

MANGOOLA OPEN CUT

GLENCORE



Rehabilitation Management Plan

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Status: Final

Effective: 21 November
2025

Owner: Environment and Community Coordinator

Version: 3

Review: 21 November
2028

Uncontrolled unless viewed on the intranet

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Summary Table

Mangoola Coal Mine Rehabilitation Management Plan	
Name of Mine:	Mangoola Open Cut
Rehabilitation Management Plan Commencement Date:	29 November 2021
Rehabilitation Management Plan Revision Dates and Version Numbers:	Version 1 - 29 November 2021 Version 2 - 25 November 2024 Version 3 – 21 November 2025
Mining Leases:	ML 1626 (expires 20/11/2029) ML 1747 (expires 05/12/2037) ML 1817 (expires 27/10/2042) ML 1815 (expires 29/09/2042)
Name of Lease Holder:	Mangoola Coal Operations Pty Limited
Date of Submission:	21 November 2025

1. Part 1 - Introduction to mining project

This Rehabilitation Management Plan (RMP) has been prepared in accordance with the NSW Resources Regulator (NSW RR) Form and Way - *Rehabilitation Management Plan for Large Mines* (NSW RR, July 2021). This RMP has been developed to satisfy the requirements of Condition B91 of Development Consent State Significant Development (SSD) 8642 as well as the requirements of the standard rehabilitation conditions for mining leases specified in the *Mining Regulation 2016 (Regulations)* under the *Mining Act 1992* (Mining Act).

This RMP was updated in November 2024, and again in November 2025 to reflect the current versions of the Rehabilitation Objectives and Final Land Use and Rehabilitation Plan (FLRP) as approved by the Resources Regulator.

1.1 History of operations

Mangoola Coal Mine (Mangoola) is an open cut coal mine operated by Mangoola Coal Operations Pty Ltd (Mangoola Coal) which is owned and operated by Glencore Coal Pty Ltd (Glencore). Mangoola is located approximately 20 km west of Muswellbrook and approximately 10 kilometres north of Denman in the Muswellbrook Local Government Area (LGA) of New South Wales (NSW) as shown in **Figure 1A**. Coal produced from Mangoola is provided to both the Australian domestic market and the export market. Product coal is transported from Mangoola to the Port of Newcastle and domestic power stations by rail via the Ulan-Muswellbrook Railway.

Mangoola Coal was granted Project Approval (PA) 06_0014 (Project Approval) by the then Minister for Planning on 7 June 2007 under the *Environmental Planning and Assessment Act 1979* (EP&A Act) to extract coal from an undeveloped coal reserve of approximately 150 million tonnes (Mt). Glencore purchased the Mangoola operation from original owners, Centennial Coal, in October 2007, following granting of Project Approval (PA) 06_0014. The Anvil Hill Project (as it was originally named) was renamed Mangoola Coal Mine at this time.

Mining operations at Mangoola commenced in September 2010 using conventional open cut mining techniques utilising hydraulic excavators, haul trucks and dozers following blasting of competent material. Coal handling, processing and train loading at Mangoola also commenced in September 2010. The original Project Approval was modified eight times and authorised the extraction of up to 13.5 million tonnes per annum (Mtpa) Run of Mine (ROM) coal to be extracted, processed and transported for a period of up to 21 years from the granting of ML 1626. PA 06_0014 was surrendered on 21 November 2022.

In July 2017 Mangoola Coal commenced preparation of the Environmental Impact Statement (EIS) associated with the Mangoola Coal Continued Operations (MCCO) Project (Umwelt, 2019). Following the comprehensive assessment and determination process, on 26 April 2021 the NSW Independent Planning Commission (IPC) approved the MCCO Project under Part 4 of the *Environmental Planning and Assessment Act 1979* and issued Development Consent SSD 8642. The consent permits mining to be carried out at up to 13.5 Mtpa of ROM coal through to 31 December 2030.

Mining is undertaken in the Southern Mining Area (Main and South Pits) and in the Northern Extension Area (Wybong Pit). A site overview is provided in **Figure 1B**.

Rehabilitation of mined areas at Mangoola has been undertaken progressively and as soon as practicable to re-establish a range of native vegetation communities. The rehabilitation aims to emulate the pre-mining environment, enhance local and regional ecological linkages and provide for a sustainable final land use. As at the end of December 2024, a total of 1,047 hectares (ha) of rehabilitation had been completed at Mangoola. Mangoola Coal is yet to decommission or demolish any significant built infrastructure. Current best practice rehabilitation methods including topsoil management and habitat resource salvage will continue for future mining operations.

Temporary rehabilitation may also be undertaken at Mangoola. Disturbed areas which are not planned to be rehabilitated for extended periods of time are seeded with ground cover to reduce potential wind and water erosion.

1.2 Current development consent, leases and licences

The existing approved operation at Mangoola is regulated by a range of leases, licences and approvals from both Federal, State and Local authorities. **Table 1.1** provides details of the current development consent, leases and licences.

Appendix B - contains reference to where applicable conditions or commitments of SSD 8642 are addressed within this RMP. As noted in **Section 1.1**, PA 06_0014 was surrendered on 21 November 2022.

Table 1.1 Mangoola Consents, Leases and Licences

Approval	Name of Approval	Date of Grant	Date of Expiry
SSD 8642	Development Consent for the Mangoola Coal Continued Operations Project	26/04/2021	31/12/2030
EPBC Approval 2018/8280	EPBC Act Approval	1/10/2021	31/12/2040
ML 1626	Mining Lease	20/11/2008	20/11/2029
ML 1747	Mining Lease	5/12/2016	05/12/2037
ML 1817	Mining Lease	27/10/2021	27/10/2042
ML 1815	Mining Lease (ancillary mining activities)	29/09/2021	29/09/2042
EL5552	Exploration Lease	01/02/1999	07/11/2025*
AL 9	Assessment Lease	08/11/2004	08/11/2030
EPL 12894	Environment Protection Licence	07/07/2008	N/A
RL 5063445	Radiation Licence	14/04/2025	28/04/2026
Water Licences	Various	Refer to Water Management Plan required under Schedule 2, Condition B50 of SSD 8642	

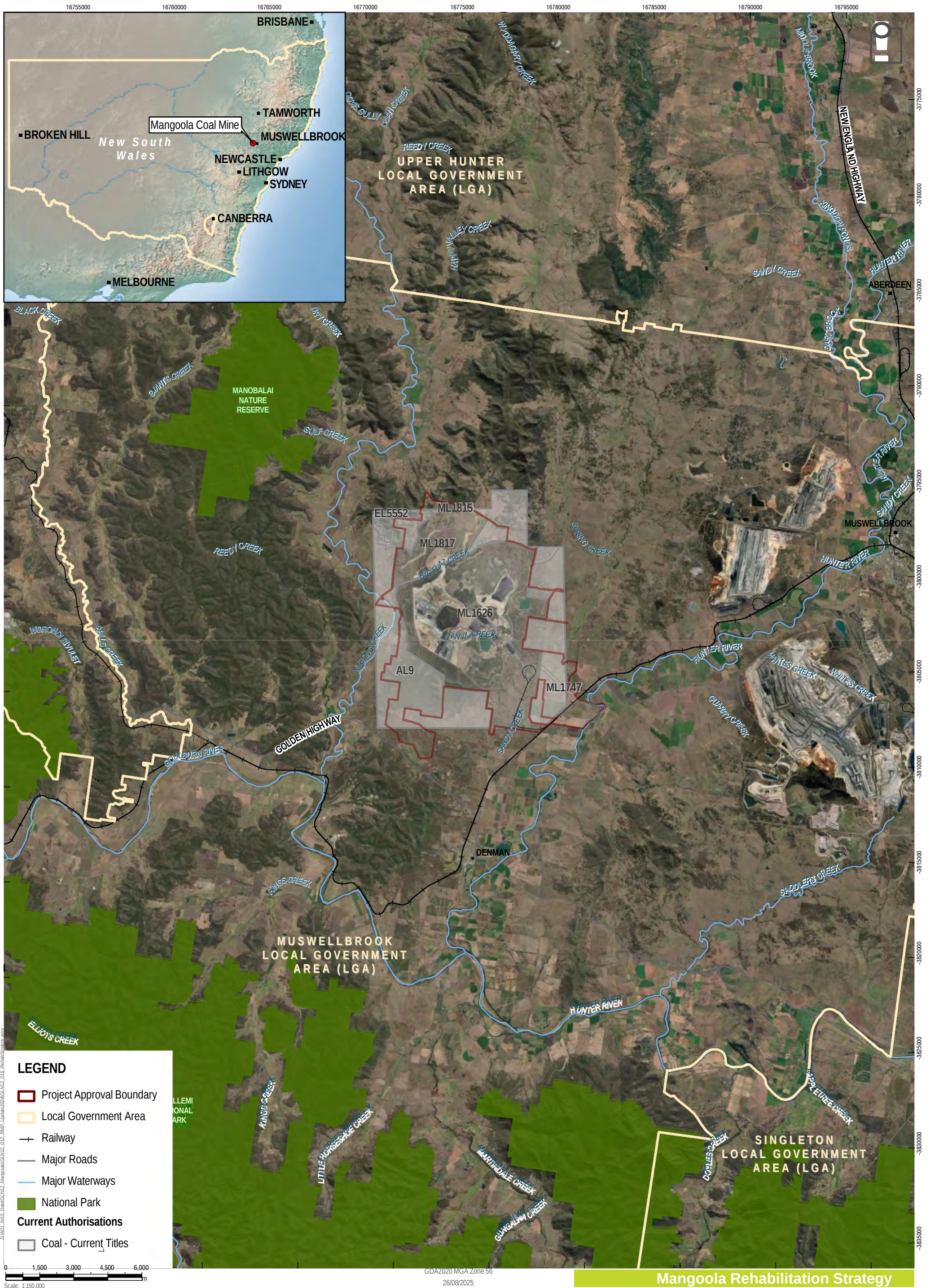
* Renewal submitted 17/10/2025

1.3 Land ownership and land use

Land use and land ownership are presented in **Figure 1C** and **Figure 1E** with a table containing the land ownership within the Project Boundary included in **Appendix A** -.

Land surrounding Mangoola that is not required for mining broadly consists of agricultural land owned by Mangoola Coal for agricultural purposes and managed by Colinta Holdings Pty Ltd (Colinta), or is an existing biodiversity offset area. All land on which Mangoola Coal undertake mining activities is privately owned by Mangoola Coal, except for small sections of public road corridors and unconstructed Crown roads. Other land uses surrounding Mangoola typically include grazing, cultivation, rural residential, nature reserves, mining and quarrying. Vegetation communities are shown on **Figure 1D**.

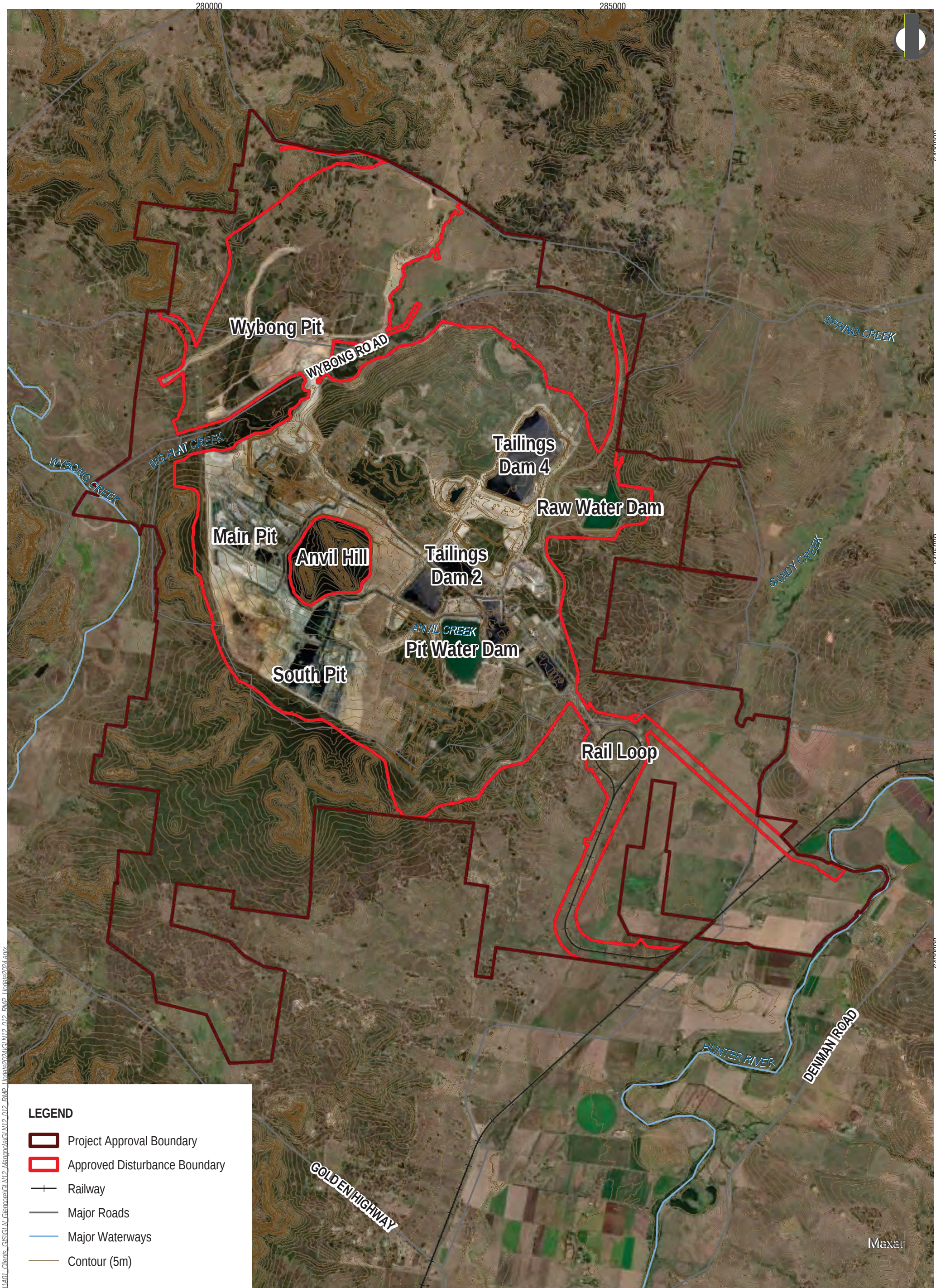
Agricultural activities adjacent to Mangoola are determined by the local landscape character and soil type. Intensive agriculture such as lucerne production is undertaken on the alluvial soils along the Hunter River floodplain, south east of Mangoola. Grazing activities are undertaken in the undulating hill slopes directly surrounding the site. Biodiversity offset areas surrounding Mangoola are identified on **Figure 1C**. Further details regarding the management of the existing biodiversity offset areas are provided in the Mangoola Biodiversity Offset Management Plan and Strategy.



Mangoola Rehabilitation Strategy

Locality Plan

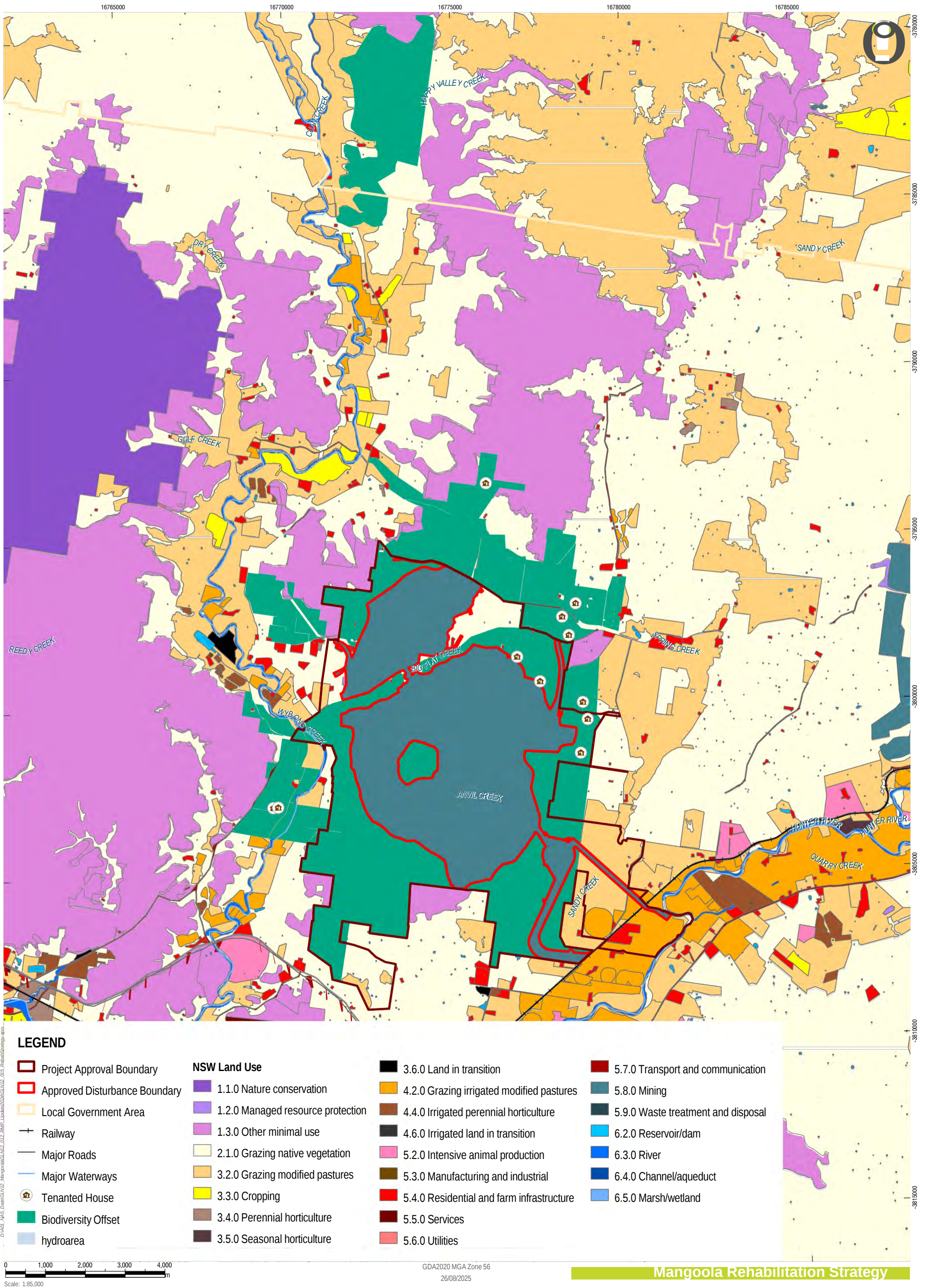
FIGURE 1A

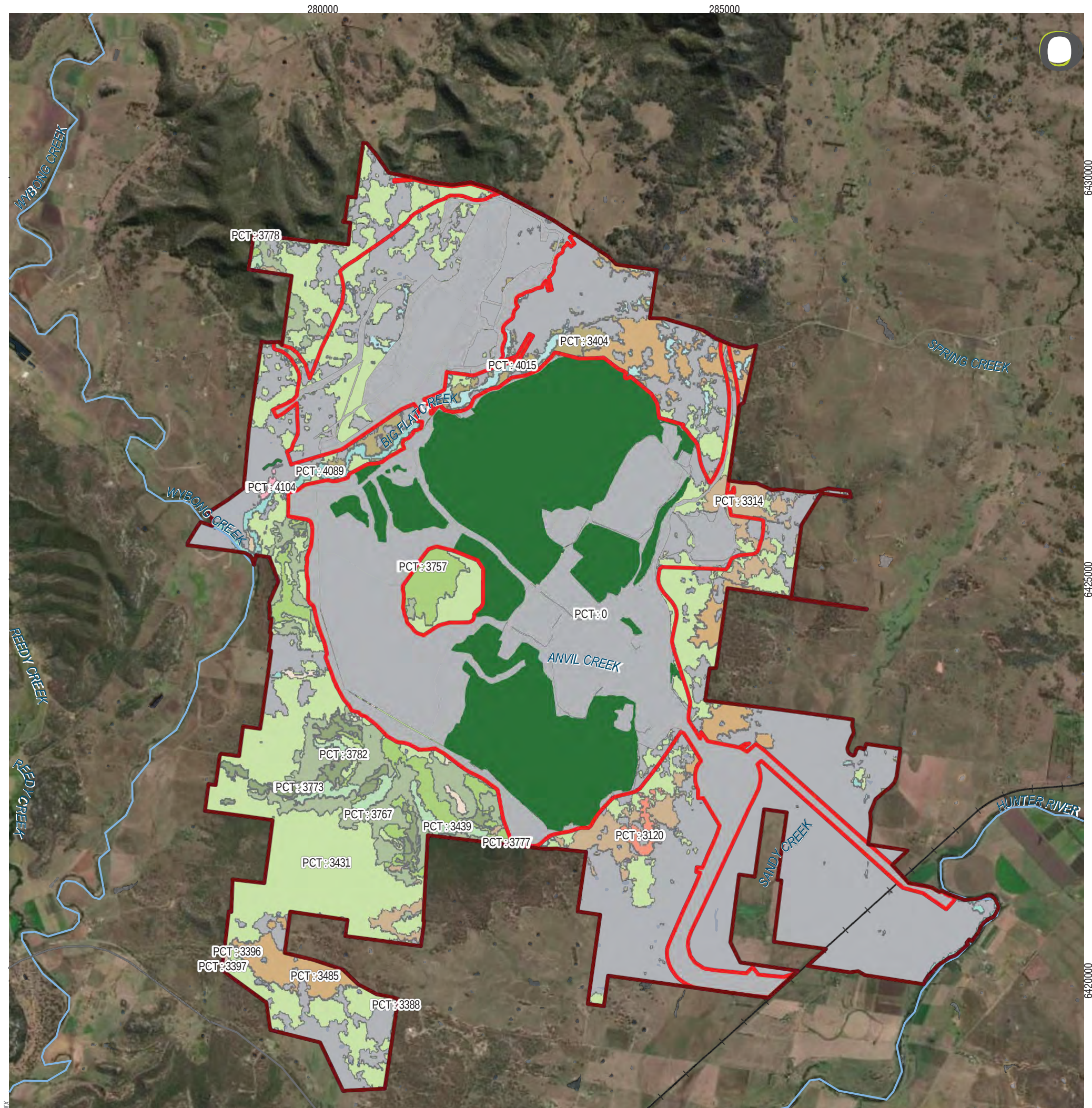


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GDA2020 MGA Zone 56
18/10/2024





