, the data collection is simple to execute and the resultant data is scientifically robust. Each monitoring transect consists of a standardised 50m long and 10 m wide linear transect with nested 2 m x 2 m and 1 m x1 m quadrats, as depicted in **Figure 12**. The 50 m x 10 m transect size is widely accepted internationally and supported by data from Neldner and Butler (2008) which indicates that around 90% of an area's biodiversity is sampled effectively in 500 m^2 plots.

The 50 m transect line is established along the contour with the start and end points of the transect permanently marked with a metal star picket and their geographical coordinates recorded using a GPS.

A total of 14 monitoring transects have been established at Bengalla. (see **Table 15**).

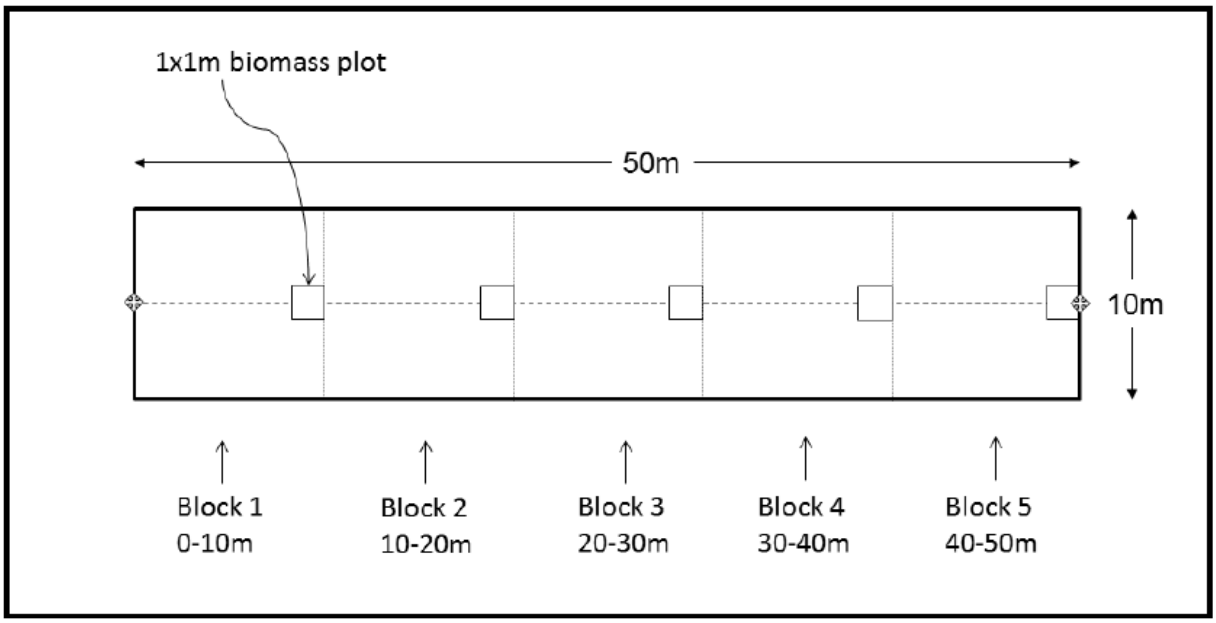


Figure 12 Monitoring Transect Layout

It is noted that several monitoring transects historically monitored across the Eastern OEA have been removed from the current monitoring program as they are located in areas planned to be re-worked to HDWV. Two analogue sites monitored in previous years no longer form part of the monitoring program due to mine progression (refer to **Section 8.1**).

Table 15: Rehabilitation Monitoring Program Study Transects

Transect Name	Geographical Location #		Final Land Use Classification	Rehab Completed	Transect Established
Existing*	Easting	Northing			
NW1	297,166	6,427,208	HDWV	2005	2009
NW2	297,401	6,428,140	HDWV	2004	2009
NW3	296,895	6,427,456	HDWV	2008	2012
NW4	297,278	6,427,375	HDWV	2007	2017
P3	296,710	6,427,664	Pasture on Class III	2012	2014
NW6	297,362	6,426,364	HDWV	2014	2017
NW7	296,381	6,426,121	HDWV	2015	2017
NW8	296,102	6,426,010	HDWV	2016	2018
NW9	295,892	6,425,838	HDWV	2016	2018

Transect Name	Geographical Location #		Final Land Use Classification	Rehab Completed	Transect Established
Existing*	Easting	Northing			
NW10	296,939	6,427,274	HDWV	2006	2018
NW11	297,501	6,428,270	HDWV	2004	2018
NW14	297,013	6,427,653	HDWV	2020	2020
NW15	297,147	6,427,905	HDWV	2020	2020
NW16	297,230	6,428,081	HDWV	2020	2020
NW17	296,911	6,427,633	HDWV	2020	2020
NW18	297,015	6,427,977	HDWV	2020	2020
NW19	297,340	6,427,767	HDWV	2020	2020
NW20	297,462	6,42,7928	HDWV	2020	2020
NW21	297,432	6,427,611	HDWV	2020	2020
NW22	296,380	6,427,604	HDWV	2020	2020
NW23	296,352	6,427,401	HDWV	2020	2020
NW24	296,244	6,427,006	HDWV	2020	2020
NW25	295,883	6,426,309	HDWV	2020	2020
NW26	295,886	6,425,949	HDWV	2020	2020
NW27	295,859	6,425,835	HDWV	2020	2020
NW28	295,619	6,425,988	HDWV	2020	2020
NW29	296,262	6,427,151	HDWV	2021	2021
NW30	296,675	6,427,115	HDWV	2021	2021
NW31	296,851	6,426,955	HDWV	2021	2021
NW32	296,314	6,427,853	HDWV	2021	2021
NW33	296,728	6,427,867	HDWV	2021	2021
NW34	296,765	6,428,083	HDWV	2021	2021
NW35	296,222	6,426,531	HDWV	2022	2022
NW36	296,076	6,426,277	HDWV	2022	2022
NW37	296,047	6,426,403	HDWV	2022	2022
NW38	296,988	6,426,789	HDWV	2021	2022

Transect Name	Geographical Location #		Final Land Use Classification	Rehab Completed	Transect Established
Existing*	Easting	Northing			
NW39	296,723	6,426,616	HDWV	2022	2022
NW40	296,902	6,426,453	HDWV	2022	2022
NW41	296,688	6,426,426	HDWV	2022	2022
NW42	295,637	6,426,310	HDWV	2021	2022

** Existing monitoring transects transferred from MOP and new monitoring transects established during 2020 and 2021.*
 # Geographic Coordinate System: GDA_94_MGA_Zone_56.

It is proposed that new monitoring sites will be established at a density of up to one transect per 10 ha of rehabilitation polygons to verify rehabilitation success. A rehabilitation polygon is a continuous block of rehabilitation complete in a specific year. The location of new transects will be randomised to minimise observer bias during transect placement.

Table 16 sets out the methodology for undertaking monitoring including the assessment area and monitoring component.

Table 16: Rehabilitation Monitoring Program Methodology

Monitoring Component	Assessment Area	Methodology
All Monitoring Transects		
Slope	N/A	• Slope gradient at the transect line is measured using a digital clinometer.
Erosion	10 m x 50 m transect area	• Erosion is assessed in accordance with the guidelines in the *Australian Soil and Land Survey Field Handbook* (CSIRO, 2009) for sheet, rill, gully and tunnel erosion. • Where rills and gullies are present, their location, width and depth are recorded along the 50m transect line.
Ground cover protection	2 m x 2 m quadrats	• The percentage ground cover of live vegetation (projected), organic litter, rocks, logs/woody debris, cryptograms and bare ground are visually estimated.
Ground cover composition	2 m x 2 m quadrats	• Ground cover species (grasses, herbs, forbs, etc.) are recorded and assigned a cover abundance score using a modified six-point Braun-Blanquet scale (<5%; 5-25%, 25-50%, 50-75%, 75-95%, >95%), adhering to the following: - All desirable species are identified to the species level wherever possible; - Listed noxious weed species (+ Galenia) are assessed and rated individually; and - Broadleaf environmental weeds need not be individually identified and can be grouped and assigned a combined rating (although notes can be made on the dominant species present).

Monitoring Component	Assessment Area	Methodology
Soil monitoring	N/A	• A hand shovel or auger is used to determine the thickness of the growing media layer.[1] • A soil sample is collected from the top 100mm using and sent to a NATA-accredited laboratory for testing of the following parameters: - Soil pH and Electrical Conductivity; - Cation exchange capacity and exchangeable major cations; - Exchangeable Sodium Percentage; - Major nutrients – Nitrogen, Phosphorous and Potassium; - Organic Matter content; and - Particle size analysis.
Photographic monitoring	50m transect line	• Digital photographs are taken from the start of the 50m transect with the end of transect in centre background, and from the end of the transect looking in. • Opportunistic photographs are taken of rehabilitation performance as required – including of active disturbance processes.
Pasture monitoring transects		
Pasture biomass	1 m x 1 m quadrats	• All herbage is cut to ground level using hand shears and the clipped material weighed on site using a digital scale to determine the green herbage biomass.
Feed quality	10 m x 50 m transect area	• A sample of available forage material is collected (in accordance with the guidelines provided by the NSW DPI for pasture sampling) and sent to a NATA-accredited laboratory for feed quality testing including: - Dry matter content and digestibility, - Organic matter content and digestibility, - Crude protein and fibre content, and - Metabolisable energy.
Woody Vegetation Monitoring Transects		
Woody species diversity and density	10 m x 50 m transect area	• All individuals of woody species are identified and recorded. Each recorded individual is categorised within a height category as follows: <1 m, 1-3 m, 3-5 m, 5-8 m, 8-12 m, >12 m.
Habitat potential	10 m x 50 m transect area	• The presence and abundance of ground logs/woody debris, large rocks or reclaimed habitat trees is quantified and recorded. • Foliage canopy cover of low shrubs, mid shrubs and canopy trees is estimated along the 50 m transect line. • Other indicators of habitat complexity are noted (and photographed) as relevant – e.g. thick litter layer, tree hollows, mistletoes, production of buds, flowers and fruits, etc.