LEGEND

- Project Approval Boundary
- Approved Disturbance Boundary

- Railway
- Major Roads
- Major Waterways
- Mine Rehabilitation

Vegetation Community

- PCT : 3120 Hunter-Peel Ranges Dry Rainforest
- PCT : 3314 Central Hunter Slopes Grey Box Forest
- PCT : 3334 Western Hunter Flats Red Gum Sedge Forest
- PCT : 3388 Central West Valleys White Box Forest

- PCT : 3396 Northwest Flats Box-Blakelys Red Gum Forest
- PCT : 3397 Northwest Flats Yellow Box Woodland
- PCT : 3404 Central West Flats Grassy Box Woodland
- PCT : 3431 Central Hunter Ironbark Grassy Woodland
- PCT : 3439 Hunter Escarpment Grey Gum Sheltered Forest
- PCT : 3485 Central Hunter Slaty Gum Grassy Forest
- PCT : 3757 Hunter Escarpment Ironbark Scrubby Low Forest
- PCT : 3767 Upper Hunter Escarpment Colluvial Ironbark Forest

- PCT : 3773 Western Hunter Currawang Low Forest
- PCT : 3777 Western Hunter Grey Gum Sheltered Forest
- PCT : 3778 Western Hunter Grey Gum-Stringybark Forest
- PCT : 3782 Western Hunter Rockplate Micromyrtus Heath
- PCT : 4015 Central Hunter Swamp Oak Riparian Forest
- PCT : 4089 Namoi-Upper Hunter River Red Gum Forest
- PCT : 4104 Central Hunter Weeping Myall Forest
- PCT : 0 Not classified



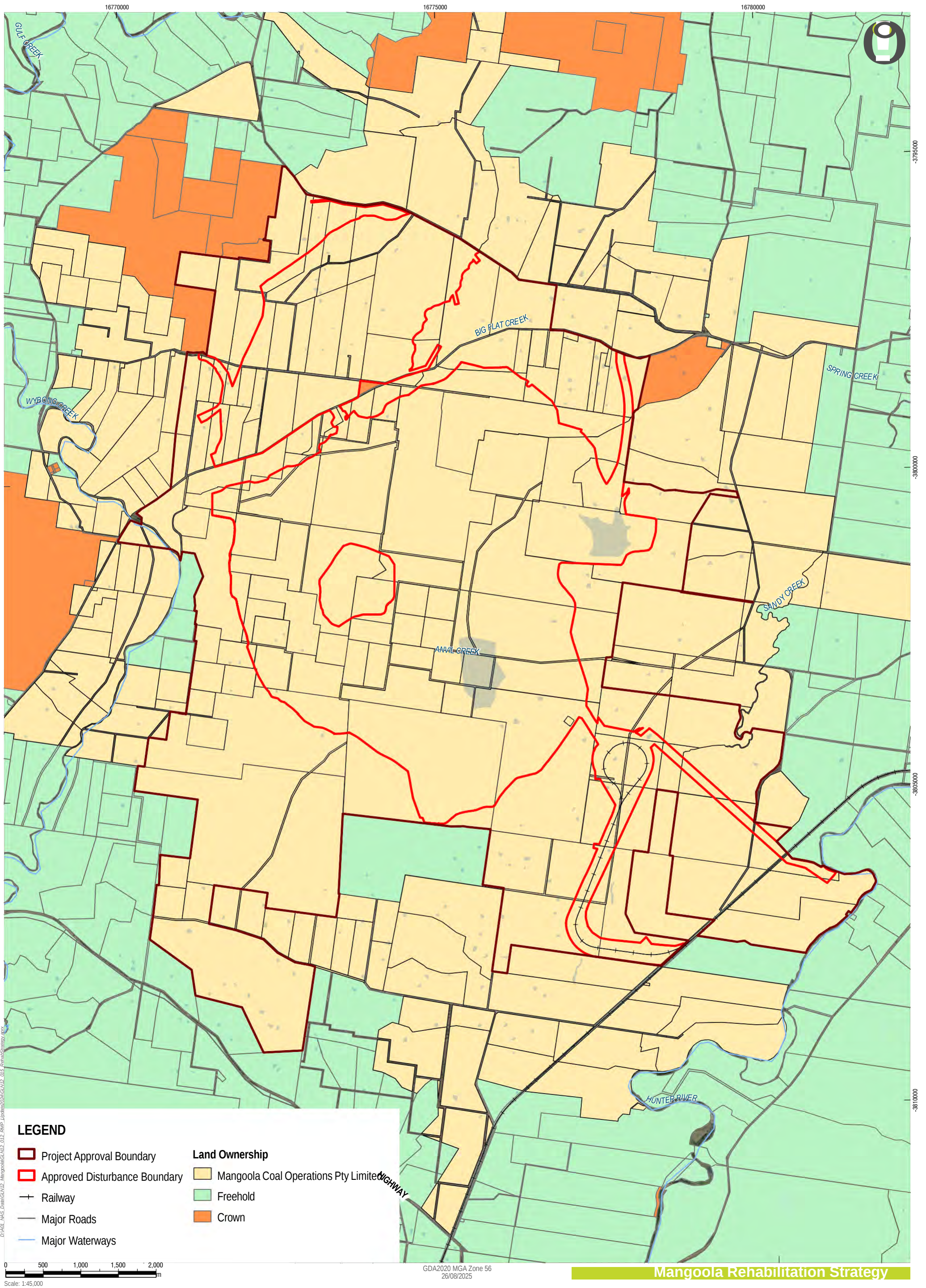
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GDA2020 MGA Zone 56
25/11/2024

Mangoola Coal Mine RMP

Vegetation Communities

FIGURE 1D



Mangoola Rehabilitation Strategy

2. Part 2 - Final land use

2.1 Regulatory requirements for rehabilitation

At Mangoola, regulatory requirements relating to rehabilitation include:

- Relevant conditions of SSD 8642 including EIS commitments
- Conditions of existing mining authorisations including
 - o ML1626
 - o ML1747
 - o AL9
 - o EL 5552
 - o ML 1817
 - o ML 1815

Appendix B - details the regulatory requirements relating to rehabilitation and whether each requirement applies to the entire site, to a specific domain or a defined parcel of land, as well as the timing to meet each requirement. Refer to **Appendix C** for the *Mining Amendment (Standard Conditions of Mining Leases—Rehabilitation) Regulation 2021*.

The Rehabilitation Risk Assessment (refer **Section 3**) identified “*failure to identify all legal obligations relating to rehabilitation*” as a potential medium risk. This section of the RMP, as well as **Appendix B** and **Appendix C** address that risk. No further treatment plans were identified.

2.2 Final land use options assessment

The final landform and land use is identified in Appendix 9 of SSD 8642 and therefore this section does not apply to Mangoola.

2.3 Final land use statement

Mangoola’s final land use and rehabilitation objectives are defined in Table 9 of Condition B85 of SSD 8642, which require that Mangoola Coal must rehabilitate the site in accordance with the conditions imposed on the mining leases associated with the development under the Mining Act. Rehabilitation Objectives have also been approved by the Resources Regulator as required under the Mining Act (refer **Section 4**). The rehabilitation must be generally consistent with the approach described in the MCCO Project EIS (Umwelt 2019) and to achieve the final landform shown in Appendix 9 of SSD 8642. The final land use is to comprise a range of grassland, woodland and forest communities including:

- Grassland
- Ironbark Woodland Complex
- Paperbark Woodland
- Slaty Box Woodland
- Forest Red Gum Riparian Woodland
- Swamp Oak Forest
- Spotted Gum Open Forest
- Weeping Myall Woodland.

The conceptual Final Landform and Rehabilitation Plan (FLRP) is provided in **FLRP Plan 1** (Final Landform Features) and **FLRP Plan 2** (Final Landform Contours) (refer to **Section 5**). The final landform and the rehabilitation are designed to achieve the rehabilitation objectives and produce a stable landform and sustainable vegetation communities that are ecologically and visually consistent with the surrounding area. **FLRP Plan 1** and **FLRP Plan 2** are generally in accordance with the conceptual rehabilitation plan for post mining rehabilitated vegetation communities specified in SSD 8642. Some modifications to the locations of planned vegetation communities have been made to the conceptual final rehabilitation plan after adoption of detailed natural landform modelling.

2.4 Final land use and mining domains

Final land use and mining domains at Mangoola have been defined in accordance with the *Form and Way for Rehabilitation Management Plans for Large Mines* (NSW RR, 2021) and are detailed in **Section 5**.

The final land use domains are as per the list below:

- Native Ecosystem
- Rehabilitation Biodiversity Offset Area
- Final Void

The mining domains are as per the list below:

- Infrastructure Area
- Tailings Storage Facility (TSF)
- Water Management Area
- Overburden Emplacement Area (OEA)
- Active Mining Area

2.4.1 Final land use domains

The final land use domains at Mangoola are detailed in **Table 2.1**. The final landform design has been a key consideration in the design of Mangoola, with the objective of achieving a sustainable rehabilitated landform post closure.

The development of the final landform will include the continued use of natural landform design processes incorporating micro-relief principles, consistent with the sites existing mine rehabilitation practices. The final landform and final land use domains are presented in **FLRP Plan 1** and **FLRP Plan 2**, with specific vegetation communities detailed in **Section 2.3**.

Table 2.1 Mangoola Final Land Use Domains

Final Land Use Domain	Description
Native Ecosystem	Self-sustaining native woodland and grassland ecosystems. This domain exists over land to the south of Wybong Road.
Rehabilitation Biodiversity Offset Area	Rehabilitation undertaken (up to 456ha) in the Northern Extension Area (Wybong Pit).
Final Void	Final remaining void/s from mining extraction areas that form part of the final landform design.

2.4.2 Mining domains

Table 2.2 provides a summary of each mining domain for Mangoola. The mining domains as outlined in **Table 2.2** have been categorised in accordance with the *Form and Way for Rehabilitation Management Plans for Large Mines* (NSW RR, 2021).

Table 2.2 Mangoola Mining Domains

Mining Domain	Description
Infrastructure Areas	CHPP and associated infrastructure Rail and train loading infrastructure Wybong Road haul road overpass Administration and employee facilities Electrical power reticulation Telecommunications cables Water supply and sewage systems Workshop and refuelling facilities Lighting ROM Stockpiles Explosives storage Topsoil management areas (strip and stockpile) Equipment laydown areas and build pads outside of active mining areas
Tailings Storage Facility	Tailings Dam 1, 2 and 4
Water Management Area	Water storage dams for clean, sediment and mine water Tailings Dam 4 Decant Dam Raw Water Dam Pit Water Dam
Overburden Emplacement Area	Includes all overburden emplacement areas established following progression of the pit (Northern, Wybong, Southern and Main Pit emplacement areas)
Active Mining Area	Active mining open cut area

3. Part 3 - Rehabilitation risk assessment

November 2024 Risk Assessment:

A rehabilitation focused risk assessment was conducted in November 2024, to identify how risk controls are to be incorporated into rehabilitation practices across the site. The actions from the previous RMP Rehabilitation Risk Assessment (May 2021) were reviewed and it was confirmed that these had all since been completed and closed out.

The method used for the risk assessment adopts principals of *AS NZS ISO 31000:2018 Risk Management – Guidelines* and was undertaken in accordance with the NSW Resources Regulator Guideline Rehabilitation Risk Assessment (NSW RR, 2021). The risk assessment encompassed the following key steps:

- identifying the related risks including the risk consequence
- analysing the risks using a qualitative risk approach (i.e. identifying existing controls, determining specific consequences/likelihoods and then determining the residual level of risk)
- evaluating the risks
- establishing controls to mitigate or treat the identified risks.

The attendees included staff from various departments, as listed below:

- Brooke York – Environment and Community Coordinator
- Matthew Cox – CHPP Manager
- Luke Dowler - Environment and Community Officer
- Connor McLoughlin - Environment and Community Officer
- Jason Gray – Mine Surveyor;
- Russell Walls – Pit Services Supt (acting MEM)
- Ricki Clifford - Senior Mining Engineer
- Jessica Coffey (Principal Environmental Consultant, IEMA – Facilitator)

Risks were assessed as either low, medium, high or very high. A total of 40 risks were identified during the process of the risk assessment. Of these risks, 30 were ranked as low and 10 were ranked as medium. There were no high or very high risks identified. **Table 3.1** below presents a summary of the medium risks identified during the November 2024 risk assessment. The risk assessment is provided as **Appendix F**.

November 2025 Risk Assessment Update:

An update to the Rehabilitation Risk Assessment was undertaken in November 2025 to include an additional two risks, as requested by the Resources Regulator in the March 2025 Revegetation TAP:

- Suitability and viability of the seed mix to achieve compositional requirements of the various target PCTs. Ranked as a low risk with no additional actions.
- Use of suitably qualified and experienced revegetation experts. Ranked as a low risk with no additional actions.

The updated risk assessment was undertaken by Brooke York (Environment and Community Coordinator), Robyn Ellis (Environment and Community Manager), Luke Dowler (Environment and Community Officer and Jessica Coffey (IEMA).

Table 3.1 Medium Rehabilitation risks Identified as applicable to Mangoola

Risk	Consequence	Controls	Actions	Where Addressed in this RMP
All Phases				
Insufficient skills and experience of rehabilitation personnel / Lack of clearly defined responsibilities	Poor rehabilitation quality	Engage suitably qualified contractors / practitioners to undertake rehabilitation. Engage suitably qualified consultants / practitioners for design assessment / monitoring of rehab. Preparation of the RMP which contains defined responsibilities. Position descriptions. Competencies with operator, including responsibilities for rehab. Quality Control and Supervision of Rehab Contractors	No further treatment plans	Section 11.2
Insufficient funding for prioritisation of rehabilitation activities.	Poor rehabilitation quality	RMP Annual Rehabilitation and Closure Plan (ARCP) Mine Planning Process Rehabilitation included in annual budget and LOM planning. Rehabilitation Cost Estimate / Financial Provision.	No further treatment plans	This RMP (regarding scope) Costs addressed separately in the Rehabilitation Cost Estimate and site budgets.
Failure to identify or comply with all legal and other obligations relating to rehabilitation	Poor rehabilitation quality and not meeting completion criteria.	Rehabilitation Management Plan (RMP) and Annual Rehabilitation Report/Forward Program Conceptual Mine Closure Plan ARCP Keep detailed records of rehabilitation process e.g. Seed mix, topsoil/fertiliser rate etc. GIS System	No further treatment plans	Section 2.1

Risk	Consequence	Controls	Actions	Where Addressed in this RMP
		Track progress against completion criteria (draft). Rehabilitation monitoring. 3yrly GCAA Internal Audits. Annual GCAA rehabilitation inspection.		
Active Mining Phase				
Adverse geochemical/chemical composition of materials such as overburden, interburden, processing wastes, subsoils and topsoils and imported cover materials.	Long-term environmental impacts. Rehabilitation bond is not returned.	No PAF No imported cover materials Use of ameliorants (gypsum) Geochem testing (EIS/historical sampling) Dumping procedure.	No further treatment plans	Section 6.2.1
Adverse surface and groundwater quality and quantity.	Long-term environmental impacts in terms of closure environment.	Groundwater model. Geochemical testing (EIS/historical sampling) Surface and Groundwater Monitoring Water Management Plan Hydrocarbon Management Plan Conceptual Mine Closure Plan Environmental Inspections / Monitoring Water balance Groundwater Impact Assessment South Pit Clean Water Sign off	No further treatment plans	Section 6.2.1
Decommissioning Phase				

Risk	Consequence	Controls	Actions	Where Addressed in this RMP
Less than adequate decommissioning/removal/augmentation of the mine water management system including dams prescribed by the Dams Safety Act 2015.	Rehabilitation bond is not returned.	Operational Water Management Plan Conceptual Mine Closure Plan Mine Closure Protocol	No further treatment plans	Section 6.2.2
Landform Establishment Phase				
Proposed final landform designs are not long-term stable (to allow relinquishment) including Tailings cap, high-walls, landforms, drainage, borehole plug seals etc.	Long-term environmental impacts. Rehabilitation bond is not returned.	CMCP RMP and FLP - Geofluid Natural Landform Design Rehabilitation Construction QC and conformance to design check Site geotechnical inspection process Annual rehabilitation monitoring and walkover inspection. ARCP	Review the need for ongoing landform stability monitoring.	Section 6.2.3
Drainage/ flow lines in rehabilitation failure or cause erosion that threatened rehabilitation during final landform establishment	Poor quality rehabilitation. Inability to achieve completion criteria.	Rehabilitation Construction QC and conformance to design check Annual rehabilitation walkover inspection report Rehabilitation and Establishment Methodology Forms Annual rehabilitation monitoring/RRC Annual rehabilitation GCAA inspection	No further treatment plans	Section 6.2.3
Failure of Anvil Creek reinstatement	Poor quality rehabilitation. Inability	Anvil Creek realignment design and contractor scope of work	No further treatment plans	Section 6.2.3

Risk	Consequence	Controls	Actions	Where Addressed in this RMP
	to achieve completion criteria.	Selective placement of material for compaction - dump to design Rehabilitation Construction QC and conformance to design check Rehabilitation Establishment methodology form Compaction testing. Annual walkover inspection		
Ecosystem and Land Use Development				
Rehabilitation quality is not to external expectations (regulatory and/or community).	Poor rehabilitation. quality Increased costs.	Rehabilitation Management Plan Annual Rehabilitation and Closure Plan Mine Planning Process Quality Control and Supervision of Rehab Contractors Rehabilitation monitoring Annual RRC and Ecological Monitoring report - incorporating rehab objectives and draft completion criteria	Develop Completion Criteria for approval by Resources Regulator.	Section 6.2.6

4. Part 4 - Rehabilitation objectives and rehabilitation completion criteria

4.1 Rehabilitation objectives and rehabilitation completion criteria

Rehabilitation objectives and rehabilitation completion criteria are defined under Clause 12 of the Regulation as Rehabilitation Outcome Documents required to be submitted to the Secretary for approval. The rehabilitation objectives and completion criteria are provided in this RMP to satisfy the requirement of Clause 12(1)(a) and Clause 12 (1)(b) of the Regulation.

SSD 8642 Rehabilitation Objectives

The SSD 8642 rehabilitation objectives for Mangoola are to demonstrate as a minimum, that the final land use domain will be returned to a condition capable of achieving the final land use. Specific rehabilitation objectives are outlined in Condition B85 of SSD 8642 and are reproduced in **Table 4.1**.

Table 4.1 Rehabilitation Objectives as outlined in Condition B85 of SSD 8642

Feature	Objective
All areas of the site affected by the development	Safe, stable and non-polluting Fit for the intended post-mining land use/s Establish the final landform and post-mining land use/s as soon as practicable after cessation of mining operations.
Areas proposed for native ecosystem re-establishment	Establish/restore native woodland ecosystems capable of being self-sustaining in perpetuity (as conditioned by conservation agreements and other covenants implemented under the Biodiversity Offset Strategy) Establish local plant community types, with a particular focus on the plant communities and species shown in Appendix 9 (of SSD 8642) Establish: - o riparian habitat within any diverted and/or re-established creek lines and retained water features - o habitat, feed and foraging resources for threatened fauna species - o vegetation connectivity and wildlife corridors, as far as is reasonable and feasible.
Areas proposed for agricultural land	Establish/restore grassland areas to support sustainable agricultural activities Use species found in the local area that are suitable for pasture production Achieve land and soil capabilities that suitable for the intended post-mining land-use Located adjacent to surrounding agricultural land, where practicable.
Final Landform	Stable and sustainable for the intended post-mining land use/s (also refer to Condition B86 included as a footnote to this table) Integrated with surrounding natural landforms and other mine rehabilitated landforms, to the greatest extent practicable Incorporate relief patterns and design principles consistent with natural drainage that mimic natural topography and mitigate erosion Maximise surface water drainage to the natural environment (i.e. free draining landforms with the exception of final void catchments) Minimise visual impacts, where practicable Minimise post mining fugitive emissions from exposed coal seams Minimise surface water flows and impacts on threatened orchid species

Feature	Objective
Final Voids	Designed as long term groundwater sink to limit the release of saline water into the surrounding environment, as described in the documents listed in condition A2(c), unless further mine planning and final landform design processes identify a more suitable outcome for the final voids (see condition B88) Optimise the size and depth of final voids to ensure the final landform is stable and non-polluting Minimise to the greatest extent practicable: - o the size and depth - o the drainage catchment of final voids - o any high wall instability risk - o the risk of flood interaction Maximise potential for beneficial reuse, where practicable
Creek Restoration Works	Engineered to be hydraulically and geomorphologically stable Incorporate erosion control measures based on vegetation and engineering revetments Incorporate structures for aquatic habitat Revegetate with suitable native species
Surface infrastructure for the development	To be decommissioned, removed and rehabilitated, unless the Resources Regulator agrees otherwise
Rehabilitation materials	Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and reused as rehabilitation resources, to the greatest extent practicable
Water quality	Water retained on the site is fit for the intended post-mining land use/s Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation
Community	Ensure public safety Minimise adverse socio-economic effects associated with mine closure

Note: Condition B86: The Rehabilitation and Mine Closure objectives in **Table 4.1** above apply to the entire site, including all landforms constructed under either this consent or previous consents. However, the Applicant is not required to undertake any additional earthmoving works on landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable, non-polluting and free-draining landform.

Rehabilitation Objectives and Completion Criteria developed under the Mining Act

In addition to the overarching rehabilitation objectives specified in SSD 8642, detailed rehabilitation objectives have been developed as required under the Mining Act. The current version of these Rehabilitation Objectives were approved by the Resources Regulator on 28 October 2025 (ROBJ0001545). Draft rehabilitation criteria have also been developed however these are not currently approved. The rehabilitation completion criteria set the benchmark values for key indicators proposed to demonstrate that the rehabilitation objectives have been met. Completion criteria are objective target levels or values assigned to a variety of indicators which can be measured to demonstrate progress and the ultimate success of rehabilitation. As such, they provide a defined end point at which time rehabilitation can be deemed successful and the mining lease relinquishment process can proceed. Rehabilitation completion criteria must be submitted to the NSW RR and be consistent with the proposed final land use for the site. Where Mangoola refines this completion criteria throughout the life of the mine, the criteria will be re-submitted to the NSW RR.

The approved rehabilitation objectives, as well as the draft performance indicators and completion criteria for Mangoola are presented in **Appendix E** and are representative of the current knowledge from monitoring data and operational experience relating to the proposed final landform at Mangoola. It is expected that the indicators and criteria will continue to be refined through the operational phase of Mangoola. It is noted that Mangoola Coal will submit the final rehabilitation completion criteria to

the NSW RR for approval no later than three years before rehabilitation of the whole (or identified part) of the mining area is proposed to be completed.

4.2 Rehabilitation objectives and rehabilitation completion criteria – stakeholder consultation

Consultation was undertaken with various stakeholders in the development of the final landform and final land use during the EA process. As outlined in the MCCO Project Response to Submission Report (Umwelt, 2019), an independent expert examination of the proposed final landform as presented in the EIS was undertaken by Integrated Environmental Management Australia (IEMA). This examination was informed by an expert review of the mine plan and final landform from a mine planning perspective, undertaken by Xenith Consulting.

The independent review concluded that the MCCO Project EIS landform represents an outcome which demonstrates that Mangoola has considered the balance between delivering an economic mine plan whilst giving proper regard to leaving beneficial post mining land uses and minimising final voids (IEMA 2020). Further, the review found that Mangoola Coal has demonstrated through the rehabilitation already completed it has been able to successfully design and construct the natural landforms along with the revegetation techniques that are proposed in the MCCO Project EIS (IEMA 2020).

In accordance with Conditions A22 and B91(a) of SSD 8642 the original 2021 version of this RMP (Version 1) was prepared in consultation with Muswellbrook Shire Council and (then) Department of Planning Industry and Environment.

In a letter dated 29 October 2024, DPHI approved the RMP to be updated (Version 2) without requiring consultation, due to the minor administrative nature of the updates. Consultation with DPHI and Muswellbrook Shire Council was undertaken for the November 2025 revision to the RMP (Version 3). A summary of all consultation is provided in **Appendix D**.

Consultation was also undertaken with the Resources Regulator during the development of the Rehabilitation Objectives and the FLRP in 2023/2024, and again in 2025. These documents have been approved by the Resources Regulator and are provided in **Appendix E** (Rehabilitation Objectives) and Section 5 (FLRP) of this RMP.

5. Part 5 - Final landform and rehabilitation plan

The final landform and rehabilitation plan is defined under Clause 12 of the Regulation as a Rehabilitation Outcome Document required to be submitted to the Secretary for approval.

In accordance with the requirements of the RMP guidelines, a Final Land Use and Rehabilitation Plan (FLRP) (**FLRP Plan 1** and **FLRP Plan 2**) has been prepared to show the proposed final land use and final landform at the end of mine life.

The FLRP was approved by the Resources Regulator on 28 October 2025 (FLRP0001348).



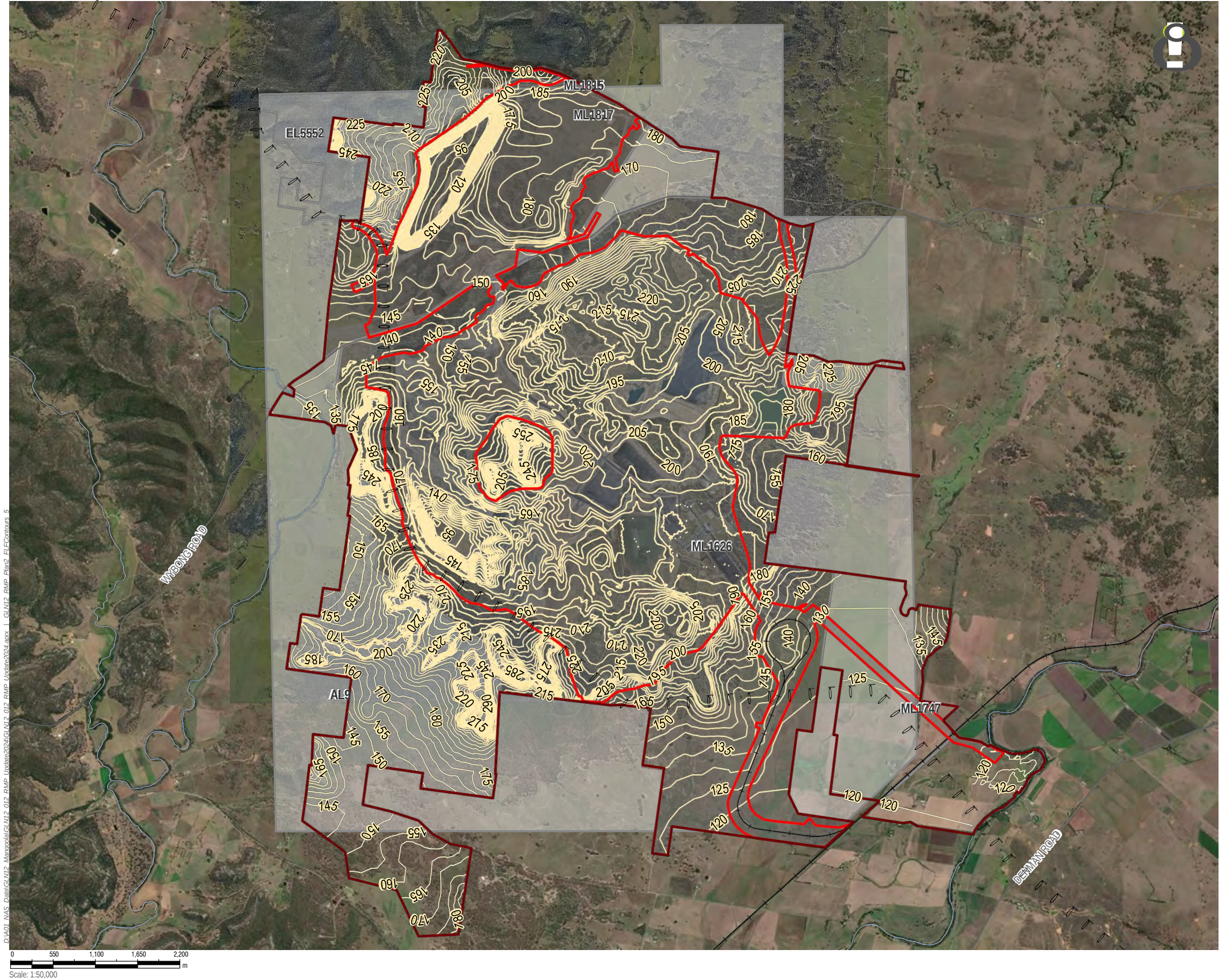
- LEGEND**
- Project Approval Boundary
 - Approved Disturbance Boundary
 - Road
 - Railway
 - Electricity Transmission Line
 - Watercourse
- Final Landform Feature**
- Drainage Network
 - Final Void Safety Bund
 - Final Void Water Level
 - 500kV Powerline Easement
- Final Landuse Domain**
- Domain A: Native Ecosystem
 - Domain D: Rehabilitation Biodiversity Offset Area
 - Domain J: Final Void
 - Domain K: Other
- Current Authorisations**
- Coal - Current Titles

Glencore Mangoola Mine Complex

**Final Landform Features
Plan 1**

Mine name	Mangoola Mine Complex
Plan name	Mangoola Mine Complex RMP
Data theme submission ID No.	10904 and 10905
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	25/09/2025

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LEGEND

- Project Approval Boundary
- Approved Disturbance Boundary
- Road
- Railway
- Electricity Transmission Line
- Watercourse
- Final Landform Contours (5m)
- Current Authorisations**
- Coal - Current Titles

Glencore Mangoola Mine Complex

**Final Landform Contours
Plan 2**

Mine name	Mangoola Mine Complex
Plan name	Mangoola Rehab Management Plan
Data theme submission ID No.	10392
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	25/09/2025

6. Part 6 - Rehabilitation implementation

6.1 Life of mine rehabilitation schedule

Areas disturbed at Mangoola will be progressively rehabilitated following mining activities. Rehabilitation is to be completed using natural landform design principles and revegetation techniques that are recognised as industry leading.

There are a number of key aspects of the mining and rehabilitation processes at Mangoola which contribute to Mangoola Coal achieving progressive rehabilitation at the site. An extensive program of detailed mine planning and review has been undertaken at Mangoola both as part of mining operations as well as the environmental assessment undertaken for the MCCO Project (Umwelt, 2019). The key life of mine (LOM) rehabilitation and mining assumptions are included below. It is noted that mining and rehabilitation planning are also discussed in the Mangoola Coal Annual Rehabilitation Report and Forward Program submitted annually by 31 March via the Resources Regulator portal.

Life of Mine Rehabilitation Schedule

An indicative Life of Mine rehabilitation schedule for Mangoola has been provided in **Table 6.1** below. Indicative progressive rehabilitation plans at five yearly intervals have been provided as **Figures 6-1, 6-2 and 6-3**. The approved final landform is provided in the FLRP (refer **Section 5**).

Table 6.1 Life of Mine Rehabilitation Schedule

Aspect	Description
a. Decommissioning of Key Infrastructure	Key infrastructure that is no longer required on site will start to be progressively removed following cessation of mining and processing activities. The majority of administrative buildings will be removed during decommissioning phase, however the main office and site access will continue to be required until capping of TD4 is complete (refer landform establishment activities below). The Pit Water Dam, Raw Water Dam, Hunter River Salinity Trading Scheme infrastructure, and roads will also be left until rehabilitation of TD4 is complete to manage water storage and discharges. The explosive magazine, CHPP, ROM and rail loop are scheduled to be decommissioned by 2033. Timing to be determined by closure studies and demolition. The Bridge and MCCO road will be decommissioned in 2034 following the completion of all Wybong Pit rehabilitation. The bioremediation area will be required throughout closure.
b. Key final landform establishment activities	Landform shaping in rehabilitation areas is undertaken progressively Rehabilitation of Main Pit is scheduled for completion in 2030 and Wybong Pit is scheduled for completion in 2033. Last coal is scheduled for 2030, and rehabilitation of the CHPP, ROM and Rail Loop is anticipated to take approximately 3 years following last coal. Tailings dams 1 and 2 are scheduled for rehabilitation by 2027. Tailings dam 4 is anticipated to be left to dry for approximately 5 years following last coal. Once dry, capping and rehabilitation is anticipated to take a further 2 years. Anvil Creek re-establishment is scheduled to occur progressively between 2026 and 2031.

Aspect	Description
c. Investigations and Studies	Studies will commence in the 5 years prior to closure, as part of the development of the mine closure plan. These may include contamination studies, tailings capping studies, geotechnical assessments of highwalls, and groundwater assessments. Specifically, TD4 tailings testing and reports are scheduled be completed over the 5 years while TD4 is drying. Wybong Pit Highwall treatment design will also undergo a detailed design review.
d. Assumptions and Principles	The key assumptions to achieving the life of mine rehabilitation schedule have been defined in the EIS (Umwelt, 2019) and these include: • Two final voids will remain as part of the final landform and will become waterbodies. It is predicted that both final voids (non- backfilled mining areas) will partially fill with water and act as long-term hydraulic sinks. Further information relating to final voids is provided in Section 6.2.3d • The final landform incorporates the haulage of approximately 50 Mbcm of overburden from the Northern Extension Area (Wybong Pit) to the Southern Mining Area (Main Pit) • Adequate topsoil is available on site for the completion of rehabilitation. The topsoil balance is updated annually. • Rehandling of approximately 5 Mbcm of overburden into the Northern Extension Area (Wybong Pit) final void for shaping and reduction of the void size • Void low walls in both the Northern and Southern Areas will be shaped at the completion of mining • Remaining high walls may be selectively blasted and shaped for visual amenity and geotechnical stability • Tailings Dam 4 (TD4) is the life of mine tailings storage facility and there is adequate capping material available on site to cap all tailings dams. • Reinstatement of Anvil Creek will occur as part of mining operations.

Detailed Rehabilitation and Mine Closure Planning

The Mangoola Coal approach to the mine closure planning process considers each phase of the mining operation, with closure planning commencing at the exploration and project phase, continuing through the operational phase and eventually to sign-off of rehabilitation and successful mining lease relinquishment. The level of detail required in a closure plan increases as the operation proceeds towards the planned closure date.

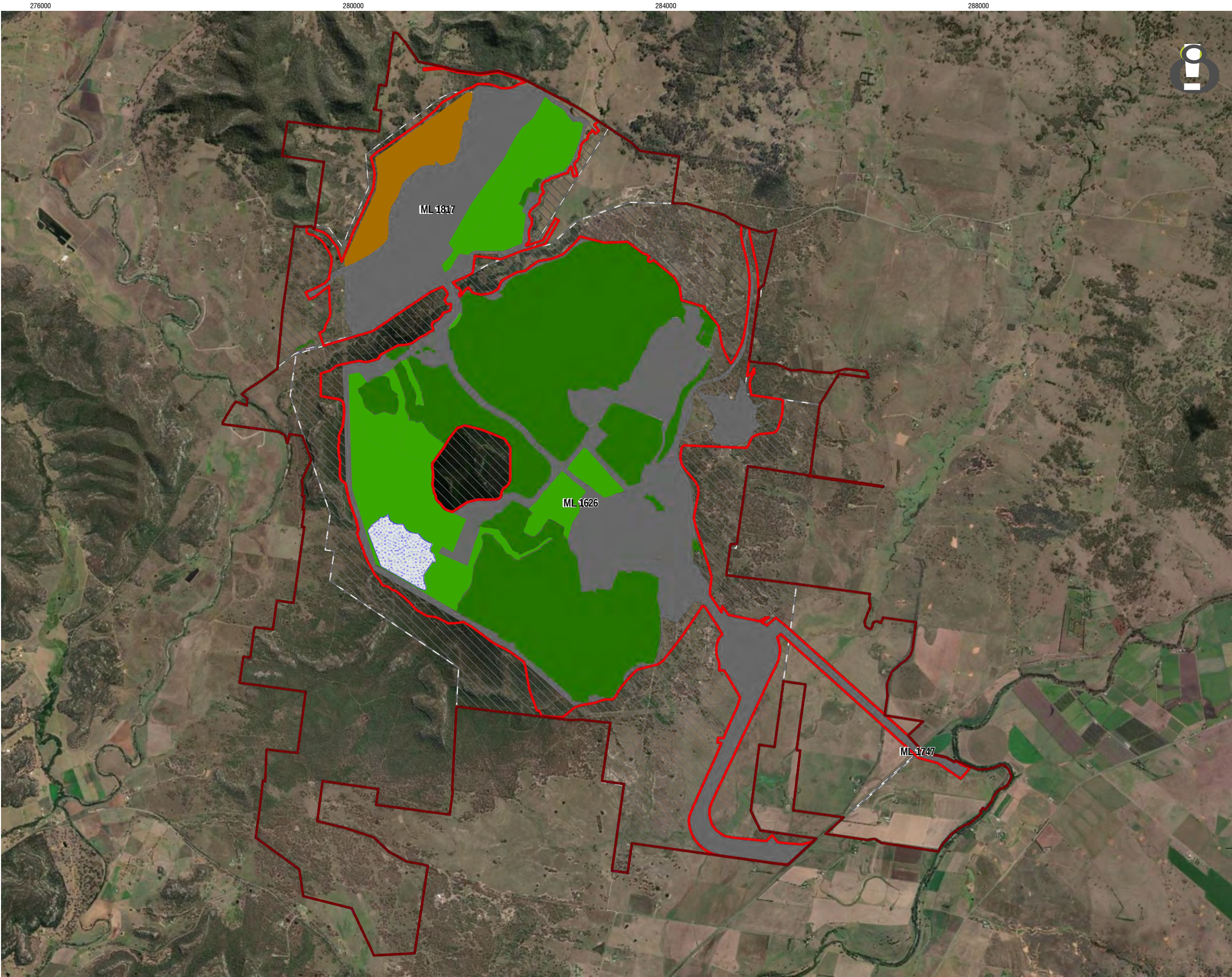
Development of a detailed Mine Closure Plan will commence five years prior to the planned mine closure and will be aimed at achieving the post mining landform and land use as presented in the EIS. This detailed Mine Closure Plan will build on the Conceptual Closure Plan that will be in place for the rest of the mine life. The detailed Mine Closure Plan will include evaluation of re-use opportunities for facilities, infrastructure and services on the site, with the majority of demolition/decommissioning works to be planned and undertaken as soon as practicable following the cessation of mining, unless alternative post mining uses are identified at that time.

As part of detailed closure planning, Mangoola Coal commits to continue to investigate potential post mining beneficial land uses for the site through the development of a Post Mining Land Use Strategy as part of the detailed Mine Closure Plan. The detailed Mine Closure Plan will also investigate ways to minimise the adverse socio-economic effects of mine closure, including reduction in local employment

levels. The development of the detailed Mine Closure Plan will include consultation with relevant stakeholders, which is expected to include the Resources Regulator, Department of Planning, Housing and Infrastructure (DPHI) and Muswellbrook Shire Council (MSC).

In accordance with B88 of SSD 8642, a Rehabilitation Strategy for Mangoola Coal has been developed. The Rehabilitation Strategy and the RMP both detail the implementation of rehabilitation outcomes in SSD-8642. While both plans are closely linked, the intent of the Rehabilitation Strategy is to set the strategic direction and outcomes for the rehabilitation of the mine, and the RMP defines how the rehabilitation of the site will achieve the objectives required by SSD-8642.

Additionally, the Forward Program also outlines the proposed rehabilitation schedule over the following three-year period. These are reviewed and amended each year to reflect current mine progression.



LEGEND

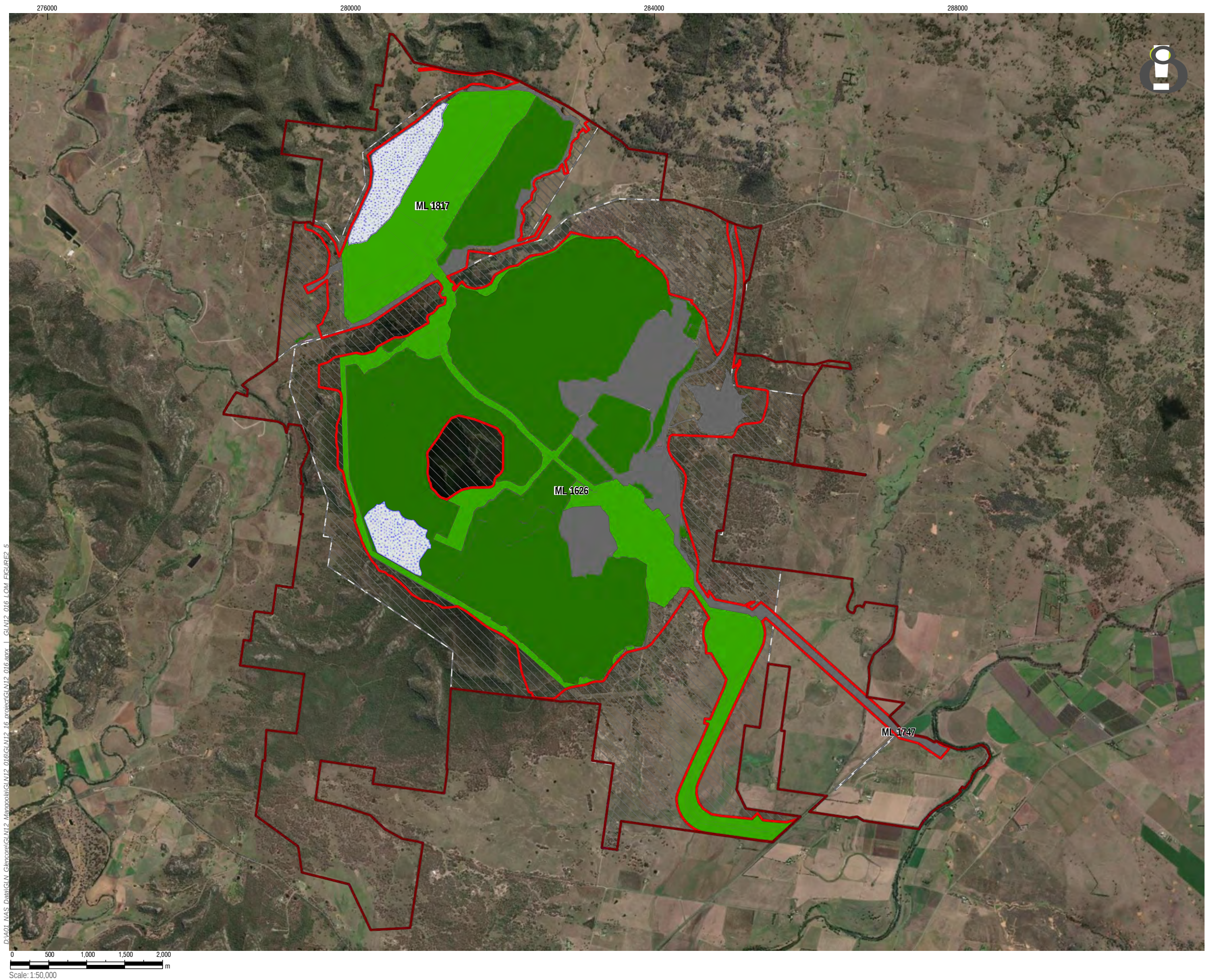
- Project Approval Areas - SSD-8642
- Approved Disturbance Boundary
- Relevant Mining Titles
- Final Landuse Domain**
 - Final Void
- Rehabilitation Stage**
 - New Rehabilitation
 - Previous Rehabilitation
 - New Disturbance
 - Previous Disturbance

Mangoola Coal Mine

Indicative Life of Mine
Rehabilitation Schedule
2029

FIGURE 6-1

Mine name	Mangoola Coal Mine
Plan name	Mangoola Coal Mine LOM
Year of anticipated relinquishment	N/A
Data theme submission ID No.	N/A
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	13/11/2025