Monitoring Component	Assessment Area	Methodology
Ecosystem resilience[2]	10 m x 50 m transect area	• Results of the woody species height stratification are used to determine the occurrence of second generation seedlings. • The reproductive status of established shrubs / trees is rated according to the following rating system: - Nil (0) – no buds, flowers or fruits evident; - Rare (1) – buds, flowers or fruits very hard to find, less than 1% of potential load; - Few (2) – low numbers of buds, flowers or fruits, less than 10% of potential load; - Moderate (3) – scattered buds, flowers or fruits, 11% to 50% of potential load; - Common (4) – buds, flowers or fruits obvious, 50% to 90% of potential load; - Abundant (5) – heavily loaded with buds, flowers or fruits, >90% of potential load. To avoid bias and ensure that measurements are meaningful and robust, up to five individuals of the same species are permanently tagged at Year 5 of monitoring, and measurements are repeated on the tagged individuals over time.

[1] This assessment is only undertaken for monitoring sites at Year 1 and Year 5 of establishment.
[2] This assessment is only undertaken for monitoring sites at Year 5 and Year 10 of establishment (and older).

8.2 Rehabilitation Audit

BMC maintains records of activities during active mining, including pre-clearance surveys, topsoil inventory, and up to date mine plans which demonstrate compliance with the methodologies described in Section 6.2.

An annual rehabilitation review is undertaken to complement the transect-based monitoring described in **Section 8.1**. In contrast to the transect-based methodology, the review consists of a reconnaissance assessment of rehabilitated land at Bengalla. Together, the transect–based monitoring and rehabilitation review provide a description of rehabilitation performance across the site on an annual basis.

8.2.1 Methodology

The audit consists of a walkover assessment of the site rehabilitation areas, covering an area as comprehensively as possible within a reasonable time allocation (i.e. walking the site in cross-sections). Additional to the walkover assessment of the site rehabilitation areas, imagery of the site, for example, aerial photography may be reviewed to assist the walkover assessment. While covering rehabilitation areas on foot, opportunistic sightings and assessments are made identifying the following where relevant:

- Stability of slopes and landforms – including presence and severity of active erosion areas (e.g. rill, gully and tunnel erosion);
- Function and condition of existing erosion and sediment control structures and landform features, including water management structures (e.g. spine drains), water ponding areas, etc. (where applicable);

- Visual assessment of ground protection and vegetation cover, vegetation health and growth rates;
- Areas of significant weed incursion;
- Evidence of presence/impact of vertebrate pests; and
- Any other disturbance factors or features, such as presence of mine waste, track disturbance, damaged fences etc.

8.2.2 Frequency

The rehabilitation audit will continue to be undertaken annually. As mining progresses the total area of rehabilitated lands increases over time. As a result, the rehabilitation may be split into two areas of (approximately) equal size with the areas audited alternatively within subsequent years (i.e. one half audited in one year, the second half audited in the following year).

8.3 Measuring Performance Against Rehabilitation Objectives and Rehabilitation Completion Criteria

Rehabilitation monitoring reports are prepared annually to document the rehabilitation performance observed in the monitoring program. The reporting includes an assessment of rehabilitation performance against the Rehabilitation Completion Criteria described in **Part 4** and identifies any thresholds that may trigger intervention or management actions detailed in the TARP (refer to **Part 10**).

A report summarising issues identified during the annual transect-based monitoring and rehabilitation review is produced for internal review following which actions are identified to address identified issues. Trends in the rehabilitation monitoring data will also be monitored to identify emerging risks that have the potential to cause a failure to achieve final land use. In general, issues are addressed using the management actions described in **Part 10**.

Pictorial and GIS based data collected during the rehabilitation monitoring program (e.g. photo monitoring data, geographical locations of identified issues and of monitoring points, etc.) are also centralised and maintained. Over time, the pictorial/GIS data can be used to document the evolution of rehabilitation condition, particularly following the implementation of remedial works.

Part 9. Rehabilitation Research, Modelling and Trials

This section describes the rehabilitation research programs, modelling and trials that are being undertaken or are proposed to be undertaken to ensure that any knowledge gaps related to rehabilitation at Bengalla do not remain unaddressed and adversely impact the implementation of the life of mine rehabilitation schedule.

BMC does not propose to undertake rehabilitation research, modelling and trials where rehabilitation methods are well established and are progressing towards achieving the approved Rehabilitation Objectives and Rehabilitation Completion Criteria.

9.1 Current Rehabilitation Research, Modelling and Trials

9.1.1 Tailings to Topsoil

Research into the effectiveness of blending tailings and soils has commenced, with germination and ex-situ glasshouse plant growth trials conducted at the University of Newcastle. To assess in-situ conditions, a plant growth trial is being conducted at Bengalla. This research will assess plant growth studies of three species of plants, at two tailings to soil mixing ratios and a soil only (control) experiment. The research is ongoing and may lead to further research subject to grant funding.

9.1.2 Species Suitability

Species suitability in both Pasture and HDWV Areas will continue to be assessed as part of the annual rehabilitation monitoring program. The findings will be used to develop and refine seed mixes and Rehabilitation Completion Criteria as an ongoing process.

9.2 Future Rehabilitation Research, Modelling and Trials

Landscape Evolution Modelling

BMC is investigating Landscape Evolution Modelling (LEM) or similar methods to demonstrate that the final landform is long term “safe and stable” (being one of the key Rehabilitation Objectives for Bengalla mining leases) and address any long term erosion and stability risks. Unless the NSW Resources Regulator directs or agrees otherwise:

- LEM or similar methods will be used to evaluate the long term erosion rates by modelling erosion and deposition over time; and
- a monitoring program (excluding surface variations not related to erosion) will be formulated to inform modelling output.

Mine closure Planning

In accordance with the EIS, should BMC determine mining will cease at Year 24 a detail Mine Closure Plan will be developed. That is, in the event that further approvals are not sought or granted BMC will prepare a Mine Closure Plan within five years of the end of Mining. Should approval be granted for the continuation of mining operations to develop additional areas and coal reserves then mine closure planning and the final landform and associated void design would be revisited at that time.

The closure plan will consider opportunities for re-use of facilities, infrastructure and services on the site in consideration of any alternative post mining land uses identified at the time. A number of post mining land use options have been investigated for Bengalla following consultation with Regulators, near neighbours and the local community as part of the EIS. As part of closure planning, BMC will continue to investigate potential post mining beneficial land uses for the site.

Part 10. Intervention and Adaptive Management

Progressive rehabilitation will be carried out as soon as reasonably practicable after disturbance occurs. In accordance with clause 7 of Schedule 8A of the Mining Regulation, BMC has undertaken a Risk Assessment to identify, assess and evaluate the risks regarding rehabilitation summarised in **Table 8**.

A TARP has been developed to manage risks outlined in **Table 8**. The TARP identifies proposed actions in the event of unexpected variations or impacts to rehabilitation such as a failure to meet a nominated completion criterion. Specific actions in the TARP will be triggered as appropriate when rehabilitation monitoring indicates that there are emerging threats to rehabilitation or rehabilitation is not progressing towards achieving the final land use (refer to **Table 8** for details). As conditions at Bengalla change, new hazards that present a risk to rehabilitation may be identified. Further, as the results of relevant rehabilitation research and trials identify improvements to the rehabilitation practices at Bengalla these will be incorporated into rehabilitation practices. In the event of a new hazard or improvement to rehabilitation practices is identified, BMC will review the Risk Assessment and update the TARP as required.

The proposed response actions in the TARP have been identified having regard for relevant studies and assessments which indicate that the action will be suitable for managing a situation before threats to rehabilitation success become unacceptable, unmanageable or irreversible. The rehabilitation monitoring program (**Part 8**) will be the primary means of monitoring the effectiveness of the mitigation measures for each proposed response action in the TARP, allowing any adjustments to those mitigation measures to be made as necessary.

Table 17: Trigger Action Response Plan

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
Landform	Not to design: • Design does not meet regulatory requirements • Insufficient suitable materials to construct the final landform • Final landform not progressively constructed in accordance with Consent • Inadequate consideration of natural/microrelief landforms commitment	Trigger	Landform constructed as per natural/microrelief design.	As built survey identifies that constructed final landform marginally deviates from the design.	As built survey identifies that constructed final landform significantly deviates from the design.
		Response	• Geotechnical assessment of mine plan landforms • Dump design includes reject emplacement and settlement considerations • LoM rehabilitation materials balance • Long-term/mid-term mine plan review • Construction supervision and monitoring • Engineered design and analysis • Training and supervision • Engage suitably qualified and experienced design engineer • Survey 'during construction and as built' to verify that the design has been adhered to • Post construction erosion and landforms stability monitoring	• Continue Post construction erosion and landforms stability monitoring • Undertake landform survey to determine if landform is to be modified	• Undertake landform survey to inform how landform is to be modified • Remedial work to achieve design
	Failure: • Landform failure, that is, geotechnical event • Unplanned ponding and/or slumping in the landform	Trigger	No evidence of ponding, slumping/slip or movement in final landform.	Monitoring indicates some minor ponding, slumping/slip or movement of OEA material. Signs of minor settlement (drop in elevation), appearance of tension cracks.	Monitoring indicates some significant slumping/slip or movement of OEA material. Elongation and widening of tension cracks, visible vertical or horizontal movement, soil bulging downslope of settlement.
		Response	• Slope Dump Management Plan • Microrelief • Final landform surface water management design	• Undertake landform survey to determine if landform is to be modified	• Review designs and schedules • Investigate source of instability • Review designs and schedules