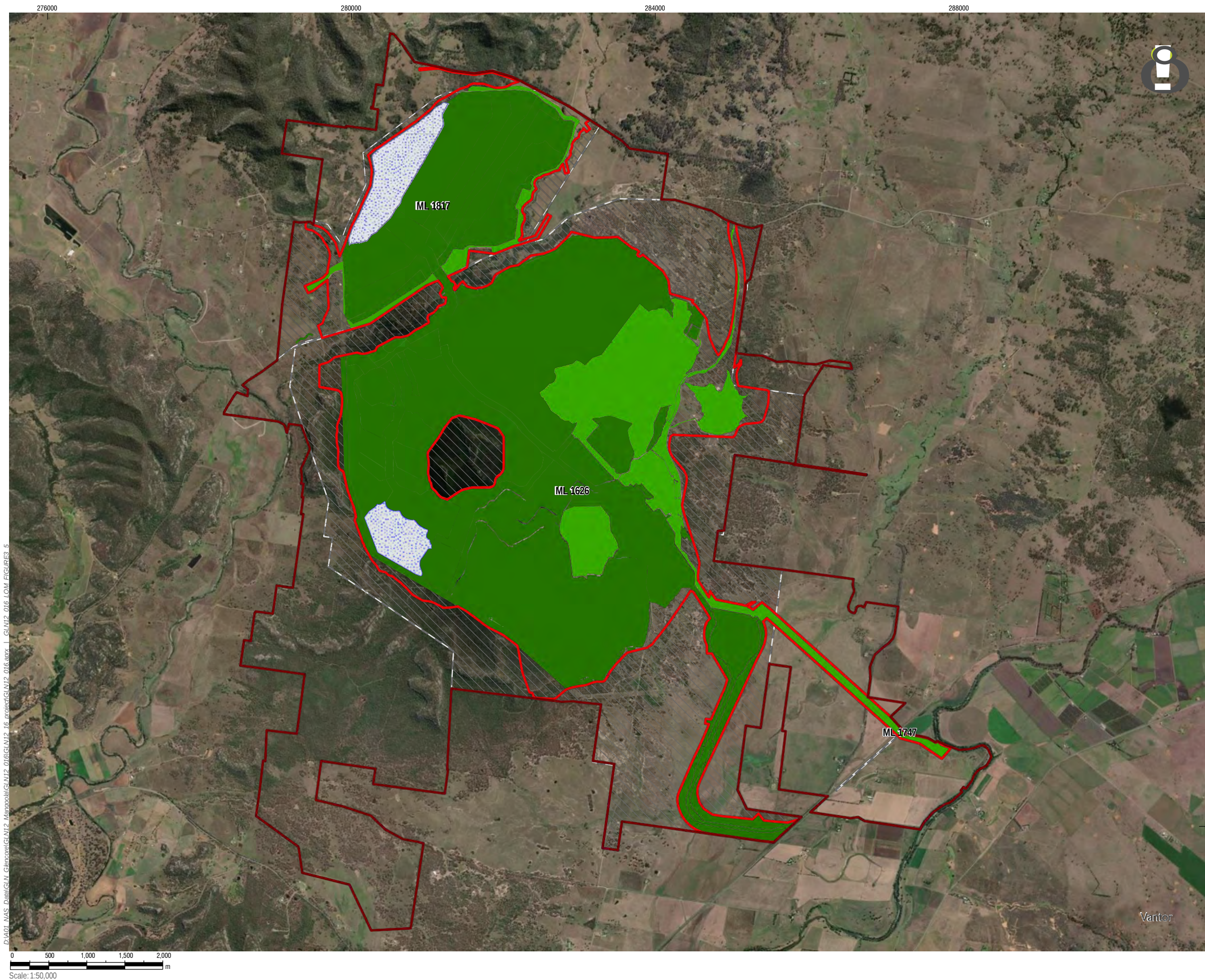
LEGEND

- Project Approval Areas - SSD-8642
- Approved Disturbance Boundary
- Relevant Mining Titles
- Final Landuse Domain**
 - Final Void
- Rehabilitation Stage**
 - New Rehabilitation
 - Previous Rehabilitation
 - Previous Disturbance

Mangoola Coal Mine

Indicative Life of Mine Rehabilitation Schedule 2034 FIGURE 6-2

Mine name	Mangoola Coal Mine
Plan name	Mangoola Coal Mine LOM
Year of anticipated relinquishment	N/A
Data theme submission ID No.	N/A
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	13/11/2025



LEGEND

- Project Approval Areas - SSD-8642
- Approved Disturbance Boundary
- Relevant Mining Titles

Final Landuse Domain

- Final Void

Rehabilitation Stage

- New Rehabilitation
- Previous Rehabilitation

Mangoola Coal Mine	
Indicative Life of Mine Rehabilitation Schedule 2039 FIGURE 6-3	
Mine name	Mangoola Coal Mine
Plan name	Mangoola Coal Mine LOM
Year of anticipated relinquishment	N/A
Data theme submission ID No.	N/A
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	13/11/2025

Source: Project Approval Boundary, Final Landform and Current Authorisations from Glencore (2025).

6.2 Phases of rehabilitation and general methodologies

Mangoola prepare an ARCP, which provides direction and guidance for the rehabilitation and land management activities at site. The plan details responsibilities for land management and rehabilitation activities, as well as nominated timeframes for completion. The plan also documents key performance indicators and associated deliverables for rehabilitation performance.

The rehabilitation objective for Mangoola is to create safe, stable, non-polluting and sustainable post mining landforms that allows the achievement of the agreed post mining land uses (refer to **Section 2.4**). This will be achieved by demonstrating completion of a series of conceptual phases of rehabilitation which are described in **Table 6.2**.

Table 6.2 Rehabilitation Phases

Phase	Description
Active Mining	Activities undertaken as part of active mining that are associated with rehabilitation include; Topsoil management, flora and fauna management, overburden emplacement, waste management, geology and geochemistry, spontaneous combustion, reject/tailings, erosion and sediment control, biological resources, mine subsidence, cultural heritage and exploration activities.
Decommissioning	Removing infrastructure, hardstands, plant, equipment, buildings and other structures, contaminated and hazardous materials.
Landform Establishment	Shaping unformed rock or other sub stratum material into a desired land surface profile including final landform and drainage features. This phase includes substrate material characterisation, hazardous material encapsulation and earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics.
Growth Medium Development	Establishing and enhancing physical structure, chemical properties and biological properties of a soil stratum for plant growth. This includes placing and spreading soil and applying ameliorants.
Ecosystem and Land Use Establishment	Seeding, planting and transplanting plant species. Incorporates management actions such as weed and feral pest control to achieve species establishment and growth to juvenile communities and habitat augmentation.
Ecosystem and Land Use Development	Applying management techniques to encourage an ecosystem to grow and develop towards a desired and sustainable post mining land use outcome. Incorporates features including species reproduction, nutrient recycling and community structure.
Rehabilitation completion	Completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished for the mining tenement.

6.2.1 Active mining phase

Prior to the commencement of any disturbance works including any re-disturbance of established rehabilitation, Mangoola implements a Ground Disturbance Permit (GDP) process. The GDP forms the basis of assessing risks and opportunities associated with the disturbance to appropriately manage the key aspects of rehabilitation in the active mining phase.

The GDP process at Mangoola provides a system to check that any ground disturbance works are conducted in accordance with relevant approvals, licences, environmental assessments or other compliance related documents.

All ground disturbance works in undisturbed areas require approval by an Environmental Department representative prior to any works being undertaken.

This approval process includes conducting a review of:

- the location of the ground disturbing works within the approved boundaries
- an assessment of the potential for impacts on environment and community aspects.

The GDP process provides opportunity to communicate the conditions of approval of the ground disturbing works to site personnel/contractors. This will include but not be limited to the following:

- Field demarcation requirements for the area specified in the GDP
- Survey coordinates of the area specified in the GDP
- Pre-clearance survey information
- Clearing management practices (including management of habitat trees, orchids or other particular ecological requirements).

The following section summarises how key aspects in the active mining phase are managed at Mangoola.

a. Soils and Materials

Mangoola's topsoil inventories identify that the site will have sufficient topsoil resources to complete rehabilitation across the life of mine. Mangoola implements a number of soil and material resource management measure to ensure that the sufficient topsoil volumes are maintained.

Prior to topsoil stripping, habitat trees and suitable ground timber will be salvaged, then where practicable, mulching of remnant vegetation will be undertaken to improve the organic matter levels within the soils.

Topsoil is removed from any disturbed areas and either direct placed on overburden or stockpiled for future use in rehabilitation works. Typically, the top 100 mm of soil is removed for this use. However, this is dependent on the depth of the topsoil.

Topsoil stockpiles are managed in a manner to preserve the quality and enhance rehabilitation outcomes. Key topsoil and subsoil management and monitoring techniques include:

- material analysis of topsoil and subsoil will be undertaken at an appropriate scale across the site, with representative samples taken to characterise the nature of the soil material and determine any ameliorant techniques that may need to be applied
- topsoil will only be taken when deemed free of significant weed infestation
- where practicable, topsoil will be stripped when moist to help maintain soil structure and to reduce dust generation.
- where practicable, topsoil will be transferred directly from stripping location to areas that have been reshaped for rehabilitation, eliminating the need for storage and re-handling
- topsoil stockpiles will be located away from traffic areas, at an appropriate distance from watercourses and have appropriate sediment controls in place
- stockpiles will be generally less than 3 m high to retain biological activity within the topsoil
- stockpiles will be assessed and if required sown with a suitable cover crop to minimise soil erosion and invasion of weed species if planned for long term storage.
- weed growth on topsoil stockpiles will be monitored and subsequently controlled if necessary. Prior to re-spreading, any weed growth will be treated or scalped from the top of the stockpiles to minimise the transport of weeds into rehabilitated areas.
- stockpiles will be appropriately identified to minimise the potential for inadvertent use or disturbance.

The site soil types were identified in the original EIS (Umwelt, 2006) as well as the 2019 EIS (Umwelt, 2019). To manage topsoil inventories on site, calculations on topsoil inventory will be conducted on an annual basis. This information is used to assist in the management of topsoil reserves and the management of ground disturbance works (with respect to the erosion potential of exposed soils).

Mitigation measures to prevent soil loss include:

- Preventing soil loss by adhering to the Pre-Clearance Survey, Land Clearing and Top Soil Stripping Procedure
- Managing soil erosion and sediment transport by implementing:
 - o drainage structures for infrastructure areas to manage water run off
 - o using sediment controls during construction
- Preventing soil contamination by:
 - o Implementing appropriate hydrocarbon management practices as per the Mangoola Open Cut Hydrocarbon Management Plan
 - o Ensuring topsoil is stockpiled in designated areas as planned.
- Implementing measures to minimise soil degradation, including:
 - o Minimising the structural decline of soil by reducing compaction during stripping and stockpiling
 - o Minimising nutrient decline by managing stockpiling methods and heights, as per the stockpiling procedure.

During the active mining phase, Mangoola will identify opportunities to develop sufficient inventories of suitable material for use in capping of TD4 at the cessation of mining. Details on stockpile locations for capping material will be identified in future revisions of the Mangoola Annual Rehabilitation Report and Forward Program.

b. Flora

Mangoola has several processes to assist in the management of flora. These include:

- ecological surveys (pre-clearance, clearance, post establishment of rehabilitation)
- robust rehabilitation methodology
- research and development
- GDP's and procedures
- weed and pest animal management

Sufficient time will be provided during the mine planning phase to allow for the implementation of appropriate pre-clearance procedures, to appropriately salvage biological and habitat resources and maximise the viability for use in rehabilitation.

Where possible, local provenance seed will be used in direct seeding, or to propagate tubestock for rehabilitation and native revegetation activities. A seed collection program is well established on site, undertaken by suitably qualified and experienced personnel who facilitate:

- preparation of seed at appropriate collection times for key native species
- an assessment of native plants and trees within the disturbance footprint, to allow for seed collection prior to, or immediately following clearing
- volumes of seed required to be collected to enable adequate supply of native seed for reuse in rehabilitation and revegetation works

- appropriate treatment and storage of seed to maintain viability
- appropriately recording collection, storage and treatment prior to reuse.

Clearing activities at Mangoola are designed to minimise impacts to any threatened flora species and vegetation communities.

A Translocation of Threatened Flora Species Management Plan is in place at Mangoola to salvage and relocate threatened orchids and other flora species affected by the progression of mining activities.

Mangoola Coal undertakes an annual ecological monitoring program, rehabilitation walkover inspection and annual bushfire hazard inspection to assess for landform stability, floristic diversity, weed presence, structural fauna habitat, management of pest species and bushfire management. Currently Mangoola Coal monitors flora monitoring sites, groundwater dependant ecosystem and rehabilitation monitoring sites.

c. Fauna

Mangoola Coal has several processes to assist in the management of fauna. These include:

- ecological surveys (pre-clearance, clearance, post establishment of rehabilitation)
- robust rehabilitation methodology
- research and development
- GDP's and procedures
- weed and pest animal management,
- salvage of habitat trees and other materials for future habitat construction where possible.

During clearance works, the salvage of habitat resources including hollow bearing trees, hollow logs and ground timber will be undertaken where practicable. This material will be relocated to post-mining rehabilitation areas, offset and conservation areas. The material will be utilised to increase the habitat complexity in these areas, making them more habitable for native species, including key threatened species. Suitably qualified personnel inspect all disturbance areas as part of the pre-clearing procedure to ensure that no unapproved impacts on threatened fauna occurs. Any fauna found during clearing activities are captured (where possible) and relocated into existing rehabilitation or offset areas.

In addition to the flora monitoring program, Mangoola Coal monitors various fauna monitoring sites, a groundwater dependant ecosystem and rehabilitation sites.

d. Rock/overburden emplacement

Overburden emplacement will continue behind an existing noise wall in Main Pit until such time that the available area is restricted beside Anvil Hill. South Pit mining will continue behind the existing noise and visual wall and the OEA will continue to follow the progression of each pit.

In the Northern Extension Area, overburden will either be emplaced immediately adjacent to Wybong Pit or hauled south to be emplaced in the existing Southern Mining Area. The material taken south will assist to develop the final landform in this mining area. Blasted overburden material is loaded by hydraulic excavators into dump trucks for transportation to the OEAs.

Final exterior dump faces are designed at a general slope of 10 degrees or to blend with existing topographic landscape. Dumps are free draining based on geomorphic landform design principles. Areas in the Northern Extension Area will be developed typically to a height of approximately 180m and up to approximately 200m AHD accounting for the final Geofluv landform. The out of pit OEAs in the Southern Mining Area will have a maximum height of 240m AHD. Some variations in the height of the final landform will be established to assist in forming a more natural landform.

Dumping at night will occur in consideration of the outer dump maximum elevation to minimise potential adverse noise and visual impacts associated with mining operations on neighbouring residences.

The following parameters have been adopted for the placement of waste in the spoil dumps:

- height of dump face to a nominal 20 metres where practical
- any carbonaceous and CHPP coarse reject materials will be dumped in discrete layers to be capped with at least 2 metres of inert material.

e. Waste management

All waste management at Mangoola is undertaken in accordance with the Mangoola Open Cut Waste Management Plan. All waste management is undertaken by a waste management contractor who is responsible for implementing the Waste Management Plan. Management of key waste streams is discussed below.

Operational Waste

The key components of operational waste include:

- Office waste including waste paper and office stationary, with material recycled where possible
- Domestic waste including food scraps, aluminium and steel cans and putrescible waste. The quantity of waste is relatively small in comparison to total waste, with material recycled where possible
- Hazardous waste, which includes waste generated from workshop and equipment maintenance activities, including oily rags, gloves, machinery components, waste metal, oils, lubricants, hydrocarbons and paints. Waste will be recycled where practicable, otherwise disposed of at a licenced facility
- Ablution waste including waste from toilets, bathhouses, kitchen sinks, which are managed in the sewage wastewater system onsite, or will be pumped out to a licenced waste contractor
- Special wastes, which have unique regulatory requirements. Special waste includes tyres which will be disposed of in the OEAs onsite, as well as asbestos, which if identified, will be disposed of by a licenced contractor in accordance with legislative requirements
- Exploration drill cuttings, chips and drill fluids will be disposed of within the Mangoola tailings facilities or offsite at a licenced facility.

Construction Waste

Construction activities across Mangoola are likely to generate inert waste such as concrete, electrical cabling and steel. Inert waste materials generated by these activities will be recycled where practicable or disposed of at an appropriate facility. Any excavated material generated during construction will be reused onsite.

Other waste that may be generated during construction include office, domestic and ablution waste, as well as a small amount of waste associated with general maintenance and workshop activities.

Contaminated Soil Management

Contaminated soil from unplanned spills is contained, cleaned up and is removed from site as required by a licensed contractor to an appropriate waste management facility or transported to the Mangoola bioremediation cell. Material taken to the bioremediation cell is managed as per the sites Bioremediation Procedure. Spills are logged within the sites incident management system with corrective actions put in place to prevent reoccurrence.

Used Tyres and Asbestos

Used haul truck tyres and asbestos are managed by Mangoola Coal. Haul truck tyres are disposed of at depth in the OEAs. The locations of the haul truck tyres are maintained in a register by the Mangoola Open Cut Mine Survey Department.

If asbestos removal is required e.g. from old dwellings on the mine site, a licensed contractor is employed for the removal process. Removal of asbestos materials is conducted in accordance with relevant government codes and standards.

f. Geology and geochemistry

Studies on material characterisation have been undertaken by Landloch in 2011 and Environmental Geochemistry International in 2019. The studies indicated that overburden/interburden and coarse reject material are likely to be Non-Acid Forming (NAF) and non-saline. They are also expected to be alkalinity producing, providing an additional factor of safety. The report also looked at testing from TD1 and TD2 and concluded that the bulk of the tailings are likely to be NAF.

It is currently not feasible to track the location of topsoil from stripping areas to rehabilitation areas. Topsoil stockpiles may be made up of topsoil stripped at multiple times and locations, as the timing of topsoil stripping is dependent on the mine plan.

Experience with rehabilitation at Mangoola has found that diversity of PCT species in completed rehabilitation is highly dependent on seed mix, conditions at time of seeding (and after seeding), and connectivity/proximity to other areas with established seed resources (seeds travel with wind, water and animal movements). The high number of variables means that it is not possible to determine if timing of topsoil stripping impacts PCT diversity in completed rehabilitation. Additionally, soil biota sampling is not considered feasible at this time.

The Rehabilitation Risk Assessment (refer **Section 3**) identified “*Adverse geochemical/chemical composition of materials*” as a potential medium risk to rehabilitation. The controls identified during the risk assessment to address this risk included:

- No PAF material on site;
- No imported cover materials;
- Use of ameliorants (gypsum);
- Geochem testing (EIS/historical sampling); and
- Dumping procedure.

No further treatment plans were identified by the group.

g. Material prone to spontaneous combustion

Management of material prone to spontaneous combustion is undertaken in accordance with the Mangoola Open Cut Mine Spontaneous Combustion Principal Hazard Management Plan. This management plan details the monitoring and control measures implemented by Mangoola Coal to reduce the incidence and impacts of spontaneous combustion. Measures include stockpile inspections, staff training, priority processing of areas that are heating, and track rolling/battering down stockpiles that will be stored for greater than three months.

With respect to rehabilitation, material that has the potential to have spontaneous combustion risks is not used in rehabilitation works and is covered to a depth of at least two metres in the OEAs.

Mangoola has a low propensity of spontaneous combustion and does not have a history of previous spontaneous combustion occurrences.

h. Material prone to generating acid mine drainage

Studies undertaken in regard to acid mine drainage generation are detailed in **Section 6.2.1f** above.

Mangoola also has surface water and groundwater monitoring programs in place. To date monitoring has not indicated the presence of acid mine drainage occurring. Acid mine drainage is therefore not anticipated to be an issue for the site.

i. Ore beneficiation waste management (reject and tailings disposal)

Coarse rejects are predominantly placed within mined areas. Any carbonaceous and CHPP coarse reject materials will be dumped in discrete layers to be capped with at least 2m of inert material.

Tailings will continue to be deposited in TD4 for the life of mine. Tailings Dams 1 and 2 (TD 1 and TD 2 respectively) are currently in a decommissioning phase, with Stage 1 capping of TD1 and TD2 completed in June 2025. Source of capping material for TD1 and TD2 is to be delivered from the current mining waste horizons as per design report 'Tailings Dams No. 1 & No. 2 Capping Strategy Detailed Design Report December 2020 Document No: 106024.17 R11'. This design report underpins the current HRA Notification (SHRA00001458) submitted to the Resources Regulator for review on 24 December 2020 and was subsequently approved as adequate on 10 March 2021. Further cone penetration testing (CPT) and shear vane testing (SVT) for TD1 and TD2, including revisiting areas within Zone A and B where testing has already been completed will continue to be undertaken. Throughout this process any surface water will be minimised from TD1 and TD2 to maximise the effect of solar desiccation.

Learnings from capping of TD1 and TD2 will be integrated into the future planning for capping of TD4. The program and methods for the capping of tailings dams on site will continue to be reported as part of the Annual Rehabilitation Report and Forward Program.

j. Erosion and sediment control

Mangoola Coal has several management systems and studies which have been developed and completed to assist with the appropriate management of erosion and sedimentation from disturbed sites. These include:

- GDP's
- Geofluv landform design
- Material characterisation (Landloch, 2011 and Environmental Geochemistry International, 2019)
- Construction erosion and sediment control plan's for construction works
- Water Management Plan (required under Condition B50 of SSD 8642) which includes:
 - o Site water balance and salt balance
 - o Erosion and Sediment Control Plan
 - o Surface Water and Groundwater Management Plans

The erosion and sediment control plans are consistent with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 and 2E Mines and Quarries, or its latest version. Erosion and sediment controls will be established prior to pre-stripping operations occurring.

Site erosion and sediment controls are inspected at least monthly and within 5 days of a high rainfall event. Annual channel stability monitoring is also undertaken to identify any erosion and sedimentation issues on surrounding creeks and drainage lines.