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
			• 'As built' landform survey • Engage suitable qualified and experienced design engineer • Training and supervision • Progressive landform	• Continue monitoring any deviations in the final landform causing ponding or slumping	• Remedial work to achieve design (i.e. backfill, stabilise, redirect water flow)
	Rehabilitated OEA Slope gradient.	Trigger	Slopes constructed in accordance with design gradient.	Slopes constructed marginally outside of the design gradient.	Constructed slopes significantly outside the design gradient anticipated to result in an unstable final landform.
		Response	•Check design for conformity Slope Dump Management Plan • Microrelief • Final landform surface water management design • 'As built' landform survey • Engage suitable qualified and experienced design engineer • Training and supervision • Progressive landform	• Check design for conformity • Continue Post construction erosion and landforms stability monitoring • Undertake landform survey to determine if landform is to be modified	• Check design for conformity • Undertake landform survey to inform how landform is to be modified • Remedial work to achieve design
	Groundwater recharge in the final void results in final void landform instability/failure.	Trigger	No evidence of final void instability. Groundwater recharge consistent with groundwater model predictions.	Monitoring indicates some minor instability of the final void and variations to the predicted groundwater model.	Monitoring indicates some significant instability/ failure of the final void and unpredicted groundwater recharge outside the model predictions.
		Response	• Void has been designed to be a long-term sink • Factor of safety to be included in the design of the final void • Groundwater monitoring network which also accounts for other users • Groundwater model reviewed every three years • Review undertaken by a suitable qualified and experienced person • Water Management Plan	• Investigate source of instability • Review designs and schedules • Monitor groundwater recharge • Geotechnical surveys if required	• Investigate source of instability • Review designs and schedules • Remedial work to achieve design (i.e. backfill, stabilise, redirect water flow)
	• Active erosion on rehabilitated areas • Major storm event	Trigger	No erosion present.	Minor gully or tunnel erosion and presence of rills and inter rill erosion.	Significant gully or tunnel erosion and presence of active and or deep rills.

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
		Response	• Rehabilitation design, which minimises slope • Rapidly stabilise the substrate and increase organic matter using sterile cover crops • Sow with appropriate methods perennial ground cover species suitable to the final land use • Design final landforms to cope with major storm events (1 in 20 year ARI)	• Investigate cause of erosion such as slope and material type, and vegetation cover • Implement remediation if determined necessary	• Undertake a review of landform drainage design, landform slope and material type • Remediate area as per review recommendation where required
Surface Water	• Surface Water Quality • Saline leachates expressing from the landform	Trigger	Surface water quality of runoff from rehabilitation areas is within relevant performance criteria.	Water quality exceeds performance criteria but does not indicate a long term rehabilitation risk.	Water quality exceeds criteria, indicating a long term rehabilitation liability, and not contained within the site water management system.
		Response	• ARD and Mineral Waste Management Plan • Mine design allows pit/dump floors to generally drain back towards the void • Water Management Plan monitoring program • Encapsulation of carbonaceous and ARD material • No hazardous material on the landform surface • Stabilise surface as soon as possible	• Water Management Plan monitoring program • Review trends of water quality monitoring results and review requirement for active management measures or remediation. Implement any recommendations from review	• Investigate possible reasons for poor water quality issues, and to provide recommendations for remediation • Implement required remediation such as surface stabilisation or additional drainage and erosion and sediment control works
Topsoil	• Topsoil depth is unsuitable for the final land-use • Inadequate depth of the sub-base • Soil Balance inaccurate • Insufficient topsoil available to effect rehabilitation	Trigger	Sufficient soil resources for proposed rehabilitation.	Minor deficiency of soil resources.	Deficiency of soil resources significant enough to delay rehabilitation activities for Forward Program term.
		Response	• Verification and inspection records • Timing of growth media application and seed bed preparation • Annual Budget Plan and Annual Rehabilitation Plan	• Monitoring and testing • Assessment of areas where alternates to topsoil can be used	• Remediate where required e.g. apply ameliorants • Modify topsoil stripping methods • Import topsoil if required

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
			• Assessment of areas where alternates to topsoil can be used • LoM topsoil balance • Review and update the Soil Balance • Appropriate equipment • Soil colour used as a guide to stripping depths • Weed spraying before stripping • Survey stockpile locations and volumes • Training and supervision • Verification of completion of works in accordance with the Purchase Order/ Rehabilitation Work Order		
	• Handling practices damage physical properties, for example, soil structure or weed infestation • Evidence of Sodicity and surface crusting • Failure to characterise soil (and ameliorates if required)	Trigger	Soil test results and vegetation growth performance demonstrate acceptable soil quality (chemistry/physical/biological properties).	Monitoring demonstrates soil quality may be limiting plant establishment/ growth.	Monitoring demonstrates soil quality is significantly limiting plant establishment/ growth.
		Response	• Using correct equipment • Mine planning (minimise rehandle) • Reintroduction of organic materials and/or habitat features to encourage insect colonisation as required • Avoiding smooth seedbeds • Stockpile management (including stockpile height) • RMP • Apply ameliorants at the time of spreading on rehabilitation areas as required • Survey stockpiles • Stockpile register (records) • Training and supervision • Verification of completion of works in accordance with the	• Monitoring and testing • Investigate potential mitigation measures	Remediate where required e.g. apply ameliorants or reintroduction of organic materials and/or habitat features.

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
			Purchase Order/ Rehabilitation Work Order		
Seeding	Poor quality seed -viability testing not completed.	Trigger	Generally successful germination of seeds in new rehabilitation areas.	Areas where seeds failed to germinate within a new rehabilitation area.	Significant areas were seeds failed to germinate within a new rehabilitation area.
		Response	• Purchase seed • Biodiversity Management Plan requires seed collection for use in rehabilitation (when available) • GDP • Viability testing (purchased or collected seed) • Ensure certification from the supplier	Investigate and verify seed quality.	Engage additional/alternate seed suppliers.
Vegetation establishment	Tubestock - Ineffective native tube stock planting methodology to achieve the final land-use.	Trigger	Effective establishment of tube stock species.	Signs of plant stress such as stunted growth and minimal dieback.	Significant tube stock dieback.
		Response	• Time tube stock planting for appropriate seasonal conditions • Apply herbicide to planting lines generally 2 weeks prior to ripping • Deep rip and seed • Plant tube stock with water crystals and fertiliser pellets as required • Deep watered until tube stock established • Maintain verification and inspection records • Training and supervision • Verification of completion of works in accordance with the Purchase Order/Rehabilitation Work Order	• Continued monitoring • Visual investigation for potential causes of low establishment rate • Consider requirement for additional tubestock planting or patch seeding to achieve required target species richness	• Consult with subject matter expert • Implement recommendations • If required a revegetation plan will be developed identifying areas which require re-sowing or supplementary tube stock planting

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
	Severe and/or prolonged drought.	Trigger	Effective establishment of vegetation.	Signs of plant stress such as stunted growth and minimal dieback.	Significant stress and dieback of vegetation cover.
		Response	• Selection of species aligned to desired vegetation community.	• Continued monitoring • If required a revegetation plan will be developed identifying areas which require re-sowing or supplementary tube stock planting • Remedial action where required.	
	Bushfire damage.	Trigger	Fuel loads in rehabilitation areas are managed as required.	Fuel loads in rehabilitation areas are inadequately managed.	A fire on site damages rehabilitation.
		Response	• Bushfire Management Plan • Selection of fire-tolerant species for revegetation and adoption of standard fire prevention measures. • Fire management on buffer land, including obligation of lease agreements for landholders to maintain firebreaks and minimise fire hazards.	• Implement Bushfire Management Plan controls • Maintain access for firefighting • Implement Bushfire Management Plan	• Implement Bushfire Management Plan • If required a revegetation plan will be developed identifying areas which require re-sowing or supplementary tube stock planting
	Predation of vegetation.	Trigger	Rehabilitation is establishing successfully with no ongoing impacts from feral animal predation.	Monitoring indicates presence of feral animal species with minimal impacts to vegetation cover.	Monitoring indicates presence of feral animal species with significant impacts to vegetation cover and/or soil stability.
		Response	• Install hare guards (tube stock) • Monitor and record vertebrate pest data • Vertebrate pest control programs • Stock exclusion fencing where required	• Vertebrate pest monitoring program • Targeted pest control programs where required	• Targeted pest control programs where required • Remediate impacted areas
	Weed Contamination.	Trigger	Weed presence is within acceptable range presents no risk to vegetation establishment.	Weeds present a minor risk to risk to vegetation establishment.	Weeds present a significant risk to risk to vegetation establishment.
		Response	• GDP • Spray weeds before stripping as required • Scalping weeds before stripping	• Review weed management practices • Assess requirement for additional mitigation	• Application of selective and/or non-selective herbicide (dependent on species • Remedial action where required e.g. weed spraying, weed scalping

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
			• Scalping stockpiles before spreading as required • Seeding stockpiles to inhibit weeds • Inspection and weed management • Annual Rehabilitation Plan • Communication • Training • Dedicated crew supervisor	measures and/or weed control measures • Application of selective and/or non-selective herbicide (dependent on species) • Infested areas may be incorporated into targeted programs to reduce the impact of weeds and achieve rehabilitation objectives	• Infested areas may be incorporated into targeted programs to reduce the impact of weeds and achieve rehabilitation objectives
	• Poor quality seed • Viability testing not completed • Inadequate seed volume or tube stock numbers for rehabilitation outcomes (availability)	Trigger	Monitoring results indicate rehabilitation area vegetation structure and density will achieve completion criteria.	Monitoring results indicate rehabilitation vegetation structure and density will require minor additional works to achieve the completion criteria.	Monitoring results indicate rehabilitation area vegetation structure and density is on a declining trajectory away from achieving the completion criteria.
		Response	• GDP – ecologist to identify opportunities • Engage suitable experienced suppliers • Establish a broad supply base of seed to mitigate supply limitations • Notify suppliers to source the correct seed (as required) • Notify suppliers so that they have sufficient tube stock available • Training and supervision • Annual Rehabilitation Plan • Biodiversity Management Plan requires seed collection for use in rehabilitation (when available) • Viability testing (purchased or collected seed) • Ensure certification from the supplier	• Investigate and verify seed quality • If required a revegetation plan will be developed identifying areas which require re-sowing or supplementary tube stock planting • Remedial action where required	• Engage additional/alternate seed/tubestock suppliers • Remedial action where required