In terms of rehabilitation, Mangoola Coal has implemented a rehabilitation monitoring program, where erosion and sediment control inspections form part of the scope. This monitoring program will be continued until it can be demonstrated that rehabilitation has satisfied the completion criteria.

k. Ongoing management of biological resources for use in rehabilitation

Refer to **Section 6.2.1a** for specific details on the ongoing management of biological resources for use in rehabilitation.

l. Mine subsidence

Mangoola is an open cut mining operation. Underground mining has not previously been conducted onsite or in the immediate surrounds and therefore, Mangoola is not affected by mine subsidence.

m. Management of potential cultural and heritage issues

An Aboriginal Cultural Heritage Management Plan (ACHMP) has been developed and implemented at Mangoola in accordance with the approval requirements. The ACHMP outlines management measures for the protection of heritage sites across Mangoola. All Aboriginal artefacts located within the approved disturbance boundary have been salvaged. Salvaged artefacts will be relocated back to Mangoola Coal and stored in accordance with the Care and Control Agreement (C0003885).

Further to the ACHMP, Mangoola operates under a Historic Heritage Management Plan (HHMP), which addresses the historical heritage management at Mangoola. The HHMP was developed in accordance with Schedule 3, Condition 43 of PA 06_0014.

The GDP process assists in the ongoing management of cultural heritage by identifying the location of known sites and providing instructions on the management of these sites.

n. Water management

Water is managed on site through the implementation of the Water Management Plan.

The Rehabilitation Risk Assessment (refer Section 3) identified *“Adverse surface and groundwater quality and quantity”* as a potential medium risk to rehabilitation. The controls identified during the risk assessment to address this risk included:

- Groundwater model;
- Geochemical testing (EIS/historical sampling);
- Surface and Groundwater Monitoring;
- Hydrocarbon Management Plan;
- Conceptual Mine Closure Plan;
- Environmental Inspections / Monitoring;
- Water balance;
- Groundwater Impact Assessment; and
- South Pit Clean Water Sign off.

No further treatment plans were identified by the group.

o. Exploration activities

Mangoola Coal will continue to undertake exploration activities within the mining leases, assessment leases and exploration licences to increase the accuracy of the site geological model. Works will include

continued structural, coal quality and crop line drilling. Reporting for these drilling programs will be conducted as per ML1626, ML1747, ML1817, AL9 and EL5552 licence requirements.

Reserve delineation drilling will be conducted as required within ML1626, ML1747 and ML1817. The aim of the program is to delineate reserves with the Approved Disturbance Boundary at Mangoola, focusing on the Great Northern, Fassifern and Upper Pilot seams in terms of structure, coal quality and geotechnical features. Mangoola Coal will apply the site Environmental Management System to manage the drilling program. Exploration activities will be conducted on a campaign basis with hours of work between 6am and 6pm, seven days a week. An ESF4 application will be submitted to the Resources Regulator prior to the commencement of any exploration drilling works outside the Approved Disturbance Boundary (within AL9 and EL5552) where required.

Construction, sealing and decommissioning of boreholes will be undertaken in accordance with relevant standards and guidelines published by the Resources Regulator.

Additional drill holes to install groundwater monitoring bores may also be required and appropriate approvals sought. Where required, monitoring bores will be licenced under the *Water Management Act 2000* or the *Water Act 1912*, depending on the aquifers being intersected and monitored. Geotechnical and test pits will be undertaken as required.

6.2.2 Decommissioning

A detailed Mine Closure Plan will be developed in consultation with government and other stakeholders and will include details covering the evaluation of re-use opportunities for facilities, infrastructure and services on the site (refer to **Section 6.1**). Most demolition/decommissioning works will be planned and undertaken as soon as practicable following the cessation of mining, unless alternative post-mining uses are identified or proposed for these assets at the time. Further detail regarding decommissioning and demolition activities will be included in the Detailed Mine Closure Plan, and Annual Rehabilitation Report and Forward Program.

a. Site security

Management of security at Mangoola will be undertaken in accordance with the Site Security Management Plan. Site security will also be implemented during decommissioning activities with security to be further reviewed during the development of the detailed Mine Closure Plan.

Security measures to be implemented include:

- Fencing, signage and locked gates (where required)
- Security patrols, where necessary
- Site inductions and restricted access.

b. Infrastructure to be removed or demolished

Infrastructure and services which are not proposed to be utilised by subsequent approved land uses will be removed including:

- Workshop and administration infrastructure
- CHPP and rail infrastructure
- Overpass over Wybong Road
- Rail and train loading infrastructure
- Water storage dams not required as part of the final landform
- Services such as power supply etc. (except the 500KV line and power supply to rural properties)
- Former infrastructure areas will be revegetated unless proposed for other land uses.

Prior to demolition, the infrastructure will be evaluated in terms of the presence of hazardous substances and waste. Waste streams will be identified with waste disposed of as per the Mangoola Open Cut Mine Waste Management Plan. If applicable, appropriate management strategies to protect employees and the public, and to minimise harm to the environment will be developed. Demolition works will be carried out in accordance with Australian Standard AS 2601-2001: *The Demolition of Structures (or the latest version)*.

Services will be removed unless they are to be utilised as part of the post mining land use. Electricity services to any remaining infrastructure will be removed prior to the commencement of any associated building demolition works. Telecommunications, water supply and other services will also be disconnected and removed where practical.

Where services are buried (i.e. pipelines, cables, etc.) and their retrieval may lead to further disturbance, the infrastructure may be left in situ provided they do not pose constraints to the post mining land use. In this situation, the location of the services will be surveyed and marked on the record tracings and a suitable caveat developed to provide that they are readily identifiable for future land holders.

Dams forming part of the mine water management system will be removed unless they are repurposed and utilised for habitat purposes, are associated with long-term stability and water management, or are beneficial to subsequent land uses (e.g. stock dams). As part of this, process water from existing dams that are no longer required may be pumped into the final voids. Removal of sediment from mine water dams will occur as required as part of the closure and rehabilitation processes, regardless of the suitability of the dams for other purposes.

The Rehabilitation Risk Assessment (refer **Section 3**) identified “*Less than adequate decommissioning/removal/augmentation of the mine water management system*” as a potential medium risk to rehabilitation. In addition to the above, the controls identified during the risk assessment to address this risk included:

- Operational Water Management Plan;
- Conceptual Mine Closure Plan; and
- Mine Closure Protocol.

No further treatment plans were identified by the group.

c. Buildings, structures and fixed plant to be retained

All infrastructure is currently planned to be decommissioned following the cessation of mining, however as part of the mine closure process, infrastructure which is proposed to be utilised by subsequent approved land uses will be retained as required. For infrastructure that is to remain, a structural assessment is to be prepared by a suitably qualified and experienced person.

The assessment will:

- Determine the integrity of the structure
- Identify the associated risks to public safety, the environment and any potential modes of failure.

The decommissioning of infrastructure will be further discussed in the Detailed Mine Closure Plan.

d. Management of carbonaceous/contaminated material

Excess material remaining at closure will be scraped up and either reprocessed or disposed of within the reject emplacement area, or as per the appropriate waste legislation. Carbonaceous material will be suitably capped to support the final land use, or removed to the reject emplacement area and rehabilitated. Management of carbonaceous material at the decommissioning phase will be undertaken in accordance with the process described in **Section 6.2.1**.

Soils within and surrounding former infrastructure areas will be assessed for potential contamination. Any contamination present will either be remediated, or appropriately disposed of. Contaminated material will be managed in accordance with the guidelines under the *Contaminated Land Management Act 1997*. Management of contaminated material will also be undertaken in accordance with the process described in **Section 6.2.1e**.

e. Hazardous materials management

Hazardous materials will be managed as per the Mangoola Open Cut Mine Waste and Hydrocarbon Management Plans. Relevant Safety Data Sheets (SDSs), as well as applicable legislation relating to hazardous material management and disposal.

All remaining materials on site at closure including hydrocarbons such as diesel, lubricants and other hazardous materials will be either utilised or disposed of at an authorised facility. The storage tanks will be removed and depending on their condition, either sold or disposed of at an authorised facility.

f. Underground infrastructure

There is currently no underground infrastructure associated with Mangoola.

6.2.3 Landform Establishment

The following sections provide an overview of the key characteristics of the final landform as shown in the **FLRP Plan 1** and **FLRP Plan 2** in **Section 5**). The design and establishment of the final landform will include the continued use of natural landform design processes incorporating micro-relief principles, consistent with the existing mining operations.

Mangoola Coal aims to return the site to a condition where the landforms, soils, hydrology and vegetation are self-sustaining and compatible with the surrounding land uses.

a. Water management infrastructure

Mangoola Coal will address the following items as part of their post-mining water management system:

- Verifying the continued use and suitability of existing dams or removing dams where they are not required in the final landform
- If required, reshaping dams in accordance with their intended use
- For dams which are to be retained, design drainage structures to capture runoff from catchment areas
- Erosion and sediment control measures will be installed where appropriate

The key design principles to be used in the natural landform design approach include:

- the drainage density of the final landform is to reflect the nature of the drainage patterns in surrounding landforms
- steeper slopes are to be located higher in the catchment (that is, where water flows are smallest), with slope gradients flattening out downstream
- drainage lines will have both channel and floodplain components to provide stability during frequent flood events
- gentle flow transitions which emulate natural transitions and maintain a balance between scour risk and sediment load.

A small drain is proposed upslope of the Northern Extension Area. Diversion of runoff from the adjacent rehabilitated overburden emplacement, south east of the final void within the Northern Extension Area would occur via a bund that is permanently integrated into the final landform. The flood levee adjacent to Big Flat Creek would be removed.

The final landform design and resulting detailed engineering of water management structures at mine closure will be included in future mine closure plans. Information relating to final voids is provided in **Section 6.2.3d**.

The Rehabilitation Risk Assessment (refer **Section 3**) identified “*failure of drainage/ flow lines in rehabilitation*” as a potential medium risk to rehabilitation. The controls identified during the risk assessment to address this risk included:

- Rehabilitation Construction QC and conformance to design check;
- Annual rehabilitation walkover inspection report;
- Rehabilitation and Establishment Methodology Forms;
- Annual rehabilitation monitoring/Rehabilitation Report Card; and
- Annual rehabilitation GCAA inspection.

No further treatment plans were identified by the group.

b. Final landform construction: general requirements

The aim of this landform is to be consistent with the surrounding landscape. The conceptual final landform will complement Anvil Hill as the most prominent topographical feature, through establishment of ridgelines leading to this feature.

The final exterior dump faces will be shaped to a general slope of approximately 10 degrees (up to a maximum of 14 degrees). The approved final dumping height for the OEAs is up to approximately RL240m AHD in the Southern Mining Area and up to approximately RL200m AHD in the Northern Extension Area.

Software is used by the Mangoola Technical Services Department to model on site dump parameters and soil type utilising comparisons to the surrounding natural land surface. The software provides a theoretically stable landform based on fluvial geomorphic landform design methods. The digital output of this software is used by the Mangoola Technical Services Department to develop appropriate dumps and ramps to produce a landform consistent with the requirement of the SSD 8642.

The final landform design for Mangoola has been developed by suitably qualified engineers in consultation with site personnel. Survey control is implemented to ensure that the final landform is consistent with recommendations from the engineer’s designs.

The following factors are considered to create stable slopes with sustainable vegetation cover:

- Carbonaceous material should not be placed close to the batter surface
- Topsoil (including tree mulch) may require amelioration to ensure stabilisation
- Concave slope profiles are preferred over linear slope profiles
- Outer batters on the landform have been recommended with a gradient of approximately 1V:6H
- Perimeter drains will be installed where required to prevent uncontrolled discharge of runoff onto the outer batter slopes until adequate vegetation cover is established
- Rehabilitation areas are to be ripped on the contour after placement of topsoil and ameliorant (if required) to create furrows approximately 400 mm deep.

Inspections of the landforms are conducted by Environmental personnel following rehabilitation to ensure the design is appropriate and landform stability is achieved to prevent erosion and create a suitable growth medium for vegetation. Complementing the landform developed through the use of the software is the selection of plant species which are most suitable to the reconstructed landforms. The vegetation communities have been selected based on the plant species found in similar natural surrounding landforms.

To manage runoff to the realigned creeks, independent specialists are engaged where required to develop conceptual drainage designs from the rehabilitated landforms. These conceptual designs will be utilised and integrated into the final landform design which will be developed by the Mangoola Technical Services Department.

The Rehabilitation Risk Assessment (refer **Section 3**) identified “*proposed final landform designs are not long-term stable*” as a potential medium risk to rehabilitation. The controls identified during the risk assessment to address this risk included:

- Conceptual Mine Closure Plan;
- FLRP and the Geofluv Natural Landform Design;
- Rehabilitation Construction QC and conformance to design check;
- Site geotechnical inspection process;
- Annual rehabilitation monitoring and walkover inspection; and
- ARCP.

One treatment plan was identified in relation to this risk, which was for Mangoola to review the need for ongoing landform stability monitoring.

c. Final landform construction: reject emplacement areas and tailings dams

Reject emplacement areas and tailings dams are to be rehabilitated to a condition and capability that supports the final land use and are safe, stable and non-polluting. Mangoola Coal will consider the following during the design and construction of the final landform where REAs and tailings dams exist:

Adequate definition of the final land use

- Long term geotechnical stability and structural integrity, including ongoing settlement
- Geochemical stability of emplaced material and its potential to create long term issues
- Settlement and desiccation of tailings dams to support capping material
- Capping and cover types, including volume of material required for construction
- Erosion stability, surface water drainage and groundwater seepage.

Specific design and construction details are in the ‘Tailings Dams No. 1 & No. 2 Capping Strategy Detailed Design Report December 2020 Document No: 106024.17 R11’. A decant dam to allow drainage and capture of water from TD4 is being utilised to allow sufficient desiccation prior to capping works. Mangoola will test the tailings dams to determine that they have sufficient bearing capacity to allow for capping placement.

d. Final landform construction: final voids, highwalls and low walls

Final Voids

Consistent with the requirements of SSD 8642 two final voids will remain at the completion of mining activities. These will include one final void of approximately 82 ha in the Northern Extension Area and another final void of approximately 48 ha within in the existing Southern Mining Area (refer to **FLRP Plan 1** and **FLRP Plan 2**).

To establish the approved final voids Mangoola’s approach to mining in the Northern Extension Area involves an integrated emplacement strategy with distribution of overburden and interburden between the Northern Extension Area and the existing Southern Mining Area to optimise the final landform design. In this regard it is planned to haul approximately 50 Mbcm of overburden from the Northern Extension Area to the existing Southern Mining Area for the purpose of optimising the final void establishing the approved final landform. Within the Northern Extension Area, in addition to progressive infilling of mining areas it is planned that approximately 5 Mbcm of overburden will be

rehandled at the completion of mining to improve the overall shape for the void and reduce the total void area.

A key objective of the landform design is to minimise the catchment size of the final voids where practicable to reduce the surface water take by the voids, by directing rainfall runoff on the established landform back to the existing environment while increasing areas available to be rehabilitated as native grassland and/or woodland. It is predicted that both final voids will partially fill with water and act as long-term hydraulic sinks. Within the Southern Mining Area, there is potential for water in the backfilled areas away from the final void to migrate out and provide recharge to the surrounding bedrock, with much of this water predicted to move north and be captured in the Northern Extension Area final void.

Final void water and salt balance modelling was undertaken as part of the EIS process (Umwelt, 2019), to simulate the behaviour of the pit lakes that would form in each of the final voids. This modelling determined that salinity is predicted to increase slowly and over a long period of time in each void, where the concentration of salt in the pit lakes rises due to evaporation from the lake surface. As part of the EIS (Umwelt, 2019), a geochemical assessment found that runoff and seepage from emplaced overburden is not expected to be acidic nor is expected to contain significant metals concentrations. Consequently, water quality issues related with acidity or heavy metals are not predicted in the final pit lakes.

Highwalls and Low walls

Highwalls may incorporate a series of benches approximately 15m to 50m width and 15m to 45m in height, resulting in slope angles ranging between 27 and 45 degrees (from vertical). The stability of the highwalls will be assessed by a suitably qualified geotechnical engineer. Appropriate stabilisation measures such as battering down weathered material will be undertaken progressively (where required) to ensure long term stability of the highwalls post-mining. A safety berm will be established along the top of each highwall, designed to restrict inadvertent access to the highwalls.

The highwall benches will be revegetated above the predicted final void water level with a suitable local native vegetation mix. Treatment may be undertaken to facilitate a safe and stable final landform and to soften the visual appearance of the highwalls if required.

The low walls will be reshaped and revegetated above the predicted final void water level to a safe and stable slope. Further refinement of highwall and low wall design will be undertaken during the development of the Detailed Mine Closure Plan (refer to **Section 6.1**).

e. Construction of creek/river diversion works

The re-establishment of Anvil Creek will enable rainfall runoff from the rehabilitated Mangoola site to drain freely back into Big Flat Creek. Anvil Creek has been subject to detailed design in 2021 to meet the requirements contained in SSD 8642. Work on the first section of the re-established Anvil Creek has commenced with the detail of the works included in the Annual Review and Annual Rehabilitation Report and Forward Program.

The Rehabilitation Risk Assessment (refer **Section 3**) identified "*Failure of Anvil Creek reinstatement*" as a potential medium risk to rehabilitation. The controls identified during the risk assessment to address this risk included:

- Anvil Creek realignment design and contractor scope of work;
- Selective placement of material for compaction - dump to design;
- Rehabilitation Construction QC and conformance to design check;
- Rehabilitation Establishment methodology form;
- Compaction testing; and
- Annual walkover inspection.

No further treatment plans were identified by the group.

6.2.4 Growth medium development

Mangoola Coal has developed robust rehabilitation methodologies to assist the site in achieving the rehabilitation objectives and rehabilitation completion criteria.

Rehabilitation to achieve objectives will generally take the form of direct seeding of endemic tree, shrub and groundcover species into a growing medium established using soil removed during pre-stripping operations.

Surface preparation activities for rehabilitated areas are conducted as soon as practicable following bulk shaping activities. The growth medium development activities include:

- Analysis of topsoil characteristics where required
- Incorporation of Geofluv design to limit loss of topsoil
- Use of temporary erosion and sediment controls such as coir logs as required
- Rock piles created where appropriate
- Installation of habitat trees where appropriate
- Installation of other habitat features such as ponds where practical
- Placement of topsoil on prepared rehabilitation surface to approximately 100mm
- Application of appropriate ameliorants (such as gypsum) as required to topsoil
- Integration of topsoil, ameliorants and seed bed preparation work through double ripping
- Seeding and planting according to final land use ecosystems
- Weed management including herbicide application prior to use of topsoil and follow up as required
- Consideration of climate conditions where appropriate

Mangoola will consider the optimal seasonal conditions for rehabilitation activities. The timing of topsoil stripping is guided by the mine plan. Whether topsoil is stripped and stockpiled or direct placed on rehabilitation areas depends on where it needs to go and what rehabilitation areas are ready for topsoil placement at the time of stripping.

Weed control measures are undertaken generally in accordance with NSW Weedwise website and are undertaken throughout the year. Suitably qualified weed control contractors make decisions on appropriate spraying conditions based on temperature and humidity readings (Delta T). Outside optimal spraying conditions, cut and paint or physical removal may be utilised for weed control. Different weed species are targeted for control at different times of year and/or growth stages (e.g. during flowering for St Johns Wort).

6.2.5 Ecosystem and land use establishment

As discussed in **Section 6.1**, Mangoola prepares an ARCP which provides direction for the rehabilitation and land management activities at site. The plan details responsibilities for land management and rehabilitation activities as well as nominated timeframes for completion.

Mangoola Coal has planned the final landform vegetation types based on the final landform design, presented in **FLRP Plan 1** and **FLRP Plan 2**. Vegetation establishment practices will vary depending on the vegetation types for the rehabilitation area. This includes species selection and establishment techniques. Typical seed mixes for the dominant vegetation types used include Grey Box / Ironbark Woodland Mix and Slaty Box Woodland Mix. Mangoola Coal also uses Native Grassland mix for areas

to be revegetated as Grassland. Mangoola utilise GPS and GIS spatial data to ensure seed mixes are applied in the correct areas as per the final landform design.

It is anticipated that the seed mixes may vary due to availability and continual increases in species diversity. Mangoola Coal will preferentially utilise local provenance seed for native revegetation activities. Where this is unable to be obtained, seed is sourced from a reputable local supplier. To reduce the risk of ant and insect predation, appropriate insecticides are incorporated into seed mixes as required.

The typical seed mixes for the two dominant vegetation types used at Mangoola are provided in **Table 6.3** below.