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
Habitat Features	Failure to recover suitable habitat features.	Trigger	Sufficient habitat resources recovered for proposed rehabilitation.	Insufficient habitat resources for proposed rehabilitation areas.	
		Response	• RMP • Annual Budget Plan and Annual Rehabilitation Plan • Fit-for-purpose salvaging equipment • Storage locations for salvaged habitat resources • GDP • Salvageable materials requirements in the GDP • Training and supervision	• Import habitat features where required	
	Lack of suitable rock (grading, size, competency) to enable key structures to be built.	Trigger	Sufficient suitable rock for proposed rehabilitation and key structures.	Insufficient suitable rock for proposed rehabilitation and key structures.	
		Response	• Mine planning • Identify suitable rock in the mining process • Stockpile mixed size rock • LoM rock budget (estimated at present) • Rock can be purchased locally if required • Rock testing to ensure required properties are met • Training and supervision • Rock recovery	• Import suitable rock as required	
Hazardous Materials	• Unsuitable materials, for example, carbonaceous materials at or near the final landform surface • Management for hazardous materials including waste rock Geochem testing not followed	Trigger	No evidence of hazardous materials on the surface.	Soil monitoring results and/or surface water monitoring results indicate unsuitable material is close to the outer surface of OEA causing minor isolated failure of revegetation.	Rehabilitation monitoring (soil test) results and/or surface water monitoring results indicate acid forming material is close to the outer surface of overburden emplacement, resulting in a widespread area (>50% of rehabilitation area) of revegetation failure.

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
	• Failure to identify and manage any acid forming material, waste rock, washery waste or carbonaceous material	Response	• Mine planning for LoM rejects management • Design layers in the mine planning software • ARD and Mineral Waste Management Plan • 'As built' landform survey • Training and supervision • Survey during construction as required • Final dumping profile is surveyed • Survey inspections • Annual Budget Plan and Annual Rehabilitation Plan	• Funding is reviewed annually • Continued monitoring and survey during construction as required	• Removal of unsuitable material and replacement with suitable material • Remediation as required
Resourcing	Inadequate resources available to meet rehabilitation requirements following the cessation of coal mining.	Trigger	Adequate resources available.	Inadequate resources available to meet rehabilitation requirements following the cessation of coal mining.	
		Response	• Internal provision for the rehabilitation maintenance • Closure plan • Internal reviews and updates are undertaken • Cost estimate to accompany the Mine Closure Plan with the LoM is <7 years • Develop a Mine Closure Plan when mine within 7 years LoM	• Secure resources to meet rehabilitation requirements	
	Premature closure of the mine means the approved final landform cannot be achieved.	Trigger	Approved final landform achieved.	Premature closure of the mine means the approved final landform cannot be achieved.	
		Response	• Seek consent modification • LoM planning • Approval application managed by suitably qualified and experienced persons • Revised project application • Monitor external factors to identify a new trigger (i.e. new legislation)	• Review authorities • Modify authorities if required • Undertake closure work • Secure resources to meet rehabilitation requirements	

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
	Infrastructure not decommissioned and/or contamination not remediated in accordance with the development consent and mining lease obligations.	Trigger	Infrastructure areas appropriately decommissioned.	Infrastructure not decommissioned and/or contamination not remediated in accordance with the development consent and mining lease obligations.	
		Response	• RMP • Develop Mine Closure Plan in accordance with the consent • Approval for operation • Seek consent modification	• Decommission and remediate in accordance with Mine Closure Plan	
	Unable to meet progressive rehabilitation targets: • Inappropriate equipment and skills, with suitable availability • Operational constraints mean plans not achieved • Ineffective scheduling of rehabilitation inside mine planning systems • Rehabilitation execution not clearly defined • Lack of governance around mine closure and related financial obligations (i.e. corporate standards)	Trigger	Progressive rehabilitation delivered in accordance with the Forward Program.	Rehabilitation progress slightly delayed (<2 years).	Rehabilitation progress significantly delayed (> 2 years).
		Response	• Access to external contractor • Pit Services Team • Budget Plan • LoM planning • Annual Budget Plan and Annual Rehabilitation Plan • Site Rehabilitation Committee • Rehabilitation planning is part of business planning	• Investigate cause of delays • Revise effective scheduling of rehabilitation and Annual Rehabilitation Plan	• Engage additional/alternate contractors • Rehabilitation Committee to review Annual Budget Plan (rehabilitation component) and Annual Rehabilitation Plan to enable rehabilitation installation according to the Forward Program and RMP • Implement Mine Closure Plan
Ongoing Management	Inappropriate post mining land-use management practices for mature rehabilitation areas post mining.	Trigger	No damage to Agricultural - Grazing and Native Ecosystem rehabilitation areas.	A significant area of damage to established rehabilitation area due to unsuitable land management practices.	
		Response	• Covenants on land that transfers with sale if required • Land Management Plans implemented until tenement relinquishment/land sale • Develop a Mine Closure Plan when mine within 7 years LoM	• Cease adverse land-use management practices • Remediate where required	

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
	Lack of follow up maintenance.	Trigger	Monitoring indicates rehabilitation is being successfully established and maintenance undertaken as required.	Monitoring indicates minor areas of unsuccessful rehabilitation and maintenance is likely required.	Monitoring indicates major areas of unsuccessful rehabilitation due to lack of follow up maintenance.
		Response	• Prepare fit-for-purpose plan • Include suitable maintenance costs in Annual Budget Plan	• Investigate cause of maintenance delays • Continued monitoring • Review Annual Budget Plan	• Remediate where required
	Uncontrolled Access.	Trigger	Access sufficiently restricted.	Evidence of occasional unauthorised access resulting in minor degradation of rehabilitation areas.	Repeated unauthorised access resulting in significant degradation of rehabilitation areas.
		Response	• Demarcation installed • Visual inspections	• Implement RMP management and intervention measures • Surveillance	• Install/alter demarcation where required • Remove intruders from site
	Rehabilitation areas are not on a trajectory to meet the approved completion criteria for the final land-use.	Trigger	Monitoring indicates rehabilitation is being successfully established and consistent with the desired completion criteria.	Monitoring indicates minor areas of unsuccessful rehabilitation inconsistent with completion criteria.	Monitoring indicates that rehabilitation does not contain the desired groundcover, species composition and will not meet approved completion criteria for the final land use.
		Response	• Rehabilitation TARPs • Rehabilitation monitoring program • Plan grazing trials to ensure suitability by the time of relinquishment • Use of industry knowledge in surrounding area and other mine sites	• Implement RMP management and intervention measures • Review rehabilitation design and/or implementation to identify factors impacting success	• Identify rehabilitation failure • Remediate where required
	Inadequate records to demonstrate rehabilitation	Trigger	Adequate records maintained.	Inadequate records to demonstrate rehabilitation success and that risks are managed.	

Aspect / Category	Key Element	Trigger / Response	Green (Existing Controls)	Amber	Red
	success and that risks are managed	Response	• Independent Rehabilitation Audit • Ongoing rehabilitation inspections and post closure monitoring • Verification records • Rehabilitation risk assessments • Ongoing review of scheduled works • Review annual rehabilitation monitoring to identify any emerging risks	•Review rehabilitation monitoring program • Audits • Collect and collate rehabilitation records	

Part 11. Review, Revision and Implementation

This RMP will be reviewed and updated as required in accordance with the triggers in **Table 18**. **Section 7.7** identifies the personnel who are responsible for the ensuring mining and rehabilitation activities are being conducted in accordance with the RMP.

Table 18: Requirements for RMP Review

Condition	Requirement	Timing
State Significant Development Consent SSD-5170 (as modified)		
Schedule 2, Condition 15	The Applicant must regularly review the strategies, plans and programs required under this consent and ensure that these documents are updated to incorporate measures to improve the environmental performance of the development and reflect current best practice in the mining industry. To facilitate these updates, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis. With the agreement of the Secretary, the Applicant may prepare a revision or stage of any strategy, plan or program required under this consent without undertaking consultation with all parties nominated under the applicable condition in this consent. Notes: • While any strategy, plan or program may be submitted on a staged basis, the Applicant must ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. • If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.	As required.

Condition	Requirement	Timing
Schedule 5, Condition 5	**Revision of Strategies, Plans and Programs** Within 3 months of the submission of: (a) an annual review under Condition 4 above; (b) an incident report under Conditions 7 below; (c) an audit report under Condition 9 below; or (d) any modification to the conditions of this consent (unless the conditions require otherwise), the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.	3 months
	Where this review leads to revisions in any such document then within 4 weeks of the review unless the Secretary agrees otherwise, the revised document must be submitted to the Secretary for approval. *Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.*	4 weeks
Mining Regulation		
Schedule 8A, Clause 11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows— (a) to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary—within 30 days after the document is approved,	30 days
	(b) as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made,	30 days
	(c) to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment—as soon as practicable after the rehabilitation risk assessment is conducted,	As soon as practicable
	(d) whenever given a written direction to do so by the Secretary—in accordance with the direction.	As directed

11.1 Auditing and Reporting

This section provides a summary of relevant reporting and auditing requirements as required under SSD-5170 (as modified) for Bengalla and the standard conditions of mining leases under Schedule 8A of the Mining Regulation.

11.2 Annual Review and Annual Rehabilitation Report

Schedule 5, Condition 4 of SSD-5170 (as modified) requires BMC to provide an Annual Review to the Secretary of DPE by the end of March each year, which will review the environmental performance of Bengalla for the previous calendar year.

The Annual Review will be made publicly available through placement on the Bengalla website and will be provided to the Bengalla CCC.

The Annual Review details activities undertaken during the reporting period that support progression towards the final land use and rehabilitation objectives. The Annual Review contains the information required by Schedule 5, Condition 4 of SSD-5170 (as modified) and relevantly includes:

- a summary of mining operations;
- a summary of rehabilitation activities;
- environmental performance of:
    - erosion and sediment control;
    - waste management;
    - contaminated land;
    - flora and fauna; and
    - weeds and pests;
- trends in monitoring data;
- non-compliances and actions that were or are being taken to ensure compliance;
- proposed activities for the next reporting period, including:
    - rehabilitation activities; and
    - any planned research or trials.

The standard mining lease conditions under Schedule 8A of the Mining Regulation relevantly require an annual rehabilitation report (**ARR**) to be submitted for each mining lease for the annual reporting period. The ARR must address certain matters as set out in the Regulation and be prepared in accordance with the *Form and Way: Annual Rehabilitation Report and Forward Program for large mines* (NSW Resources Regulator, 2 July 2021).

BMC applied to the Secretary for approval (via the NSW Resources Regulator portal) in December 2022 to:

- group its mining leases (including for the purposes of the ARR, so that there is a single ARR which covers all BMC mining leases); and
- change the annual reporting period and date for submission of the ARR so that it relates to the previous calendar year and is due by the end of March each year (unless otherwise agreed by the Secretary) so as to align with the Annual Review under SSD-5170 (as modified).

The application was subsequently approved by the Resources Regulator and described the first annual reporting period for the ARR to be 27 June 2022 to 31 December 2022. The second and subsequent ARRs will relate to a calendar year and will be due for submission by the end of March each year to align with the Annual Review.

11.3 Independent Environmental Audit

Schedule 5, Condition 9 of SSD-5170 (as modified) requires BMC to commission and pay the full cost of an Independent Environmental Audit (IEA) of Bengalla within one year of the commencement of development under SSD-5170 (i.e. by 1 October 2016) and every three years thereafter, unless the Secretary directs otherwise. The IEA must comply with certain requirements.

In accordance with Schedule 5, Condition 10 of SSD-5170 (as modified), BMC will submit the IEA report and its response to the Secretary within 6 weeks of completion of the IEA (unless the Secretary agrees otherwise).

11.4 Reporting an Incident or Non-Compliance

Schedule 5, Condition 7 of SSD-5170 (as modified) requires that BMC immediately notify any incident (defined as “An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance”) to the Department and any other relevant agencies. The notification must include certain details.

Schedule 5, Condition 7A of SSD-5170 (as modified) provides that within seven days of becoming aware of a non-compliance (defined as “An occurrence, set of circumstances or development that is a breach of this consent”), BMC must notify the DPE of the non- compliance. The notification must include certain details.

Note: A non-compliance which has been notified as an incident does not need to be also notified as a non-compliance.

Clause 18 of Schedule 8A of the Mining Regulation requires BMC to provide the Minister with a written report detailing any non-compliance with a condition of the mining lease or a requirement of the Act or the Regulation relating to activities under the mining lease, within 7 days after becoming aware of the non-compliance. The report must include certain details.

11.5 Complaints

BMC has a procedure which details how to receive, respond to, record and address community complaints. BMC will continue to maintain a record of community complaints and subsequent actions. The following details will be recorded:

- Complainant details (where provided);
- The nature of the complaint;
- How the complaint was made;
- Actions (if appropriate); and
- Consultation undertaken.

Complaints regarding any environmental matters are directed to the 24 hour environmental hotline: 1800 178 984. A complaints summary will be published monthly on BMC’s website in accordance with Schedule 5, Condition 11(a) of SSD-5170 (as modified).

11.6 Continuous Improvement

Environmental performance at Bengalla in relation to rehabilitation is evaluated through:

- Review and investigation of any TARP exceedances;
- Rehabilitation monitoring program results;
- Independent Environmental Audits; and
- Feedback from stakeholder consultation.

BMC will then determine any rehabilitation management practices that require further refinement.

11.7 Public Access to Information

In accordance with Schedule 5, Condition 11 of SSD-510, BMC provides environmental information to the public via the Bengalla website including: statutory approvals and associated documents; summary of environmental monitoring results; complaints register; CCC meeting minutes; Annual Reviews for the last 5 years, Independent Environmental Audits and BMC's responses to the same; management plans (including this RMP) and any other information required by the Secretary.

BMC will make a copy of this RMP, the Forward Program and the Annual Rehabilitation Report publicly available on the Bengalla website at the required times in accordance with clause 16 of Schedule 8A of the Mining Regulation.

Part 12. References

- Bengalla (2017a). *Biodiversity Management Plan*
- Bengalla (2017b). *Historic Heritage Management Plan*
- Bengalla (2017c). *Aboriginal Cultural Heritage Management Plan*
- Hansen Bailey (2013). *Continuation of Bengalla Mine Environmental Impact Statement*
- Neldner, V.J. & Butler, D.W. (2008). Is 500 square meters an effective plot size to sample floristic diversity for Queensland's vegetation? *Cunninghamia* 10(4): 513-519
- NSW Resources Regulator (2023). *Guideline: Rehabilitation Objectives and Rehabilitation Completion Criteria*
- NSW Resources Regulator (2021b). *Form and Way: Rehabilitation management plan for large mines*
- NSW Resources Regulator (2021c). *Guideline: Mine Rehabilitation Portal*
- Parsons Brinckerhoff (2013). *Dry Creek Interim Management System and Conceptual Re-establishment Study*
- Standards Australia (2001). *Australian Standard AS 2601-2001: The Demolitions of Structures*

Part 13. Abbreviations

Abbreviation	Meaning
ACHMP	*Aboriginal Cultural Heritage Management Plan* (Bengalla 2017c)
ANC	Acid Neutralising Capacity
ARD	Acid Rock Drainage
ASS	Archerfield Sandston Sequence
BJV	Bengalla Joint Venture
BMC	Bengalla Mining Company Pty Limited
BMP	*Biodiversity Management Plan* (Bengalla 2017a)
CCC	Community Consultative Committee
CHPP	Coal Handling and Preparation Plant
DCEEW	Commonwealth Department of Climate Energy, Energy the Environment and Water
DPE	Department of Planning and Environment
EIS	*Continuation of Bengalla Mine Environmental Impact Statement* (Hansen Bailey, 2013)
EL	Exploration Licence
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	Environment Protection Licence
GDP	Ground disturbance permit
GIS	Global Information System
HDWV	High Density Woodland Vegetation
HVEC	Hunter Valley Energy Coal Pty Ltd
MACH	MACH Energy Australia Pty Ltd
Mbcm	Million bulk cubic metres
MEG	Department of Regional NSW, Division of Mining, Exploration and Geoscience
ML	Mining Lease
Mining Act	*Mining Act 1992* (NSW)
Mining Regulation	*Mining Regulation 2016* (NSW)
MIA	Mining Infrastructure Area
MOP	Mining Operations Plan 2017-2022 Amendment D
MSC	Muswellbrook Shire Council
Mtpa	Million tonnes per annum

Abbreviation	Meaning
NAF	Non-acid Forming
NSW	New South Wales
OEA	Overburden Emplacement Area
OEH	NSW Office of Environment & Heritage
PAF	Potentially Acid Forming
RL	Reduced Level
RMP	Rehabilitation Management Plan
ROM	Run of mine
SSD	State Significant Development
TARP	Trigger Action Response Plan
WAL	Water Access Licence