Table 6.3 Typical seed mix for dominant vegetation types at Mangoola

Grey Box/Ironbark Woodland Mix	
Species	Application Rate (Kilogram per hectare)
<i>Eucalyptus moluccana</i>	0.2
<i>Eucalyptus crebra</i>	0.25
<i>Eucalyptus dwyeri</i>	0.01
<i>Brachychiton populneus</i>	0.1
<i>Acacia salicina</i>	0.2
<i>A. falcata</i>	0.17
<i>A. decora</i>	0.2
<i>A. parvipinnula</i>	0.15
<i>A. spectabilis</i>	0.02
<i>A. implexa</i>	0.03
<i>A. pilligera</i>	0.03
<i>Dodonaea viscosa ssp viscosa</i>	0.1
<i>Dodonaea viscosa ssp cuneata</i>	0.02
<i>Allocasuarina distyla</i>	0.1
<i>Allocasuarina verticillata</i>	0.02
<i>Allocasuarina leuhmannii</i>	0.02
<i>Myoporum montanum</i>	0.03
<i>Bursaria spinosa</i>	0.05
<i>Psychdrax odorata</i>	0.05
<i>Kunzea occidentalis</i>	0.05
<i>Notelaea microcarpa</i>	0.05
<i>Cassinia arcuata</i>	0.05
<i>Olearia elliptica</i>	0.025
<i>Styphelia triflora</i>	0.03
<i>Native grass mix</i>	1
<i>Daviesia ulicifolia</i>	0.02
<i>Sida hackettiana</i>	0.02
<i>Einadia polygonoides</i>	0.01
<i>Einadia trigonos</i>	0.025
<i>Einadia nutans</i>	0.01
<i>Einadia hastata</i>	0.01
<i>Chrysocephalum apiculatum</i>	0.01
<i>Senna artemisioides</i>	0.03
<i>Leiocarpa panaetiodes</i>	0.01
<i>Vitidinia muelleri</i>	0.01
<i>Denhamia silvestris</i>	0.01
<i>Dysphania pumilio</i>	0.02
<i>Dysphania carinata</i>	0.02
<i>Enchylaena tomentosa</i>	0.01
<i>Atriplex semibaccata</i>	0.01
<i>Calotis lappulacea</i>	0.01
<i>Hardenbergia violacea</i>	0.01

Grey Box/Ironbark Woodland Mix	
Species	Application Rate (Kilogram per hectare)
<i>Calocephalus citreus</i>	0.02
<i>Dichondra repens</i>	0.03
<i>Solanum cinereum</i>	0.02
<i>Cynodon dactylon</i>	0.20
<i>Jap millet</i>	5
<i>Oats</i>	3
Slaty Box Woodland	
Species	Application Rate (Kilogram per hectare)
<i>Eucalyptus dawsonii</i>	0.15
<i>E. tereticornis</i>	0.1
<i>Angophora floribunda</i>	0.05
<i>Acacia paradoxa</i>	0.1
<i>A. salicina</i>	0.1
<i>A. decora</i>	0.15
<i>A. falcata</i>	0.17
<i>Dodonaea viscosa</i>	0.1
<i>Dodonaea boroniifolia</i>	0.02
<i>Daviesia ulicifolia</i>	0.03
<i>Native grass mix</i>	1
<i>Eremophila debilis</i>	0.04
<i>Cassinia arcuata</i>	0.05
<i>Sida hackettiana</i>	0.02
<i>Einadia hastata</i>	0.01
<i>Einadia polygonoides</i>	0.02
<i>Chenopodium carinatum</i>	0.02
<i>Olearia elliptica</i>	0.05
<i>Teucrium junceum</i>	0.05
<i>Dysphania glomulifera</i>	0.02
<i>Lomandra longifolia</i>	0.05
<i>Leiocarpa panaetiodes</i>	0.02
<i>Atriplex semibaccata</i>	0.02
<i>Dysphania carinata</i>	0.01
<i>Pomax umbellata</i>	0.01
<i>Calotis lappulaceae</i>	0.02
<i>Senna artemisioides ssp artemisioides</i>	0.05
<i>Vittadinia cuneata</i>	0.02
<i>Solanum cinereum</i>	0.02
<i>Chrysocephalum semipapposum</i>	0.01
<i>Dichondra repens</i>	0.03
<i>Ptilotus nobilis</i>	0.01
<i>Cynodon dactylon</i>	0.2
<i>Oats</i>	3
<i>Millet</i>	5

Amendments to seed mixes may be considered if recommended by an ecologist and agreed to by Mangoola.

Independent testing of seed is not considered necessary at Mangoola. The diversity of species established on the rehabilitation is considered appropriate, and the majority of seed used is collected on site. All seed collection, cleaning and storage is carried out in accordance with Florabank Guidelines and Model Code of Practice.

During the rehabilitation process, the ecological structure of the rehabilitated land will be consistent with what would be expected in a typical disturbed landscape transitioning back to woodland.

Succession patterns are likely to resemble those that are observable in forest areas heavily impacted by bushfire and cleared land (such as agricultural land) regenerating to bushland. Most or all the vegetation to be disturbed has been previously cleared and is comprised now of regenerated vegetation that has developed through various successional stages.

During the early stages of rehabilitation, grasses and fast-growing pioneer species will initially dominate with pioneer species such as acacias dominating the mid strata and canopy. As the pioneer species senesce, other canopy species such as the eucalypt species grow, and occupy a greater percentage of canopy. In rehabilitated areas and heavily disturbed environments, until pioneer species have started to senesce there is less light available in the lower storeys. This generally results in a consequential low species richness in ground and shrub layers. As the pioneer species die out and canopy height increases, increased species richness can be expected to develop in the understorey.

The following activities will be conducted in rehabilitation areas to provide habitat and enhance final land use ecosystems:

- Installation of nest boxes and bee/bug hotels
- Translocation of orchid and other threatened, cryptic or slow to establish flora species
- Creation of aquatic habitat/frog pond areas
- Salvaged and reinstatement of habitat trees and ground timber.

Installation of Nest Boxes and Bee/Bug Hotels

Nest boxes may be used to provide habitat for target fauna species. Nest boxes have been installed in existing rehabilitation areas on habitat trees and posts. Living trees may also be used for nest box installation once rehabilitation areas are sufficiently mature to accommodate them without significant damage to the host tree. Nest boxes are installed between approximately 3 and 7 metres from the ground to facilitate safe installation, maintenance and monitoring in accordance with the Biodiversity Offset Management Plan and Strategy (BOMPS). The nest box monitoring program shows nest boxes are utilised by a diversity of species including birds, mammals and amphibians. The number of nest boxes or habitat trees installed will aim to be similar to the number of habitat trees that were removed from an area, which was recorded during EIS ecological surveys. Bee and bug hotels have been installed as a trial to provide habitat for invertebrates and pollinators. If monitoring results show appropriate usage, additional units will be installed.

Salvage and Reinstatement of Habitat Trees

Efforts will be made to reinstate trees with hollows salvaged during clearing works, with the aim of maximising the re-use of resources from the site disturbance. These trees will be identified during the pre-clearing surveys and stockpiled for later use. The trees will be installed as habitat for native fauna, either as stags or placed in the rehabilitated ground layer.

Inspection and Monitoring of Rehabilitated Areas

On completion of rehabilitation works, an initial establishment inspection will be undertaken as part of annual inspections (refer to **Section 8.2**) to review if there are any early indicators of whether rehabilitation is likely to succeed or fail (e.g. presence of moderate to significant erosion, lack of germination, high mortality of tube stock etc). Additional inspections may be undertaken as required as a result of specific site conditions that may affect the outcome of the rehabilitation program such as storms, prolonged rainfall events and/or droughts.

Mangoola Coal implements a weed management program throughout the year that includes weed control in rehabilitation areas. In addition, a feral fauna management program is conducted for those species which have been identified as being a risk to the success of the rehabilitation program.

Annual inspections of rehabilitated areas will be undertaken over the life of the mine to assess soil conditions and erosion, drainage and sediment control structures, assessment of runoff water quality, revegetation germination rates, plant health and weed infestation. In preparation for the walkover inspection aerial photography, LIDAR and field observations from site staff may be considered to target any areas where adverse rehabilitation outcomes may be potentially occurring. Outcomes of the annual rehabilitation inspection will be recorded and any required management actions that are identified as part of the inspection implemented as required. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards.

The monitoring program will be undertaken in association with reference site monitoring, using similar monitoring methods. The results of the reference site monitoring will be used to provide recommendations for mine rehabilitation maintenance work.

6.2.6 Ecosystem and Land Use Development

Rehabilitated lands are actively managed at Mangoola to ensure that the rehabilitation is sustainable and can be demonstrated to have achieved the approved rehabilitation objectives, rehabilitation completion criteria and the final landform and rehabilitation plan. Rehabilitated land will be actively managed for Mangoola to achieve the approved final land use.

The program will be implemented with the aim of providing rehabilitation that is sustainable for the long term. The program will include, as required, measures such as:

- weeds and feral animal control
- erosion and drainage control works
- environmental monitoring and management of surface water, groundwater, ecology and land capability in line with other approved environmental management plans required by the development
- re-seeding/planting of rehabilitation areas that may have failed (e.g. lack of germination, high plant mortality rate, etc) or require the establishment of later phase successional species
- repair of fence lines, access tracks and other general related land management activities.

The monitoring program will be continued within rehabilitation as well as non-mined areas until it can be demonstrated that rehabilitation has satisfied the completion criteria. Information from the monitoring program will also be used to refine closure criteria and modify rehabilitation procedures as required. This program will be continued as required until it can be demonstrated that the rehabilitation meets relevant completion criteria. There is no current rehabilitation at the site meeting the completion criteria phase.

As part of the implementation of the final landform design, Mangoola will consult with appropriate bushfire experts (e.g. Rural Fire Service) to ensure that retained access tracks through rehabilitation are appropriate for bushfire control purposes.

The Rehabilitation Risk Assessment (refer **Section 3**) identified “*Rehabilitation quality is not to external expectations*” as a medium risk to rehabilitation. The monitoring and maintenance outlined in this section of the RMP addresses that risk. Additional controls identified during the risk assessment included:

- Annual Rehabilitation and Closure Plan Mine Planning Process
- Quality Control and Supervision of Rehab Contractors
- Rehabilitation monitoring
- Annual Rehabilitation Report Card and Ecological Monitoring report (incorporating rehab objectives and draft completion criteria)

An additional treatment plan was identified by the group in relation to this risk, which is for Mangoola to develop Completion Criteria for approval by the Resources Regulator. This RMP will be updated with the Completion Criteria once approved.

6.3 Rehabilitation areas affected by subsidence

Mangoola has no areas affected underground mining subsidence.

7. Part 7 - Rehabilitation quality assurance process

The rehabilitation quality assurance process addresses the key actions and processes for each of the rehabilitation phases.

The purpose of the process is to:

- Implement the rehabilitation in accordance with the nominated methodologies
- Adequately identify risks to rehabilitation before proceeding to the next phase of rehabilitation.

The quality assurance process will be implemented throughout the life of the operation, refer to **Table 7.1**.

Table 7.1 Rehabilitation Quality Assurance Process

Rehabilitation Phase	Quality Assurance Actions and Processes	Responsibilities for Implementation	Method for documenting and recording process	Method and timeframe for reviewing and refining process
Active Mining	Up to date mine plans. Pre-clearance surveys. Maintenance of topsoil inventory to document stripped, stockpiled and re spread resources. Inspections of erosion and sediment controls. Weed management, control programs and inspections. Routine and ad-hoc inspections and monitoring.	Technical Services Manager Environment and Community Manager	Inspections and documentation. Annual reporting of outcomes in the Annual Rehabilitation Report and Forward Program. Ecological pre-clearing survey forms. Annual Rehabilitation and Closure Plan including topsoil inventory. Monthly weed management reports.	Process reviewed annually and/or following an incident.
Decommissioning	Inspections and demolition reports to confirm all infrastructure has been removed. Validation testing to ensure any contamination has been appropriately remediated and/or removed prior to commencing the next phase of rehabilitation.	Environment and Community Manager	Inspections and documentation. Validation Reports. Waste Disposal Records. Compliance reporting.	Process reviewed annually and/or following an incident.
Landform Establishment	Survey and preparation of as-constructed drawings of final constructed slopes, landforms and water drainage structures. Constructed landforms are to be confirmed as being generally in accordance with the final landform prior to commencing to the next rehabilitation phase.	Technical Services Manager Environment and Community Manager	As-built landform survey records. Bulk Shaping and Final Trim handover form.	Process reviewed annually and/or following an incident.

Rehabilitation Phase	Quality Assurance Actions and Processes	Responsibilities for Implementation	Method for documenting and recording process	Method and timeframe for reviewing and refining process
Growth Medium Development	Maintenance of topsoil inventory . Soil testing if required. Weed management of topsoil stockpiles prior to application. Microbial inoculation as required. Ameliorants applied as required . Recording depths of ripping and rehabilitation. Inspection to confirm growth medium materials have been applied appropriately prior to application of seed and/or tubestock.	Environment and Community Manager	Inspections and documentation. Rehabilitation establishment and methodology record form. Topsoil inventory in Annual Rehabilitation and Closure Plan. Weed management monthly reports. Annual rehabilitation monitoring and reporting in the Annual Rehabilitation Report. Rehabilitation walkover inspection report.	Process reviewed annually and/or following an incident.
Ecosystem and Land Use Establishment	Verification of correct seed mix/plant species and application area prior to seeding. Seeding and planting activities. Weed and feral pest management. Water monitoring. Rehabilitation monitoring.	Environment and Community Manager	Rehabilitation establishment and methodology record form. Weed management monthly reports. Vertebrate pest control reports Rehabilitation walkover inspection report. Ecological monitoring reports Rehabilitation Report Card and procedure. Annual rehabilitation monitoring and reporting in the Annual Rehabilitation Report.	Process reviewed annually and/or following an incident.

Rehabilitation Phase	Quality Assurance Actions and Processes	Responsibilities for Implementation	Method for documenting and recording process	Method and timeframe for reviewing and refining process
Ecosystem and Land Use Development	Weed and feral pest management. Water monitoring. Rehabilitation monitoring.	Environment and Community Manager	Rehabilitation monitoring procedure. Weed management monthly reports. Vertebrate pest control reports Rehabilitation walkover inspection report. Ecological monitoring reports Rehabilitation Report Card and procedure. Annual rehabilitation monitoring and reporting in the Annual Rehabilitation Report.	Process reviewed annually and/or following an incident.

8. Part 8 - Rehabilitation monitoring program

To provide an opportunity to assess the progression of rehabilitation completed at Mangoola, a rehabilitation monitoring program has been developed. This includes:

- Rehabilitation inspections
- Flora monitoring
- Fauna monitoring
- Aquatic monitoring where required

The objectives of the program are to:

- assess the long-term stability and functioning of re-established ecosystems on mine affected land
- assess rehabilitation performance against the rehabilitation objectives and completion criteria
- facilitate continuous improvement in rehabilitation practices.

The monitoring program will be undertaken within rehabilitated and non-mined areas until it can be demonstrated that rehabilitation has satisfied the rehabilitation objectives and completion criteria. Information from this monitoring program will also be used to refine completion criteria as required. The monitoring programs are detailed in the following sub sections.

The Mangoola ecological monitoring program commenced with baseline surveys in 2007 and surveys and reporting have been undertaken annually since. The current monitoring program is rigorous and systematic and includes a feedback loop, to allow for the adaptive management of biodiversity values within the mine rehabilitation areas.

The ecological monitoring program involves systematic and repeatable surveys at permanent monitoring sites. At these monitoring sites both qualitative and quantitative data are collected to provide adequate data to assess progress against relevant performance indicators, rehabilitation objectives and completion criteria.

Components of the ecological monitoring program include:

- Fauna surveys, with a particular emphasis on threatened species, and include:
 - Habitat assessment
 - Diurnal bird surveys
 - Diurnal herpetofauna survey
 - Anabat echolocation surveys
 - Spotlighting surveys
 - Mollusc searches
 - Fauna Trail Cameras
- Flora surveys (undertaken in accordance with NSW BAM methodology) including:
 - Assessment of strata present
 - Progressive photo monitoring
 - Plant health assessment
 - Documentation of recruitment
 - Floristic diversity and cover abundance (including introduced species)

- Comparison of results against performance indicators, rehabilitation objectives and completion criteria

The monitoring results will be assessed and utilised in the continual improvement and refinement of revegetation/regeneration techniques. Based on the outcomes of the rehabilitation monitoring program, a care and maintenance program will be implemented so that rehabilitation is sustainable for the long term. The scope of the care and maintenance program will include implementation of, as necessary, weed and feral animal control, re-seeding or planting and erosion and sediment control works, track maintenance and bushfire management. It is envisaged that this program will be continued as required until it can be demonstrated that the rehabilitation has satisfied the completion criteria.

Monitoring events will identify any maintenance actions required, whether assistance is required to achieve target native vegetation communities, progression of revegetation/regeneration and the need for management strategies such as weed control or pest fauna management. The frequency of monitoring will be reduced as areas of rehabilitation advance through the Ecosystem and Land Use establishment phase.

Rehabilitation monitoring requirements currently include:

1. Initial Establishment Monitoring (IEM) for Targeted Native Vegetation Rehabilitation
2. Long Term Monitoring (LTM) for Targeted Native Vegetation Rehabilitation

The methodology forms a statistically rigorous sampling process for the collection of all rehabilitation data. This data is then used to develop an annual rehabilitation report card (performance summary).

The following aspects of rehabilitation are monitored during an annual rehabilitation inspection:

- evidence of soil profile development (e.g. leaf litter, decomposition, pedality etc)
- visual assessment of surface materials (e.g. rocky substrate, topsoil cover, presence of chitter)
- evidence of erosion (e.g. sheet, rilling, gully)
- stability and function of erosion and sediment control structures
- growth rates of vegetation
- evidence of plant mortality or die back
- grassland species diversity
- native species diversity
- presence of native over-storey species (estimated %)
- presence of native mid-storey species (estimated %)
- presence of native under-storey species (estimated %)
- exotic species present and estimated densities
- evidence of reproductive potential in native woodland
- evidence of biological nutrient cycling in woodland
- evidence of spontaneous combustion
- evidence of contamination or other limitations to vegetative establishment
- photographic evidence of rehabilitation to provide annual comparisons.

For each of the aspects listed above and assessed during the annual inspection, performance data is captured as part of the Glencore Rehabilitation Report Card process.

An internal report comprising a GIS based site plan and accompanying data tables summarising monitoring outcomes and performance for each success indicator is prepared at the conclusion of each monitoring year. The criteria used to determine the status of rehabilitation is shown in **Table 8.1**.

Table 8.1 Criteria used to determine rehabilitation status

Rehabilitation Status	Criteria
Rework	Does not meet completion criteria. Extensive rework required that would not typically form part of a rehabilitation maintenance program (e.g. slopes do not comply with approval requirements, bare areas >0.1ha, large erosion gullies).
Maintenance	Does not meet completion criteria. Rehabilitation maintenance works required (e.g. weed control, infill seeding/plantings, repair of minor erosion, fertiliser application).
Monitor	Trending towards completion criteria but does not meet all criteria. Minimal to no intervention required but continued monitoring required (e.g. ecologically young areas, variable results, minimal weed presence requiring vigilance).
Acceptable (not certified)	Meets all completion (success) criteria and ready for sign off by regulators. Continue to manage and monitor to maintain status until sign off is sought.
Acceptable (certified)	Meets all completion (success) criteria and has been certified as such by the relevant regulators. Maintain in the same condition until tenure is relinquished/surrendered.

It is envisaged that this monitoring/inspection program will be continued as required until it can be demonstrated that the rehabilitation has satisfied the closure criteria. Any action from monitoring will be undertaken as per **Section 10**.

8.1 Analogue site baseline monitoring

Analogue or reference sites established within nearby biodiversity offset areas are used for condition monitoring to measure and evaluate seasonal variation for comparison with rehabilitation vegetation health. Additionally, the sites are used to inform flora species diversity and composition, as an aid to developing final rehabilitation vegetation communities. Analogue sites may also be used in the refinement of completion criteria in conjunction with other scientific studies and data gathered.

8.2 Rehabilitation establishment monitoring

Mangoola Coal undertakes rehabilitation monitoring for existing and new rehabilitation monitoring sites. This methodology utilised at Mangoola includes:

- IEM which is applied to sites that are ≤3 years old
- LTM which is applied to rehabilitation that is a minimum of four years since establishment (refer to **Section 8.3**).

The monitoring parameters of the IEM sites relate to identifying key and dominant species (native and exotic including high threat/priority weeds) to determine germination success and landform stability.

Initial establishment monitoring results are assessed to determine:

- if there are any emerging risks to rehabilitation, including areas where rehabilitation may be failing and require early intervention
- identify if triggers have been met for preventative or mitigation controls to minimise the impacts of emerging issues in accordance with the Trigger Action Response Plan outlined in **Section 10**
- provide data that may inform continuous improvement of rehabilitation records.

8.3 Measuring performance against rehabilitation objectives and rehabilitation completion criteria

The objective of the rehabilitation monitoring program is to track the progress of rehabilitation works and document any changes in floristics, structure and habitat condition, specifically in relation to rehabilitation objectives and completion criteria. Where appropriate, management recommendations are provided to improve biodiversity values.

The current monitoring program includes both LTM sites and IEM sites.

The key aspects of the LTM sites relate to:

- richness and diversity of native and exotic species (including high threat/priority weeds)
- cover and abundance
- the structure and habitat they provide.

The IEM sites selected to progress to LTM sites will be compared at four years of age and in future monitoring events.

9. Part 9 - Rehabilitation research, modelling and trials

9.1 Current rehabilitation research, modelling and trials

Mangoola Coal has or is currently undertaking several research programs to address knowledge gaps or to improve rehabilitation/environmental outcomes including:

- Research into threatened terrestrial and epiphytic orchids
- Revegetation of tailings dams to assist in dewatering and strengthening of the crust through transpiration and the “water pump” effect of the root system
- Translocation of specific flora salvaged during the clearing process including *Xanthorrhoea*, *Spartothamnella* and *Macrozamia* species
- Translocation of critically endangered *Pomaderris reperta*
- Cool burn trials.

a. Threatened terrestrial and epiphytic orchids

A study is being undertaken on site relating to the translocation of terrestrial orchid species *Diuris tricolor* and *Prasophyllum petilum*. Translocation plots have been established in offset and rehabilitation areas, with reference sites based in nearby buffer lands. Seven translocation events have been undertaken since 2010, comprising the salvage and relocation of over 2,700 orchid cores. Annual monitoring is undertaken to assess the viability of different translocation methods in achieving conservation outcomes. Ongoing trial work is being undertaken to divide and grow *Cymbidium canaliculatum* that have been collected during tree felling operations. The trials involve placing tubers into a range of different types of growth mediums and assessing the success of different propagation methods. These orchids were relocated to offset and rehabilitation areas at Mangoola.

b. Tailings dam desiccation enhancement using tubestock planting

Project C27009 “Tailings Revegetation Project through the Vegetative Water Pump” commenced 1 February 2018. So far it has succeeded in developing a new approach to safe site access at tailings dams using crust cone pressure resistance adding to personnel safety in the future. Experiments have been set up to test the dewatering capacity of tailings by vegetation and survivorship has been observed for *Melaleuca quinquenervia* and *Casuarina glauca* despite plants being under challenge from unexpected weather events during early establishment.

The Mangoola TD1 was planted with 6 trial species during September 2018 and October 2018. Rainfall since December 2018 (76mm) and early March 2019 (40mm + 36mm three days later) and then at the end of March 2019 (90mm in one weekend) resulted in a total of approximately 100ML of water which had accumulated on the tailings dam and had to be pumped out mechanically. Pit pump requirements led to considerable delay in water removal following flooding at the end of March 2019 and survival was not assessed until August 2019 following up to 9 weeks of flooding.

This repeated flooding of TD1 led to the application for additional funding to investigate how to better produce flood adapted plants for the long term dewatering of the dam. Flood tolerant species have been used, but surface flooding in early phases of establishment have been fatal for some species. The need to develop procedures to aid adaptation and survival of plants during the extreme hydrological fluctuations on tailings dams has become necessary so that they can perform their ultimate function of drying the core of tailings dams through transpiration.

This phase of the research will have the following objectives:

- To test the ability of several species of different ages (sizes) to withstand flooding to different levels over different periods of time.
- To measure their physiological condition during a preconditioning experiment by monitoring growth activity, leaf chlorophyll content and leaf function.
- To transfer plants preconditioned by flooding to a tailings dam and monitor survival, growth and leaf function.

Transpiration measurements, with the Porometer/Fluorometer (LI-COR LI600), on the *Melaleuca quinquenervia* plants from the C27009 project site continue to be taken to establish a baseline before the capping of the upper half of the dam proceeds. The first stage of capping was completed in June 2025 and once the tailings surface has been assessed, measurements will be repeated to determine if environmental parameters and/or leaf function has changed for the trees. Chlorophyll readings on the same plants are showing very high readings indicating that these trees are very healthy and have access to sufficient nutrients from the tailings or are cycling nutrients within the plant.

Ameliorant and ground cover Experiment

A new experiment was planted in September 2024 using Queensland species (*Casuarina cristata*, *Melaleuca viridiflora*, *Eucalyptus cambageana*, *E. tereticornis* prov. *Biloela* and *E. tereticornis* prov. *Proston*). To explore methods to increase survival of small, planted tube stock by modifying the immediate surrounds of the root ball by back filling a standardised sized hole with different mixes of ameliorants. Mixes being trialled are Mix 1: 1cocopeat:2sand; Mix 2: 1cocopeat:1sand:1hard wood mulch; Mix 3: 1cocopeat:1tailings:1hard wood mulch. Also, a Mix 0 is used where tailings are just back filled in the same manner without any ameliorants other than a dose of fertiliser which is used in all Mixes. The sand is used to allow aeration in tailings that are very fine; the cocopeat is used to add organic matter and a nutrient fixing substrate; the hardwood mulch provides long-term organic carbon, a surface against which cracking, swelling and shrinking can occur to maintain some level of open surface to the tailings. This can act as a humidity

The research team continue to find plant roots in trap to support potential soil microbial growth. most holes dug into the tailings whilst planting, up to more than 5m from the nearest tree. We assume them to be of *M. quinquenervia* but probably also of *Casuarina glauca* (photos – here a natural drain in the foreground of the photo on the right shows roots exposed after erosion – detail on the left). It is not unusual for wetland plants to grow horizontal roots, especially where cracking and aeration opportunities exist as depth causes anoxia (M. Cole 2024, unpublished).



Flood Preconditioning Experiment

The four Queensland species (*Melaleuca viridiflora*, *Eucalyptus cambageana*, *E. tereticornis* prov. *Biloela* and *E. tereticornis* prov. *Proston*) that had been pre-conditioned with a flooding treatment were planted at Mangoola in September. These, when assessed one month later had all survived. They will be left to grow before further assessments on transpiration capacity are carried out.

c. Flora species translocations

Certain species have been identified during ecological pre-clearing surveys that are suitable for translocation in the rehabilitation areas. These species include *Xanthorrhoea johnsonii*, *Macrozamia communis* and *Spartothamnella juncea*.

All the species that have been collected and translocated to date are either slow growing or difficult to establish, however are important elements of an ironbark woodland complex. Translocation of

salvaged species will continue to be undertaken with the aim of continually improving flora species diversity.

d. *Pomaderris reperta* translocation

Mangoola Coal is partnering with the NSW Biodiversity Conservation Trust (BCT) on a large scale translocation project of the critically endangered *Pomaderris reperta*. The aim of the project is to evaluate the effectiveness of propagation and translocation on this species as a means of extending its distribution within the natural range of the species. Two 12m x 12m translocation plots have been established within establishing Mangoola rehabilitation and two identical sized plots located in Mangoola offset land. Ongoing monitoring and research will be conducted to evaluate the effectiveness of the translocation project.

e. *Cool Burn Trial*

In 2022, Mangoola Coal undertook a trial ecological cool burn in two areas of approximately ten year old rehabilitation. One area comprised 6 ha of a native grassland final land use, and the other a 2.5 ha slaty box woodland vegetation community. The purpose of the burn was to evaluate the impact of the burn on the flora assemblages, secondary succession, fire resilience, soil chemistry, weed control and hazard reduction potential. Pre-burn ecological monitoring and soil testing and post-burn monitoring was undertaken to evaluate the impacts.

9.2 Future rehabilitation research, modelling and trials

There is no additional research and trials planned for Mangoola Coal at this time. Monitoring of the trials listed in **Section 9.1** will continue as applicable.

10. Part 10 - Intervention and adaptive management

The rehabilitation monitoring program as outlined in **Section 8** will be used to identify any maintenance actions required and whether further works are required to achieve specific closure criteria (refer to **Table 6.2**).

The rehabilitation care and maintenance program will be undertaken following the completion of rehabilitation activities at the site and will be utilised to facilitate the sites rehabilitation progression towards achieving the closure criteria.

The following Trigger Action Response Plans (TARP) have been developed to identify required management actions in the event of impacts to rehabilitation, or where rehabilitation outcomes are not achieved in an acceptable timeframe. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards. The rehabilitation monitoring program will trigger response actions as specified in the TARP. The TARP in **Table 10.1** below will be reviewed and may be revised as conditions at Mangoola change or new threats to rehabilitation are identified.

Table 10.1 Trigger Action Response Plan

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber Actions required to be completed within 12 months if deemed necessary, otherwise continue monitoring	Condition Red Actions required to be completed within 12 months
Landform stability	Slope gradient	Trigger	Rehabilitated overburden areas have slopes that are generally <10°.	Rehabilitated overburden areas have slopes >10° but <14°.	Rehabilitated overburden areas have slopes >15°.
		Response	No response required. Continue monitoring program.	Undertake a review of the landform design and if required undertake regrading and revegetation of the area, if it is not designed to be >10° <14°.	Undertake a review of the landform design, including survey if required. Undertake regrading and revegetation of the area, if required.
	Erosion control	Trigger	No gully or tunnel erosion. No rilling present.	Minor gully or tunnel erosion present and/or rilling <200 mm deep.	Significant gully or tunnel erosion present and/or rilling >200 mm deep.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address erosion issues. Remediate as appropriate.	Undertake a review of the drainage of the area and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable.
	Drainage Condition	Trigger	Drainage condition is in accordance with the design criteria established within this document.	Landforms exhibiting minor drainage issues but does not threaten to cause rehabilitation failure.	Landforms exhibiting significant drainage issues, threatening or causing rehabilitation failure.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate.	Undertake a review of the drainage design and provide recommendations to appropriately remediate the area. Remediate as soon as practicable.
Water Quality	Monitoring parameters	Trigger	Surface water quality of runoff from rehabilitation areas is within EPL criteria and rehabilitation performance criteria established within this document or is managed by the site dirty water management system.	Water quality exceeds EPL or performance criteria but does not indicate a long term rehabilitation issue or is managed by the site dirty water management system.	Water quality exceeds criteria, indicating a long term rehabilitation liability, and not contained within the site dirty water management system.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber Actions required to be completed within 12 months if deemed necessary, otherwise continue monitoring	Condition Red Actions required to be completed within 12 months
		Response	No response required. Continue monitoring program.	Review and investigation of water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Reporting as per PIRMP and all statutory reporting requirements. Implement relevant responses and undertake immediate review to determine source of issues and implement identified remediation measures as soon as practicable.
Spontaneous Combustion	Evidence of Spontaneous Combustion	Trigger	No evidence of spontaneous combustion in rehabilitation areas.	Isolated incidence of heating in rehabilitation areas.	Widespread or repeated incidences of ignition in rehabilitation areas.
		Response	No response required. Continue monitoring program.	Investigate sources of potential ignition. Excavate material with propensity for spontaneous combustion in proximity to rehabilitated surface. Review overburden/coarse reject emplacement practices.	Develop remediation plan to mitigate spontaneous combustion such as increased capping. Review Spontaneous Combustion Principal Hazard Management Plan and material emplacement practices.
Topsoil Availability	Topsoil quantity	Trigger	Sufficient topsoil identified for rehabilitation over the RMP term and for the LOM.	Topsoil balance indicates a deficiency in topsoil available for rehabilitation over the LOM.	Deficiency significant enough to delay rehab progression during the RMP term
		Response	No response required.	Investigate options and alternatives to be able to meet future topsoil requirements. Continue direct seeding on spoil where possible and approved.	Source and budget for purchasing topsoil for use in rehabilitation. Investigate use of alternatives.
Vegetation	Ground cover	Trigger	Five years following revegetation to woodland, a minimum of 70% total ground cover (vegetation, leaf litter, mulch) is present within rehabilitated areas.	Five years following revegetation to woodland, total ground cover (vegetation, leaf litter, mulch) of between 55-70% in rehabilitated areas.	Five years following revegetation to woodland, total ground cover (vegetation, leaf litter, mulch) is <55% within rehabilitated areas.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber Actions required to be completed within 12 months if deemed necessary, otherwise continue monitoring	Condition Red Actions required to be completed within 12 months
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	A suitably trained person to inspect the site. Investigate use of appropriate management options to remediate. Remediate as appropriate.
		Trigger	Five years following revegetation to grassland, vegetative cover is at least 80% over a minimum of 95% of areas treated.	Five years following revegetation to grassland, vegetative cover is between 65-80% over a minimum of 95% of areas treated.	Five years following revegetation to grassland, vegetative cover is <65% over a minimum of 85% of areas treated.
		Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	A suitably trained person to inspect the site. Investigate use of appropriate management options to remediate. Remediate as appropriate.
	Weed presence	Trigger	Twelve months following revegetation, no significant weed infestations present.	Twelve months following revegetation, >10% but <25% cover of undesirable species present.	Twelve months following revegetation, >25% cover of undesirable species present.
		Response	No response required. Continue monitoring program.	Engage weed management contractor to remove introduced species from the site.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and additional ground covers and implement as soon as practicable.
	Delayed Rehabilitation	Trigger	Environmental conditions do not delay rehabilitation.	Environmental conditions result in short-term delays to rehabilitation (e.g. less than one week). Examples include unfavourable winds or rain that impacts soil placement, seed spreading, or herbicide application.	Environmental conditions result in long-term delays to rehabilitation (e.g. more than one month). Examples include prolonged rainfall events or drought.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber Actions required to be completed within 12 months if deemed necessary, otherwise continue monitoring	Condition Red Actions required to be completed within 12 months
		Response	No response required. Continue monitoring program.	Delay rehabilitation activities until conditions are suitable for rehabilitation. Review weather forecasts and reschedule rehabilitation activities for next available window.	Delay rehabilitation activities until conditions are suitable for rehabilitation. Review weather forecasts and reschedule rehabilitation activities for next available window. Consider if actions are required to maintain rehabilitation resources (e.g. stockpiling and temporary seeding topsoil)
	Species composition	Trigger	Five years following revegetation to woodland, species composition comprises native tree and shrub species consistent with analogue site.	Five years following revegetation to woodland, native tree and shrub species composition comprises <75% consistent with analogue site.	Five years following revegetation to woodland, native tree and shrub species composition comprises <60% consistent with analogue site.
		Response	No response required. Continue monitoring program.	Review native seed mix and amend accordingly. Consider remedial actions such as tube stock planting or re-seeding to achieve required species composition.	An inspection of the site will be undertaken by a suitably trained person. Investigate remedial options to achieve required species composition.
		Trigger	Two years following revegetation to grassland, species composition consists of grasses and groundcover species are consistent with analogue site.	Two years following revegetation to grassland, <75% of grasses and groundcover species are consistent with analogue site.	Five years following revegetation to grassland, species composition comprises <50% consistency with analogue site.
		Response	No response required. Continue monitoring program.	Investigate additional weeding and re-seeding where required and ensure seed mix utilised is consistent with desired species composition.	An inspection of the site will be undertaken by a suitably trained person. Investigate remedial options to achieve required species composition.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber Actions required to be completed within 12 months if deemed necessary, otherwise continue monitoring	Condition Red Actions required to be completed within 12 months
Biodiversity	Habitat features	Trigger	Monitoring indicates rehabilitation is being successfully established and consistent with the desired vegetation community composition and being utilised for fauna species movement.	Revegetation is being successfully established and consistent with the desired vegetation community composition however are not being utilised for fauna species movement.	Monitoring indicates that rehabilitation vegetation does not contain the desired vegetation community composition and is not being utilised for the movement of fauna species.
		Response	No response required. Continue monitoring program.	Investigate whether sufficient habitat features (rock piles, felled hollow bearing trees, nest boxes etc.) are available and have been incorporated into the rehabilitation areas.	Engage ecologist to recommend remedial rehabilitation works such as additional planting or seeding, soil amelioration, or weed reduction. Ensure sufficient habitat features are available for fauna.
Feral animals	Damage to rehabilitation by feral animals	Trigger	Monitoring indicates rehabilitation is being successfully established and consistent with no ongoing impacts from feral animal species.	Monitoring indicates rehabilitation is being moderately impacted by feral animal species, affecting vegetation cover and seedling recruitment.	Monitoring indicates rehabilitation is being heavily impacted by feral animal species, affecting vegetation cover and soil stability.
		Response	No response required. Continue monitoring program.	Engage vertebrate pest contractor to implement management program in rehabilitation areas.	Engage vertebrate pest contractor to implement management program. Investigate longer term management actions in rehabilitation and surrounding areas.
Bushfire	Fuel load	Trigger	Fuel loads are assessed and managed as required (including maintaining firebreaks) and there is firefighting access across rehabilitation areas and water resources available for fighting fires.	Monitoring indicates fuel loads have not been managed and fire breaks have not been maintained. In the event of a fire, this would result in firefighters not being able to access the site or water resources.	A fire on site damages rehabilitated areas.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber Actions required to be completed within 12 months if deemed necessary, otherwise continue monitoring	Condition Red Actions required to be completed within 12 months
		Response	No response required. Continue monitoring program.	Reduce fuel loads and ensure access tracks are cleared. Inspect water sources are and ensure sufficient water is available.	Review and update (if required) the Bushfire Management Plan to ensure monitoring and maintenance is completed for fuel loads, access tracks, and water bodies.
Seed collection	Local provenance seed availability	Trigger	Sufficient availability of local provenance seed available for rehabilitation activities.	Temporary shortage of local provenance seed available from existing seed collection contractor.	Longer term shortage of local provenance seed available from existing seed collection contractor.
		Response	No response required.	Purchase local provenance seed from alternative supplier.	Source and engage alternative seed collection contractor to ensure reliable supply of local provenance seed resources.

11. Part 11 - Review, revision and implementation

11.1 Review and revision

Statutory triggers for reviewing and revising this RMP are provided in **Table 11.1**.

Table 11.1 Statutory Triggers for RMP Review and Revision

Condition	Review Trigger Requirement
SSD 8642 Condition D7	Within three months of: (a) The submission of an incident report under Condition D9; (b) The submission of an Annual Review under Condition D11; (c) The submission of an Independent Environmental Audit under Condition D12; (d) The approval of any modification of the conditions of this consent (unless the consent require otherwise); or (e) Notification of a change in development phase under Condition A13. The suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.
SSD 8642 Condition D8	If necessary, to either improve the environmental performance of the, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary/Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.
Mining Amendment Regulation 2021 Clause 11 Schedule 8A	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.

11.2 Implementation

Table 11.2 defines the personnel who are responsible for the monitoring, review and implementation of this RMP.

Table 11.2 Responsibilities for the Implementation of this RMP

Position	Responsibility
Operations Manager	Implement the procedures referenced in this RMP Undertake training in relevant Management Plans and procedures as required Provide resources required and support to implement these procedures Implement the procedures referenced in this RMP Develop mine plans to allow for progressive rehabilitation of mined land.
Environment and Community Manager	Implement, monitor and review the programs and procedures linked to this RMP Consult with regulatory authorities as required Undertake monitoring as required Undertake maintenance as required Provide measures for continual improvement to this RMP and procedures Ensure all personnel undertaking works in relation to this RMP are trained and competent Report the progress of any rehabilitation and monitoring of biodiversity in the Annual Review Undertake site-based actions to implement this RMP in cooperation with the Operations Manager Coordinate the development of Annual Rehabilitation Plans to guide rehabilitation activities Coordinate the completion of rehabilitation activities in accordance with this document Coordinate the development of the site rehabilitation objectives and closure criteria in consultation with key stakeholders Coordinate the rehabilitation monitoring program and an annual review of monitoring results to provide a continual improvement process for rehabilitation.
Technical Services Manager	Development of short, medium and long term mine plans. Coordinate survey of landform to verify conformance to design. Coordinate survey of completed rehabilitation areas for reporting.

The Rehabilitation Risk Assessment (refer **Section 3**) identified a lack of clearly defined responsibilities as a medium risk to rehabilitation. This section of the RMP addresses that risk, in addition to the following:

- Engaging suitably qualified contractors / practitioners to undertake rehabilitation;
- Engaging suitably qualified consultants / practitioners for design assessment / monitoring of rehab;
- Position descriptions;
- Competencies with operator, including responsibilities for rehab; and
- Quality Control and Supervision of Rehab Contractors.

11.3 Reporting

Mangoola prepare an Annual Review, which reports on the environmental performance of Mangoola, in accordance with:

- Part D, Condition D11 of SSD5862
- The NSW Government Annual Review Guideline (October 2015)
- Mining Lease 1626 (ML 1626)
- Mining Lease 1747 (ML 1747)
- Mining Lease 1817 (ML 1817)
- Mining Lease 1815 (ML 1815)
- Outcomes from Annual Review feedback and inspection.

11.4 References

Glencore Coal Assets Australia (GCAA) Rehabilitation Monitoring Procedure

Landloch Pty Ltd (2011) Development of recommendations for the Mangoola Waste Landform prepared by Landloch Pty Ltd on behalf of Mangoola Coal

NSW Resources Regulator Rehabilitation Management Plan for Large Mines (2021) Form and Way, and associated Guidelines and Factsheets

NSW Government Department of Planning and Infrastructure (2021) Development Approval State Significant Development 8642 (April 2021)

Mangoola Open Cut Aboriginal Cultural Heritage Management Plan

Mangoola Open Cut Biodiversity Offset Management Plan and Strategy

Mangoola Open Cut Bioremediation Procedure

Mangoola Open Cut Bushfire Management Plan

Mangoola Open Cut Environmental Management System

Mangoola Open Cut Ground Disturbance Permit

Mangoola Open Cut Historic Heritage Management Plan

Mangoola Open Cut Hydrocarbon Management Plan

Mangoola Open Cut Pre-Clearing Procedure

Mangoola Open Cut Site Water Management Plan

Mangoola Open Cut Spontaneous Combustion Principal Hazard Management Plan

Mangoola Open Cut Waste Management Plan

Mining Act 1992 NSW Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021

Umwelt (Australia) Pty Limited (2019). Mangoola Coal Continued Operations Project Environmental Impact Statement (and associated appendices). Prepared for Mangoola Coal Operations Pty Limited.