APPENDIX A

LAND OWNERSHIP

Table A1: Land Ownership Schedule

APPENDIX B

APPROVED REHABILITATION OBJECTIVES AND PROPOSED COMPLETION CRITERIA

Table B1: Approved Rehabilitation Objectives and Proposed Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with native communities of high density woody vegetation (HDWV). The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities	Species Diversity	Species establishing are aligned to those included in the species mix for the domain and species diversity on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Rehabilitation monitoring reports.
				The vegetation structure of the rehabilitation is similar to that of native communities of high density woody vegetation (HDWV). The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities	Stem Densities	Stem densities maintained at ≥ 400 stems/ha in nominated HDWV areas	Rehabilitation monitoring reports
				Levels of Ecosystem Function have been established that demonstrate the rehabilitation is self sustainable	Soil/growth medium	Soil/growth medium maintains chemical and physical qualities appropriate to achieve native vegetation growth.	Rehabilitation monitoring reports.
					Habitat augmentation.	Presence of habitat features (e.g., boulders and large logs) on rehabilitated areas.	Rehabilitation monitoring reports.
					Habitat augmentation	Presence of native animal activity.	Rehabilitation monitoring reports.
					Nutrient cycling.	Surface organic litter present.	Rehabilitation monitoring reports.
					Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Weed management reports.
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Rehabilitation monitoring reports.
					Ecosystem development.	Evidence of reproductive material on mature long lived vegetation and/or presence of second generation seedlings from mature long lived species as determined by a suitably qualified expert.	Rehabilitation monitoring reports.
					Ecosystem resilience.	Recruitment rates are equal to or exceed mortality rates.	Rehabilitation monitoring reports.
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Potential hazards (mechanical, electrical) have been effectively isolated	Potential hazards isolated	Final closure report
					Access tracks that are to remain are in a trafficable condition that is suitable for their intended purposes	Any required repairs or upgrades completed	Final closure report
				All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)	Where applicable, necessary approvals are in place where buildings and infrastructure are to be retained as part of final land use	Required permits and approval documents issued	Final closure report
	Overburden Emplacement Area	A4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports
			Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with native communities of high density woody vegetation (HDWV). The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities	Species Diversity	Species establishing are aligned to those included in the species mix for the domain and species diversity on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Rehabilitation monitoring reports.
				The vegetation structure of the rehabilitation is similar to native communities of high density woody vegetation (HDWV). The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities	Stem Densities	Stem densities maintained at ≥ 400 stems/ha in nominated HDWV areas	Rehabilitation monitoring reports
				Eastern and Southern Faces of the Overburden Emplacement Area to have levels of Ecosystem Function which demonstrate that the rehabilitation is self sustainable	Soil/growth medium	Soil/growth medium maintains chemical and physical qualities appropriate to achieve native vegetation growth.	Rehabilitation monitoring reports.
					Habitat augmentation.	Presence of habitat features (e.g., boulders and large logs) on rehabilitated areas.	Rehabilitation monitoring reports.
					Habitat augmentation	Presence of native animal activity.	Rehabilitation monitoring reports.
					Nutrient cycling.	Surface organic litter present.	Rehabilitation monitoring reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
					Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Weed management reports.
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Rehabilitation monitoring reports.
					Ecosystem development.	Evidence of reproductive material on mature long lived vegetation and/or presence of second generation seedlings from mature long lived species as determined by a suitably qualified expert.	Rehabilitation monitoring reports.
					Ecosystem resilience.	Recruitment rates are equal to or exceed mortality rates.	Rehabilitation monitoring reports.
				Incorporate open woodland across at least 10% of the rehabilitated landform	Species diversity	Species establishing are aligned to those included in the species mix for the domain and species diversity on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region	Rehabilitation monitoring reports
				Levels of Ecosystem Function have been established that demonstrate the rehabilitation is self sustainable	Soil/growth medium	Soil/growth medium maintains chemical and physical qualities appropriate to achieve native vegetation growth.	Rehabilitation monitoring reports.
					Habitat augmentation.	Presence of habitat features (e.g., boulders and large logs) on rehabilitated areas.	Rehabilitation monitoring reports.
					Habitat augmentation	Presence of native animal activity.	Rehabilitation monitoring reports.
					Nutrient cycling.	Surface organic litter present.	Rehabilitation monitoring reports.
					Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Weed management reports.
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Rehabilitation monitoring reports.
					Ecosystem development.	Evidence of reproductive material on mature long lived vegetation and/or presence of second generation seedlings from mature long lived species as determined by a suitably qualified expert.	Rehabilitation monitoring reports.
					Ecosystem resilience.	Recruitment rates are equal to or exceed mortality rates.	Rehabilitation monitoring reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material.	No evidence of contamination	Rehabilitation monitoring reports
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Landform suitable for proposed land use.	Land safely accessible.	Final landform survey.
					Stability.	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance works.	Rehabilitation monitoring reports.
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Integrity and functionality of water/sediment management structures.	No evidence of erosion within the water/sediment management structures that requires ongoing management and maintenance.	Rehabilitation monitoring reports.
					Erosion.	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works.	Rehabilitation monitoring reports.
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Final Landform integration with surrounding landform.	Landform compliant with approved Final Landform	Final landform survey
					Water/sediment management structures incorporated into final landform.	Water/sediment management structures installed per design. No evidence of erosion requiring ongoing management and maintenance.	Final landform survey. Rehabilitation monitoring reports
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water).	Services disconnected and removed	Final closure report
				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.	Removal of infrastructure (e.g. roads, rail, conveyors, buildings, hardstands and stockpiles pumps, pump stations, water pipes, power lines, dam walls (if required))	Infrastructure removed	Final closure report
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports
				Run off water quality is similar to that of surrounding undisturbed areas	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment	The measured groundwater regime assets meets predictions. Modelled drawdown and water take is consistent with approval predictions	Landform compliant with the approved hydrological modelling landform design	Final landform survey. Groundwater impact assessment by a suitably qualified person.
				Groundwater quality meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	The measured groundwater quality assets meets predictions. Modelled drawdown and water take is consistent with approval predictions	Landform compliant with the approved hydrological modelling landform design	Final landform survey. Groundwater impact assessment by a suitably qualified person.
			Management of waste and process materials	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.	Waste storage areas are designed by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use	Waste storage areas have been constructed as designed. Verification and/or testing confirms integrity of structures and does not pose threat of environmental harm	Final Landform Survey Final Closure Report
	Active Mining Area (Open Cut Void)	A5	Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with native communities of high density woody vegetation (HDWV). The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities	Species Diversity	Species establishing are aligned to those included in the species mix for the domain and species diversity on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Rehabilitation monitoring reports.
				The vegetation structure of the rehabilitation is similar to that of native communities of high density woody vegetation (HDWV). The HDWV species mix is based on the locally occurring Grey Box – Ironbark Woodland and Ironbark – Spotted Gum – Grey Box Woodland vegetation communities	Stem Densities	Stem densities maintained at ≥ 400 stems/ha in nominated HDWV areas	Rehabilitation monitoring reports
				Levels of Ecosystem Function have been established that demonstrate the rehabilitation is self sustainable	Soil/growth medium	Soil/growth medium maintains chemical and physical qualities appropriate to achieve native vegetation growth.	Rehabilitation monitoring reports.
					Habitat augmentation.	Presence of habitat features (e.g., boulders and large logs) on rehabilitated areas.	Rehabilitation monitoring reports.
					Habitat augmentation	Presence of native animal activity.	Rehabilitation monitoring reports.
					Nutrient cycling.	Surface organic litter present.	Rehabilitation monitoring reports.
					Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native woodland areas within the region.	Weed management reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Rehabilitation monitoring reports.
					Ecosystem development.	Evidence of reproductive material on mature long lived vegetation and/or presence of second generation seedlings from mature long lived species as determined by a suitably qualified expert.	Rehabilitation monitoring reports.
					Ecosystem resilience.	Recruitment rates are equal to or exceed mortality rates.	Rehabilitation monitoring reports.
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports
Agriculture Grazing	Infrastructure Area	B1	Agricultural revegetation	Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region.	Water monitoring reports.
					Weed incidence.	No species with known toxicities to grazing stock.	Rehabilitation monitoring reports.
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Weed management reports. Rehabilitation monitoring reports.
					Ground cover species diversity	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region.	Weed management reports. Rehabilitation monitoring reports.
					Nutrient cycling.	Surface organic litter present across rehabilitated areas.	Rehabilitation monitoring reports.
					Size of surface rocks.	Surface rocks present on land surface do not impede the post-mining land use.	Rehabilitation monitoring reports.
				Incorporate open woodland across at least 10% of the rehabilitated landform	Tree coverage.	SSD - 5170 (as modified) Conceptual Final Landform Plan	Rehabilitation monitoring reports. Final closure report
				Vegetation composition is recognisable as pasture land similar to other areas within the region	Ground cover	Vegetation cover on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region.	Rehabilitation monitoring reports
				Ensure final landform is safe for future land use	Landform suitable for proposed land use.	Land safely accessible to grazing stock.	Final landform survey.
					Stability.	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance works.	Rehabilitation monitoring reports.
				Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Final landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material.	No evidence of contamination	Contaminated site report
				There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contaminated land identified and remediated.	Contaminated land remediated in accordance with relevant procedures and guidelines	Rehabilitation monitoring reports
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Landform suitable for proposed land use	Land safely accessible to grazing stock	Final landform survey
				Rehabilitation area to be Safe, Stable and Non-Polluting	Stability	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance works	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Integrity and functionality of water/sediment management structures	No evidence of erosion within the water/sediment management structures that requires ongoing management and maintenance	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Erosion	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works	Rehabilitation monitoring reports
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Final landform integration with surrounding landform	Landform compliant with approved Final Landform	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Micro-relief suitable to establish Class III pasture	Landform compliant with approved landform design	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Slope suitable to establish Class III pasture	Landform compliant with approved landform design	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Delivered Final Landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water)	Services disconnected and removed	Final closure report
				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.	Removal of infrastructure (e.g. roads, rail, conveyors, buildings, hardstands and stockpiles pumps, pump stations, water pipes, power lines, dam walls (if required))	Infrastructure removed	Final closure report
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports
				Run off water quality is similar to that of surrounding undisturbed areas	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports
			Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Potential hazards (mechanical, electrical) have been effectively isolated	Potential hazards isolated	Final closure report
					Access tracks that are to remain are in a trafficable condition that is suitable for their intended purposes	Any required repairs or upgrades completed	Final closure report
				All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)	Where applicable, necessary approvals are in place where buildings and infrastructure are to be retained as part of final land use	Required permits and approval documents issued	Final closure report
	Water Management Area	B3	Agricultural revegetation	Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Weed management reports. Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence	No species with known toxicities to grazing stock	Weed management reports. Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Feral pest incidence	Monitoring indicates no increasing trends in population or species diversity of feral pests	Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
				Rehabilitation to be Class IV or V Agricultural Land Capability	Ground cover species diversity	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Nutrient cycling	Surface organic litter present across rehabilitated areas	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Size of surface rocks	Surface rocks present on land surface do not impede the post-mining land use	Rehabilitation monitoring reports
				Incorporate open woodland across at least 10% of the rehabilitated landform	Tree coverage	SSD - 5170 (as modified) Conceptual Final Landform Plan	Rehabilitation monitoring reports. Final closure report
				Vegetation composition is recognisable as pasture land similar to other areas within the region	Ground cover	Vegetation cover on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
				Ensure final landform is safe for future land use	No uncontrolled access	Demarcation present and access restricted	Final closure report
				Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Final landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material	No evidence of contamination	Contaminated site report
				There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contaminated land identified and remediated	Contaminated land remediated in accordance with relevant procedures and guidelines	Rehabilitation monitoring reports
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Landform suitable for proposed land use	Land safely accessible to grazing stock.	Final landform survey
				Rehabilitation area to be Safe, Stable and Non-Polluting	Stability	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance works	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Integrity and functionality of water/sediment management structures	No evidence of erosion within the water/sediment management structures that requires ongoing management and maintenance	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Erosion	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works	Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Final landform integration with surrounding landform	Landform compliant with approved Final Landform	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Micro-relief suitable to establish Class III pasture.	Landform compliant with approved landform design.	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Slope suitable to establish Class III pasture	Landform compliant with approved landform design.	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Delivered Final Landform	Pasture productivity comparable to vegetation communities of similar type in the region.	Agricultural monitoring reports Rehabilitation monitoring reports
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water).	Services disconnected and removed.	Final closure report
				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.	Removal of infrastructure (e.g. roads, rail, conveyors, buildings, hardstands and stockpiles pumps, pump stations, water pipes, power lines, dam walls (if required)	Infrastructure removed.	Final closure report
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports.
				Run off water quality is similar to that of surrounding undisturbed areas	Surface runoff does not impact downstream properties.	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports.
	Overburden Emplacement Area	B4	Agricultural revegetation	Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Weed management reports. Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
				Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence	No species with known toxicities to grazing stock	Weed management reports. Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Feral pest incidence	Monitoring indicates no increasing trends in population or species diversity of feral pests	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Ground cover species diversity	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Nutrient cycling	Surface organic litter present across rehabilitated areas	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Size of surface rocks	Surface rocks present on land surface do not impede the post-mining land use.	Rehabilitation monitoring reports.
				Rehabilitation to be Class III Agricultural Land Capability	Weed incidence	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Weed management reports. Rehabilitation monitoring reports
					Weed incidence	No species with known toxicities to grazing stock	Weed management reports. Rehabilitation monitoring reports
					Feral pest incidence	Monitoring indicates no increasing trends in population or species diversity of feral pests	Rehabilitation monitoring reports
					Ground cover species diversity	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
					Nutrient cycling	Surface organic litter present across rehabilitated areas	Rehabilitation monitoring reports
					Size of surface rocks	Surface rocks present on land surface do not impede the post-mining land use.	Rehabilitation monitoring reports.
				Incorporate open woodland across at least 10% of the rehabilitated landform	Tree coverage	SSD - 5170 (as modified) Conceptual Final Landform Plan	Rehabilitation monitoring reports. Final closure report
				Vegetation composition is recognisable as pasture land similar to other areas within the region	Ground cover	Vegetation cover on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
				Ensure final landform is safe for future land use	No uncontrolled access	Demarcation present and access restricted	Final closure report
				Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Final landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material.	No evidence of contamination	Contaminated site report
				There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contaminated land identified and remediated	Contaminated land remediated in accordance with relevant procedures and guidelines	Rehabilitation monitoring reports
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Landform suitable for proposed land use.	Land safely accessible to grazing stock	Final landform survey.
				Rehabilitation area to be Safe, Stable and Non-Polluting	Stability	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance works	Rehabilitation monitoring reports.
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Integrity and functionality of water/sediment management structures	No evidence of erosion within the water/sediment management structures that requires ongoing management and maintenance	Rehabilitation monitoring reports.
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Erosion	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works	Rehabilitation monitoring reports.
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Final landform integration with surrounding landform	Landform compliant with approved Final Landform	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Micro-relief suitable to establish Class III pasture	Landform compliant with approved landform design	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Slope suitable to establish Class III pasture	Landform compliant with approved landform design	Final landform survey
				Rehabilitated landforms to incorporate (where reasonable and feasible) micro-relief and natural drainage lines and to integrate with surrounding landforms where practicable	Delivered Final Landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water)	Services disconnected and removed.	Final closure report
				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.	Removal of infrastructure (e.g. roads, rail, conveyors, buildings, hardstands and stockpiles pumps, pump stations, water pipes, power lines, dam walls (if required)).	Infrastructure removed.	Final closure report

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports.
				Run off water quality is similar to that of surrounding undisturbed areas	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports.
			Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment	The measured groundwater regime assets meets predictions. Modelled drawdown and water take is consistent with approval predictions	Landform compliant with the approved hydrological modelling landform design	Final landform survey. Groundwater impact assessment by a suitably qualified person.
				Groundwater quality meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	The measured groundwater quality assets meets predictions. Modelled drawdown and water take is consistent with approval predictions	Landform compliant with the approved hydrological modelling landform design	Final landform survey. Groundwater impact assessment by a suitably qualified person.
			Management of waste and process materials	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.	Waste storage areas are designed by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use	Waste storage areas have been constructed as designed. Verification and/or testing confirms integrity of structures and does not pose threat of environmental harm	Final Landform Survey Final Closure Report
	Active Mining Area (Open Cut Void)	B5	Agricultural revegetation	Ensure final landform is safe for future land use	No uncontrolled access	Demarcation present and access restricted	Final closure report
				Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Final landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting	Bushfire Management Plan Rehabilitation monitoring reports
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material	No evidence of contamination	Contaminated site report.
				There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contaminated land identified and remediated	Contaminated land remediated in accordance with relevant procedures and guidelines	Rehabilitation monitoring reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Landform stability	The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Integrity and functionality of water/sediment management structures	No evidence of erosion within the water/sediment management structures that requires ongoing management and maintenance.	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Erosion	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works	Rehabilitation monitoring reports
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports
				Run off water quality is similar to that of surrounding undisturbed areas	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports
	Beneficiation Facility	B7	Agricultural revegetation	Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Weed management reports. Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Weed incidence.	No species with known toxicities to grazing stock	Weed management reports. Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Ground cover species diversity	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Nutrient cycling.	Surface organic litter present across rehabilitated areas	Rehabilitation monitoring reports
				Rehabilitation to be Class IV or V Agricultural Land Capability	Size of surface rocks.	Surface rocks present on land surface do not impede the post-mining land use	Rehabilitation monitoring reports
				Incorporate open woodland across at least 10% of the rehabilitated landform	Tree coverage	SSD - 5170 (as modified) Conceptual Final Landform Plan	Rehabilitation monitoring reports. Final closure report

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
				Vegetation composition is recognisable as pasture land similar to other areas within the region	Ground cover	Vegetation cover on rehabilitated land as determined by a suitably qualified expert is comparable to similar pasture areas within the region	Rehabilitation monitoring reports
				Ensure final landform is safe for future land use	No uncontrolled access	Demarcation present and access restricted	Final closure report
				Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Final landform	Pasture productivity comparable to vegetation communities of similar type in the region	Agricultural monitoring reports Rehabilitation monitoring reports
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting.	Bushfire Management Plan Rehabilitation monitoring reports
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material	No evidence of contamination	Contaminated site report.
				There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contaminated land identified and remediated	Contaminated land remediated in accordance with relevant procedures and guidelines	Rehabilitation monitoring reports.
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Landform suitable for proposed land use	Land safely accessible to grazing stock	Final landform survey.
				Rehabilitation area to be Safe, Stable and Non-Polluting	Stability	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance works	Rehabilitation monitoring reports.
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Integrity and functionality of water/sediment management structures	No evidence of erosion within the water/sediment management structures that requires ongoing management and maintenance	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Erosion	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works	Rehabilitation monitoring reports
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water).	Services disconnected and removed	Final closure report.
				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.	Removal of infrastructure (e.g. roads, rail, conveyors, buildings, hardstands and stockpiles pumps, pump stations, water pipes, power lines, dam walls (if required).	Infrastructure removed	Final closure report.
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports.
				Run off water quality is similar to that of surrounding undisturbed areas	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports.
Water Management Areas	Water Management Area	F3	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use.	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting.	Bushfire Management Plan. Rehabilitation monitoring reports.
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material.	No evidence of contamination	Rehabilitation monitoring reports.
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Stability	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance	Rehabilitation monitoring reports
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage.	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water).	Services disconnected and removed.	Final closure report.
				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.	Removal of infrastructure (e.g. power lines, roads, conveyors)	Infrastructure removed.	Final closure report.
			Ecological rehabilitation	Rehabilitation to restore, maintain and/or improve the hydrological and ecological function, quality and geomorphic stability of Dry Creek Reinstatement	Soil/growth medium	Soil/growth medium maintains chemical and physical qualities appropriate to achieve native vegetation growth.	Rehabilitation monitoring reports.
					Habitat augmentation.	Presence of habitat features (e.g., boulders and snags) on rehabilitated areas.	Rehabilitation monitoring reports.
					Habitat augmentation	Presence of native animal activity.	Rehabilitation monitoring reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
					Nutrient cycling.	Surface organic litter present.	Rehabilitation monitoring reports.
					Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert to be comparable to similar riparian areas within the region.	Weed management reports.
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Rehabilitation monitoring reports.
					Stem density	Riparian zone of the Dry Creek Reinstatement to be subject of high density planting as determined suitable by a qualified expert	Rehabilitation monitoring reports.
					Geomorphic stability	Constructed to a design developed to ensure natural water movement without causing erosion requiring ongoing management and maintenance.	Final landform survey.
	Overburden Emplacement Area	F4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use.	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting	Bushfire Management Plan. Rehabilitation monitoring reports.
			Ecological rehabilitation	The vegetation composition of the rehabilitation contains species that are commensurate with native vegetation communities of Hunter Valley River Red Gum / River Oak riparian woodland wetland community found in the local area.	Species diversity.	Species establishing are aligned to those included in the species mix for the domain and species diversity on rehabilitated land as determined by a suitably qualified expert to be comparable to similar native riparian wood land areas within the region.	Rehabilitation monitoring reports.
				The vegetation structure of the rehabilitation is similar to that of native vegetation communities of Hunter Valley River Red Gum / River Oak riparian woodland wetland found in the local area.	Stem density	Riparian zone of the Dry Creek Reinstatement to be subject of high density planting as determined suitable by a qualified expert	Rehabilitation monitoring reports.
				Established ecosystem is suitable for post mining land use	Ecosystem development	Evidence of reproductive material on mature long lived vegetation and/or presence of second generation seedlings from mature long lived species as determined by a suitably qualified expert.	Rehabilitation monitoring reports.
				Established ecosystem is suitable for post mining land use	Ecosystem resilience	Recruitment rates are equal to or exceed mortality rates	Rehabilitation monitoring reports.
				Levels of Ecosystem Function have been established that demonstrate the rehabilitation is self sustainable	Soil/growth medium	Soil/growth medium maintains chemical and physical qualities appropriate to achieve native vegetation growth.	Rehabilitation monitoring reports.
					Habitat augmentation.	Presence of habitat features (e.g., boulders and snags) on rehabilitated areas.	Rehabilitation monitoring reports.
					Habitat augmentation	Presence of native animal activity.	Rehabilitation monitoring reports.
					Nutrient cycling.	Surface organic litter present.	Rehabilitation monitoring reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
					Weed incidence.	Weed control focuses on priority species such that weed coverage on rehabilitated land as determined by a suitably qualified expert to be comparable to similar riparian areas within the region.	Weed management reports.
					Feral pest incidence.	Monitoring indicates no increasing trends in population or species diversity of feral pests.	Rehabilitation monitoring reports.
					Ecosystem development	Evidence of reproductive material on mature long lived vegetation and/or presence of second generation seedlings from mature long lived species as determined by a suitably qualified expert.	Rehabilitation monitoring reports.
					Ecosystem resilience	Recruitment rates are equal to or exceed mortality rates	Rehabilitation monitoring reports.
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material	No evidence of contamination	Rehabilitation monitoring reports
			Landform stability	Rehabilitation area to be Safe, Stable and Non-Polluting	Surface runoff does not impact downstream properties	Surface runoff is diverted to neighbouring drainage lines	Rehabilitation monitoring reports
				The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Stability.	No visible signs of instability (slumping/ cracks) that require ongoing management and maintenance	Rehabilitation monitoring reports
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Run off water quality is similar to that of surrounding undisturbed areas	Water quality of surface runoff and seepage	Water quality meets parameters suitable for land use chosen from Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000 or its latest version	Water monitoring reports
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water).	Infrastructure removed.	Final closure report.
				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.	Removal of infrastructure (e.g. power lines, roads, conveyors)	Demarcation present and access restricted.	Final closure report.
			Landform stability	Dry Creek Reinstatement to result in no net loss of creek length	Channel length meets design criteria in SSD-5170 (as modified)	Minimum length approximately 4500 m	Final landform survey
				Dry Creek Reinstatement to incorporate (where reasonable and feasible) erosion control measures (natural and/or engineered)	Rock scour protection	Rock scour protection implemented as determined by a suitably qualified expert	Final landform survey

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
Water Storage (Excluding Final Void)	Water Management Area	G3	Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material.	No evidence of contamination.	Rehabilitation monitoring reports
			Surface water	Water quality in water storages to meet requirements for pasture use as indicated by the ANZECC Guidelines 2000	Assessment of water quality against guidelines for the final land use (e.g. agricultural).	Water quality in all storages left on site (other than final voids) is suitable for the approved final land use	Water monitoring reports
			Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Potential hazards (mechanical, electrical) have been effectively isolated	Potential hazards isolated	Final closure report
					Drainage lines that are to remain are in a condition that is suitable for their intended purposes	Any required repairs or upgrades completed	Final closure report
				All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)	Where applicable, necessary approvals are in place where buildings and infrastructure are to be retained as part of final land use	Required permits and approval documents issued	Final closure report
			Landform stability	The landform shows no sign of serious erosion or slumping and does not pose an environmental or safety risk to downslope or downstream of the site	Erosion	No erosion rills, gullies or tunnel erosion that requires ongoing management and maintenance works	Rehabilitation monitoring reports.
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
Heritage Area	Infrastructure Area	H1	Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Surface runoff does not impact downstream properties.	Surface runoff is diverted to neighbouring drainage lines.	Rehabilitation monitoring reports.
			Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Bushfire controls implemented appropriate to final land use	Adoption of standard fire prevention measures including firebreaks and minimising fire hazards. Access maintained for firefighting.	Bushfire Management Plan. Rehabilitation monitoring reports.
			Retention of infrastructure	Conservation of Heritage Structures	Heritage obligations under SSD-5170 (as modified) have been met.	Implementation of the approved Historic Heritage Management Plan (HHMP).	Heritage monitoring reports.
				All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Potential hazards (mechanical, electrical) have been effectively isolated	Potential hazards isolated	Final closure report
					Heritage structures that are to remain are in a condition that is suitable for their intended purposes	Any required repairs or upgrades completed	Final closure report

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
				All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc)	Where applicable, necessary approvals are in place where buildings and infrastructure are to be retained as part of final land use	Required permits and approval documents issued	Final closure report
Final Void	Active Mining Area (Open Cut Void)	J5	Agricultural revegetation	Incorporate open woodland across at least 10% of the rehabilitated landform	Tree coverage	Tree coverage is comparable with the SSD – 5170 (as modified) Conceptual Final Landform Plan.	Rehabilitation monitoring reports
				Vegetation composition is recognisable as pasture land similar to other areas within the region	Ground cover species diversity	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land is determined by a suitably qualified expert is comparable to similar final void pasture areas within the region.	Rehabilitation monitoring reports
			Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Landform slopes.	Landform compliant with approved landform design.	Final landform survey. Final closure report
					Final landform.	Presence of grasses and legumes from the species mix relevant to the domain on rehabilitated land is determined by a suitably qualified expert is comparable to similar final void pasture areas within the region	Rehabilitation monitoring reports
			Ecological rehabilitation	Rehabilitation Areas to have established woody vegetation species comparable with species mix and tube stock plantings	Tree coverage	Tree coverage is comparable with the SSD – 5170 (as modified) Conceptual Final Landform Plan.	Rehabilitation monitoring reports.
				Levels of Ecosystem Function have been established that demonstrate the rehabilitation is self sustainable	Final landform.	Pasture comparable to vegetation communities of similar type in the region	Agricultural monitoring reports. Rehabilitation monitoring reports.
				Selected sections of the final Void Crest to be subject to high density planting	Stem density	Final Void Crest to be subject of high density planting as determined suitable by a qualified expert	Rehabilitation monitoring reports.
			Land contamination	There is no contamination from hazardous or problematic materials that poses a threat to the environment or the proposed final land use	Contamination from hazardous or problematic materials e.g. PAF waste, carbonaceous material or reject material.	No evidence of contamination.	Rehabilitation monitoring reports
			Landform stability	Final Void Landform to be designed with consideration of surrounding natural terrain features to the greatest extent practicable	Biodiversity connectivity	Tree distribution is comparable to SSD – 5170 (as modified) and links with woodland areas on surrounding grazing land.	Rehabilitation monitoring reports.
				Rehabilitation area to be Safe, Stable and Non-Polluting	No uncontrolled access.	Access restricted along length of final highwall.	Rehabilitation monitoring reports.
				Rehabilitation area to be Safe, Stable and Non-Polluting	Erosion.	No erosion rills, gullies or tunnel erosion that require ongoing management and maintenance works.	Rehabilitation monitoring reports.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
				Minimise the size and depth of the final void to the greatest extent practicable	Landform minimises the final void and the surface water catchment in the final void.	Final void consistent with Closure Plan. Water management measures divert surface water away from the final void. No evidence of degradation of structures that require ongoing management and maintenance works.	Final closure report.
				Minimise the instability risk of the final void to the greatest extent practicable	Stability.	No visible signs of instability (slumping/ cracks) gullies that require ongoing management and maintenance works.	Rehabilitation monitoring reports.
			Removal of infrastructure	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.	Disconnection of services (e.g. power, communications and water).	Services disconnected and removed.	Final closure report.
				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.	Removal of infrastructure (e.g. roads, rail, conveyors, buildings, hardstands and stockpiles).	Infrastructure removed.	Final closure report.
				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.	Mobile equipment demobilised (e.g. trucks, excavators, dragline, dozers, light vehicles, water and fuel trucks, graders).	Mobile equipment removed from site.	Final closure report.
			Water approvals	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.	Licences held where required	Required licences and approval documents issued	Final closure report
			Surface water	Minimise the catchment of the final void to the greatest extent practicable	Landform minimises the surface water catchment in the final void.	Water management measures divert surface water away from the final void where practicable.	Final closure report.
				Minimise the risk of flood interaction of the final void to the greatest extent practicable	Flood interaction minimised.	Final void consistent with Closure Plan. Water management measures divert surface water away from the final void where practicable. No evidence of degradation of structures that require ongoing management and maintenance works	Final closure report.
				Design the final void to avoid the risk of water flowing from the final void to neighbouring surface water catchments to the greatest extent practicable	Water retained within final void.	Final void consistent with Closure Plan. Water management measures divert surface water away from the final void. No evidence of degradation of structures that require ongoing management and maintenance works.	Final closure report.

Final Land Use Domain	Mining Domain	Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicators	Rehabilitation Completion Criteria	Validation Method
			Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment	The measured groundwater regime assets meets predictions. Modelled drawdown and water take is consistent with approval predictions	Landform compliant with the approved hydrological modelling landform design	Final landform survey. Groundwater impact assessment by a suitably qualified person.
				Groundwater quality meets the requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	The measured groundwater quality assets meets predictions. Modelled drawdown and water take is consistent with approval predictions	Landform compliant with the approved hydrological modelling landform design	Final landform survey. Groundwater impact assessment by a suitably qualified person.
				Final Void to be designed to be maintained in the long-term as a groundwater sink	Landform design.	Landform compliant with the hydrological modelling landform design.	Final landform survey. Groundwater impact assessment by a suitably qualified person.

Note: The Rehabilitation Objective Statement was submitted to the NSW Resources Regulator via the Regulator Portal for assessment on 1 August 2022. The Statement was subsequently revised and resubmitted on 25 November 2022 in response to Regulator feedback. To date BMC is awaiting approval of the Rehabilitation Objective Statement before submitting the Rehabilitation Completion Criteria statement for approval via the Regulator Portal. As such the Rehabilitation Completion Criteria provided in Appendix B may be revised following approval of the Rehabilitation Objective Statement.