12. Part 12 – Supporting Appendices

Appendix A - Land Ownership

Table A1 – Land Ownership within the Project Boundary as depicted on Figure 1E

LOT//DP	TITLE OWNER	LOT//DP	TITLE OWNER
24//8090	Mangoola Coal Operations Pty Limited	1//744314	Mangoola Coal Operations Pty Limited
14//112946	Mangoola Coal Operations Pty Limited	1//995693	Mangoola Coal Operations Pty Limited
13//112946	Mangoola Coal Operations Pty Limited	40//750968	Mangoola Coal Operations Pty Limited
13//1166900	Mangoola Coal Operations Pty Limited	52//750969	Mangoola Coal Operations Pty Limited
4//1168210	Mangoola Coal Operations Pty Limited	122//811176	Mangoola Coal Operations Pty Limited
71//750924	Mangoola Coal Operations Pty Limited	45//750968	Mangoola Coal Operations Pty Limited
2//593485	Mangoola Coal Operations Pty Limited	123//811176	Mangoola Coal Operations Pty Limited
69//750924	Mangoola Coal Operations Pty Limited	7//260132	Mangoola Coal Operations Pty Limited
77//750924	Mangoola Coal Operations Pty Limited	1//121350	Mangoola Coal Operations Pty Limited
76//750924	Mangoola Coal Operations Pty Limited	204//750968	Mangoola Coal Operations Pty Limited
70//750924	Mangoola Coal Operations Pty Limited	64//750924	Mangoola Coal Operations Pty Limited
68//750924	Mangoola Coal Operations Pty Limited	178//750924	Mangoola Coal Operations Pty Limited
160//750968	Mangoola Coal Operations Pty Limited	503//521969	Mangoola Coal Operations Pty Limited
12//1152682	Mangoola Coal Operations Pty Limited	11//655757	Mangoola Coal Operations Pty Limited
36//1183354	Mangoola Coal Operations Pty Limited	190//750968	Mangoola Coal Operations Pty Limited
3//1193998	Mangoola Coal Operations Pty Limited	194//750968	Mangoola Coal Operations Pty Limited
1//1193998	Mangoola Coal Operations Pty Limited	154//750968	Mangoola Coal Operations Pty Limited
7//252956	Mangoola Coal Operations Pty Limited	12//594674	Mangoola Coal Operations Pty Limited
12//240086	Mangoola Coal Operations Pty Limited	2170//706389	Mangoola Coal Operations Pty Limited
22//8090	Mangoola Coal Operations Pty Limited	227//750968	Mangoola Coal Operations Pty Limited
22//8090	Mangoola Coal Operations Pty Limited	4//587737	Mangoola Coal Operations Pty Limited
14//1166900	Mangoola Coal Operations Pty Limited	212//750968	Mangoola Coal Operations Pty Limited
15//1166900	Mangoola Coal Operations Pty Limited	5//113745	Mangoola Coal Operations Pty Limited
1//954072	Mangoola Coal Operations Pty Limited	39//750968	Mangoola Coal Operations Pty Limited
256//706955	Mangoola Coal Operations Pty Limited	188//750924	Mangoola Coal Operations Pty Limited
7//1152687	Mangoola Coal Operations Pty Limited	230//869334	Mangoola Coal Operations Pty Limited
24//1108520	Mangoola Coal Operations Pty Limited	1//910116	Mangoola Coal Operations Pty Limited
216//750968	Mangoola Coal Operations Pty Limited	187//750924	Mangoola Coal Operations Pty Limited
218//750968	Mangoola Coal Operations Pty Limited	41//750968	Mangoola Coal Operations Pty Limited
12//112946	Mangoola Coal Operations Pty Limited	66//750924	Mangoola Coal Operations Pty Limited
2//1168210	Mangoola Coal Operations Pty Limited	2//1003300	Mangoola Coal Operations Pty Limited
2//1113504	Mangoola Coal Operations Pty Limited	11//112946	Mangoola Coal Operations Pty Limited
1//1168210	Mangoola Coal Operations Pty Limited	89//818690	Mangoola Coal Operations Pty Limited
18//996754	Mangoola Coal Operations Pty Limited	72//631197	Mangoola Coal Operations Pty Limited
100//1156069	Mangoola Coal Operations Pty Limited	59//750969	Mangoola Coal Operations Pty Limited
1//1003300	Mangoola Coal Operations Pty Limited	60//750968	Mangoola Coal Operations Pty Limited
23//1108520	Mangoola Coal Operations Pty Limited	3//240086	Mangoola Coal Operations Pty Limited
41//850807	Mangoola Coal Operations Pty Limited	123//750968	Mangoola Coal Operations Pty Limited
123//869335	Mangoola Coal Operations Pty Limited	219//750968	Mangoola Coal Operations Pty Limited
3//1168210	Mangoola Coal Operations Pty Limited	4//240086	Mangoola Coal Operations Pty Limited

LOT//DP	TITLE OWNER	LOT//DP	TITLE OWNER
3//1193978	Mangoola Coal Operations Pty Limited	18//750969	Mangoola Coal Operations Pty Limited
11//842072	Mangoola Coal Operations Pty Limited	151//750968	Mangoola Coal Operations Pty Limited
40//850807	Mangoola Coal Operations Pty Limited	21//8090	Mangoola Coal Operations Pty Limited
2//1193998	Mangoola Coal Operations Pty Limited	193//750968	Mangoola Coal Operations Pty Limited
257//706955	Mangoola Coal Operations Pty Limited	1//1010583	Mangoola Coal Operations Pty Limited
912//588390	Mangoola Coal Operations Pty Limited	502//521971	Mangoola Coal Operations Pty Limited
10//1152687	Mangoola Coal Operations Pty Limited	7//750969	Mangoola Coal Operations Pty Limited
6//1152687	Mangoola Coal Operations Pty Limited	189//750968	Mangoola Coal Operations Pty Limited
1//1152687	Mangoola Coal Operations Pty Limited	173//750968	Mangoola Coal Operations Pty Limited
195//750968	Mangoola Coal Operations Pty Limited	93//750968	Mangoola Coal Operations Pty Limited
5//1152687	Mangoola Coal Operations Pty Limited	21//228209	Mangoola Coal Operations Pty Limited
8//1152687	Mangoola Coal Operations Pty Limited	2//567385	Mangoola Coal Operations Pty Limited
183//750924	Mangoola Coal Operations Pty Limited	205//750968	Mangoola Coal Operations Pty Limited
3//1152687	Mangoola Coal Operations Pty Limited	97//750968	Mangoola Coal Operations Pty Limited
1//1178289	Mangoola Coal Operations Pty Limited	8//240086	Mangoola Coal Operations Pty Limited
185//750924	Mangoola Coal Operations Pty Limited	1594//809469	Mangoola Coal Operations Pty Limited
184//750924	Mangoola Coal Operations Pty Limited	41//805505	Mangoola Coal Operations Pty Limited
11//1152683	Mangoola Coal Operations Pty Limited	11//577026	Mangoola Coal Operations Pty Limited
3//556410	Mangoola Coal Operations Pty Limited	657//633417	Mangoola Coal Operations Pty Limited
1//1113504	Mangoola Coal Operations Pty Limited	653//263080	Mangoola Coal Operations Pty Limited
7004//93189	Mangoola Coal Operations Pty Limited	1//845723	Mangoola Coal Operations Pty Limited
229//726283	Mangoola Coal Operations Pty Limited	201//706571	Mangoola Coal Operations Pty Limited
892//590976	Mangoola Coal Operations Pty Limited	1//950763	Mangoola Coal Operations Pty Limited
4//1152687	Mangoola Coal Operations Pty Limited	4//845723	Mangoola Coal Operations Pty Limited
2//1152687	Mangoola Coal Operations Pty Limited	633//748470	Mangoola Coal Operations Pty Limited
9//1152687	Mangoola Coal Operations Pty Limited	31//735121	Mangoola Coal Operations Pty Limited
176//750915	Mangoola Coal Operations Pty Limited	656//633417	Mangoola Coal Operations Pty Limited
193//750915	Mangoola Coal Operations Pty Limited	1//727239	Mangoola Coal Operations Pty Limited
14//750915	Mangoola Coal Operations Pty Limited	21//622786	Mangoola Coal Operations Pty Limited
23//240086	Mangoola Coal Operations Pty Limited	652//263080	Mangoola Coal Operations Pty Limited
10//240086	Mangoola Coal Operations Pty Limited	20//711164	Mangoola Coal Operations Pty Limited
11//805364	Mangoola Coal Operations Pty Limited	101//805458	Mangoola Coal Operations Pty Limited
2//555166	Mangoola Coal Operations Pty Limited	112//531273	Mangoola Coal Operations Pty Limited
13//577026	Mangoola Coal Operations Pty Limited	42//531030	Mangoola Coal Operations Pty Limited
9//240086	Mangoola Coal Operations Pty Limited	162//750968	Mangoola Coal Operations Pty Limited
71//631197	Mangoola Coal Operations Pty Limited	225//750968	Mangoola Coal Operations Pty Limited
3//845723	Mangoola Coal Operations Pty Limited	19//240086	Mangoola Coal Operations Pty Limited
51//750969	Mangoola Coal Operations Pty Limited	659//633417	Mangoola Coal Operations Pty Limited
179//750924	Mangoola Coal Operations Pty Limited	100//805458	Mangoola Coal Operations Pty Limited
6//750969	Mangoola Coal Operations Pty Limited	42//805505	Mangoola Coal Operations Pty Limited
63//750969	Mangoola Coal Operations Pty Limited	144//750968	Mangoola Coal Operations Pty Limited
79//750969	Mangoola Coal Operations Pty Limited	121//585122	Mangoola Coal Operations Pty Limited
651//263080	Mangoola Coal Operations Pty Limited	5//845723	Mangoola Coal Operations Pty Limited
12//1043996	Mangoola Coal Operations Pty Limited	1//1014899	Mangoola Coal Operations Pty Limited
5//240086	Mangoola Coal Operations Pty Limited	12//230283	Mangoola Coal Operations Pty Limited

LOT//DP	TITLE OWNER	LOT//DP	TITLE OWNER
21//706943	Mangoola Coal Operations Pty Limited	22//622786	Mangoola Coal Operations Pty Limited
4//555166	Mangoola Coal Operations Pty Limited	163//750968	Mangoola Coal Operations Pty Limited
101//1111213	Mangoola Coal Operations Pty Limited	3//7590	Mangoola Coal Operations Pty Limited
121//811176	Mangoola Coal Operations Pty Limited	658//633417	Mangoola Coal Operations Pty Limited
22//706943	Mangoola Coal Operations Pty Limited	111//531273	Mangoola Coal Operations Pty Limited
49//750968	Mangoola Coal Operations Pty Limited	23//622786	Mangoola Coal Operations Pty Limited
1//814437	Mangoola Coal Operations Pty Limited	634//748470	Mangoola Coal Operations Pty Limited
210//750968	Mangoola Coal Operations Pty Limited	215//750968	Mangoola Coal Operations Pty Limited
6//260132	Mangoola Coal Operations Pty Limited	41//531030	Mangoola Coal Operations Pty Limited
3//260132	Mangoola Coal Operations Pty Limited	1593//809469	Mangoola Coal Operations Pty Limited
46//750968	Mangoola Coal Operations Pty Limited	1//260132	Mangoola Coal Operations Pty Limited
42//750968	Mangoola Coal Operations Pty Limited	165//750968	Mangoola Coal Operations Pty Limited
209//750968	Mangoola Coal Operations Pty Limited	17//240086	Mangoola Coal Operations Pty Limited
3//845915	Mangoola Coal Operations Pty Limited	32//735121	Mangoola Coal Operations Pty Limited
2//260132	Mangoola Coal Operations Pty Limited	88//750968	Mangoola Coal Operations Pty Limited
196//750968	Mangoola Coal Operations Pty Limited	198//750968	Mangoola Coal Operations Pty Limited
191//750968	Mangoola Coal Operations Pty Limited	18//240086	Mangoola Coal Operations Pty Limited
36//750924	Mangoola Coal Operations Pty Limited	129//750968	Mangoola Coal Operations Pty Limited
181//750924	Mangoola Coal Operations Pty Limited	62//750968	Mangoola Coal Operations Pty Limited
2//862989	Mangoola Coal Operations Pty Limited	120//750968	Mangoola Coal Operations Pty Limited
1//862989	Mangoola Coal Operations Pty Limited	16//240086	Mangoola Coal Operations Pty Limited
2//845915	Mangoola Coal Operations Pty Limited	21//711164	Mangoola Coal Operations Pty Limited
11//594674	Mangoola Coal Operations Pty Limited	655//263080	Mangoola Coal Operations Pty Limited
2171//706389	Mangoola Coal Operations Pty Limited	654//263080	Mangoola Coal Operations Pty Limited
63//750924	Mangoola Coal Operations Pty Limited	14//240086	Mangoola Coal Operations Pty Limited
1//571113	Mangoola Coal Operations Pty Limited	15//240086	Mangoola Coal Operations Pty Limited
1//845915	Mangoola Coal Operations Pty Limited	13//240086	Mangoola Coal Operations Pty Limited
199//750968	Mangoola Coal Operations Pty Limited	22//240086	Mangoola Coal Operations Pty Limited
177//750968	Mangoola Coal Operations Pty Limited	21//240086	Mangoola Coal Operations Pty Limited
1//360377	Mangoola Coal Operations Pty Limited	911//588390	Mangoola Coal Operations Pty Limited
67//750924	Mangoola Coal Operations Pty Limited	20//240086	Mangoola Coal Operations Pty Limited
192//750968	Mangoola Coal Operations Pty Limited	32//750968	Mangoola Coal Operations Pty Limited
211//750968	Mangoola Coal Operations Pty Limited	24//240086	Mangoola Coal Operations Pty Limited
43//750969	Mangoola Coal Operations Pty Limited	4//729944	Mangoola Coal Operations Pty Limited
10//805364	Mangoola Coal Operations Pty Limited	5//729944	Mangoola Coal Operations Pty Limited
144//750924	Mangoola Coal Operations Pty Limited	61//833005	Mangoola Coal Operations Pty Limited
501//521971	Mangoola Coal Operations Pty Limited	11//240086	Mangoola Coal Operations Pty Limited
155//750968	Mangoola Coal Operations Pty Limited	25//240086	Mangoola Coal Operations Pty Limited
2//250876	Mangoola Coal Operations Pty Limited	60//750969	Mangoola Coal Operations Pty Limited
2//113744	Mangoola Coal Operations Pty Limited	153//750969	Mangoola Coal Operations Pty Limited
19//650541	Mangoola Coal Operations Pty Limited	6//240086	Mangoola Coal Operations Pty Limited
62//833005	Mangoola Coal Operations Pty Limited	95//750968	Mangoola Coal Operations Pty Limited
1//250876	Mangoola Coal Operations Pty Limited	94//750968	Mangoola Coal Operations Pty Limited
65//750924	Mangoola Coal Operations Pty Limited	31//848496	Mangoola Coal Operations Pty Limited
156//750968	Mangoola Coal Operations Pty Limited	186//750924	Mangoola Coal Operations Pty Limited

Appendix B - Regulatory Requirements for Rehabilitation

Requirement/Condition	Specific Area/Domain Requirement Applies to	Timing	Where addressed in RMP
Development Approval SSD 8642			
A22. Evidence of Consultation Where conditions of this consent require consultation with an identified party, the Applicant must: (a) Consult with the relevant party prior to submitting the subject document: and	Entire site	During preparation and revision of RMP	Section 4.2 Appendix D
(b) Provide details of the consultation undertaken to the Department, including: (i) The outcome of that consultation, matters resolved and unresolved; and (ii) Details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	Entire site	During preparation and revision of RMP	Section 4.2 Appendix D
B85. Rehabilitation Objectives The Applicant must rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the development under the <i>Mining Act 1992</i> . This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the documents listed in condition A2(c) and shown in Appendix 9, and must comply with the objectives in Table 9.	Entire site	Ongoing	Section 4 Appendix E
B86. Rehabilitation Objectives The Rehabilitation and Mine Closure objectives in Table 9 apply to the entire site, including all landforms constructed under either this consent or previous consents. However, the Applicant is not required to undertake any additional earthmoving works on landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable, non-polluting and free-draining landform.	Entire site	Ongoing	Section 4 Appendix E

Requirement/Condition	Specific Area/Domain Requirement Applies to	Timing	Where addressed in RMP
B87. Progressive Rehabilitation The Applicant must rehabilitate^a the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable steps must be taken to minimise the total area exposed at any time. Interim stabilisation and temporary revegetation strategies must be employed when areas prone to dust generation, soil erosion and weed incursion cannot be permanently rehabilitated. ^athis condition does not prevent further disturbance at some later stage of the development of areas that have been rehabilitated.	Entire site	Ongoing	Section 6.1
B91. Rehabilitation Management Plan The applicant must prepare a Rehabilitation Management Plan for the development in accordance with the conditions imposed on the mining lease(s) associated with the development under the <i>Mining Act 1992</i>. This plan must:	Entire site	Submission of completion criteria and rehabilitation objectives to NSW RR	This plan
a) Be prepared in consultation with the Department and the Council;			Section 4.2 Appendix D
b) Be prepared in accordance with any relevant Resources Regulator Guidelines;			Section 1
c) Include detailed performance indicators and completion criteria for each rehabilitation domain, and triggers and remedial actions;			Section 4 Appendix E
d) Include an overview of the identified risks to achieving successful rehabilitation;			Section 3
e) Describe the measures to be implemented on the site to achieve Rehabilitation and Mine Closure Objectives in Table 9, the requirements of the Rehabilitation Strategy referred to in condition B88 and the criteria in paragraph (c);			Section 6
f) Include a program to monitor, independently audit and report on the progress against the criteria in paragraph (c) and the effectiveness of the measures in paragraph (d);			Sections 7, 8 and 11
g) Describe any further studies, work, research or consultation that will be undertaken to expand the site specific rehabilitation knowledge base, reduce uncertainty and improve rehabilitation outcomes; and			Section 9

Requirement/Condition	Specific Area/Domain Requirement Applies to	Timing	Where addressed in RMP
h) Outline intervention and adaptive management techniques to ensure rehabilitation remains on the trajectory if achieving Rehabilitation and Mine Closure Objectives, Rehabilitation Completion Criteria and the Final Landform in the Rehabilitation Management Plan as soon as reasonably practical.			Section 10
D5. Management Plan Requirements Management plans required under this consent must be prepared in accordance with relevant guidelines, and include; a) Summary of relevant background or baseline data;	Entire site	Ongoing	Sections 1 and 8
b) Details of: i) The relevant statutory requirements (including any relevant approval; licence or lease conditions) ii) Any relevant limits or performance measures and criteria; and iii) The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Entire site	Ongoing	Section 1.2 Section 2.1 Section 8
c) Any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	N/A	Ongoing	Section 1 Appendix B -
d) A description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Entire site	Ongoing	Section 6
e) A program to monitor and report on the: i) Impacts and environmental performance of the development; and ii) Effectiveness of the management measures set out pursuant to condition D4(c);	Entire site	Various	Section 8
f) A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below the relevant impact assessment criteria as quickly as possible;	Entire site	Ongoing	Section 10
g) A program to investigate and implement ways to improve the environmental performance of the development over time;	Entire site	Ongoing	Sections 8 and 10

Requirement/Condition	Specific Area/Domain Requirement Applies to	Timing	Where addressed in RMP
h) A protocol for managing and reporting any: i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion ii) complaint; or iii) failure to comply with other statutory requirements	Entire site	Ongoing	Section 10
i) public sources of information and data to assist stakeholders in understanding the environmental impacts of the development; and	N/A	N/A	Mangoola Website
j) a protocol for periodic review of the plan. Note: the Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for the particular management plan.	N/A	Various	Section 11
D6. Management Plan Requirements The Applicant must ensure that management plans prepared for the development are consistent with the conditions of this consent and any EPL issued for the site.	N/A	Ongoing	Appendix B -EPL – Does not Contain specific Rehabilitation Conditions
EIS 2019 Environmental Management and Monitoring Measures			
Mangoola will implement a natural landform approach to the design and development of the final landform, outside of the final void areas. The final landform will be designed to: – be safe, stable and non-polluting – incorporate natural landform design features (i.e. micro relief) – incorporate drainage lines consistent with topography and natural drainage where reasonable and feasible – sustain the intended land use for the post-mining domains – minimise the visual impacts of the development – be in keeping with the natural terrain features of the area	Entire site	LOM	Section 5
Mangoola will progressively rehabilitate disturbed areas over the life of the MCCO Project	Entire site	Ongoing	Section 6
Mangoola will use temporary revegetation (predominantly fast growing grass species) on unshaped overburden areas and other disturbed areas that are planned to be inactive for prolonged periods	Entire site	Ongoing	Section 6

Requirement/Condition	Specific Area/Domain Requirement Applies to	Timing	Where addressed in RMP
Mangoola will undertake topsoil handling in accordance with the topsoil stockpile handling strategy detailed in the existing MOP	Entire site	Ongoing	Section 6.2
Mangoola will develop and implement a management approach to address any areas of potential acid forming materials that may be identified as part of the MCCO Project	Entire site	N/A as not issue at Mangoola	Section 6.2
The revegetation strategy for the MCCO Additional Project Area will include: – ecological rehabilitation consisting of native vegetation communities (as required to meet the needs of the biodiversity offset strategy) – open woodland vegetation and native grassland that contain flora species assemblages characteristic of the dominant vegetation communities impacted by the MCCO Project or known as remnant community type prior to clearance for agriculture	Entire site	Ongoing	Sections 6.1 and 6.2
Mangoola will undertake a rehabilitation monitoring program and use the findings to seek to continually improve rehabilitation outcomes	Rehabilitation areas, BOAs	Ongoing	Section 8
The closure and rehabilitation completion criteria outlined in the existing MOP will be reviewed and updated to incorporate the MCCO Additional Project Area.	Entire site	As required	Section 4
A Conceptual Closure Plan will be developed as part of the implementation of the MCCO Project and will be incorporated into the MOP/Rehabilitation Management Plan and will be developed in consideration of the approach outlined in this EIS, subject to requirements of the Project approval conditions	N/A	N/A	Section 6.1 Conceptual Closure Plan has been developed as a separate document.
Mangoola commits to continue to investigate potentially feasible final void options during the life of the Project as part of preparing a detailed final landform and final void strategy for the Project. This strategy would be prepared as part of the initial MOP for the MCCO Project and then updated over the life of the MCCO Project so that it is responsive to any changes in the mining operation	N/A	N/A	FLRP Any further updates to the final landform are to be included in subsequent revisions
A detailed mine closure plan will commence at least five years prior to the anticipated mine closure date (e.g. cessation of mining) with the closure plan being finalised at least two years prior to this date	Entire site	N/A	Internal mine closure planning has commenced.

Requirement/Condition	Specific Area/Domain Requirement Applies to	Timing	Where addressed in RMP
A Final Void Management Plan will be developed and included in the Final Closure Plan.	Entire site	N/A	Internal mine closure planning has commenced.
Mangoola commits to further investigating supplementary post mining land uses, including potential uses for the final voids, as part of developing the detailed closure plan for the mine.	Entire site	N/A	Internal mine closure planning has commenced.
Mangoola will prepare a Final Land Use Strategy for the Mangoola Coal Mine as part of the mine closure plan.	Entire site	N/A	Internal mine closure planning has commenced.

Appendix C - Standard Mining Lease Conditions

Standard Conditions under Mining Regulation 2016, Schedule 8A, Part 2.		
No.	Condition	Reference
Division 1 - Protection of the environment and rehabilitation		
4	Must prevent or minimise harm to environment (1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease. (2) In this clause-- "harm" to the environment has the same meaning as in the Protection of the Environment Operations Act 1997.	Section 6
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.	Section 6
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.	Section 2
Division 2- Risk Assessment		
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.	Section 3

Standard Conditions under Mining Regulation 2016, Schedule 8A, Part 2.		
No.	Condition	Reference
Division 3 - Rehabilitation Documents		
8	Application of Division This Division does not apply to a mining lease unless-- (a) the security deposit required under the mining lease is greater than the minimum deposit prescribed under the Act, section 261BF in relation to that type of mining lease, or (b) the Secretary gives a written direction to the holder of the mining lease that this Division, or a provision of this Division, applies to the mining lease.	Section 2.1
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.	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-- (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.	This document
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.	Section 11.1
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.	Section 4 FLRP (Section 5)

No.	Standard Conditions under Mining Regulation 2016, Schedule 8A, Part 2. Condition	Reference
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, (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.	Addressed in the Annual Rehabilitation Report and Forward Program (available on the Mangoola website)
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.	Section 11.1

No.	Standard Conditions under Mining Regulation 2016, Schedule 8A, Part 2. Condition	Reference
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 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 (ii) at a later date approved by the Secretary.	Noted
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 (iii) 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.	Mangoola Coal Website

Standard Conditions under Mining Regulation 2016, Schedule 8A, Part 2.		
No.	Condition	Reference
Division 4 - Records, Reporting and Notification		
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.	Section 7 Section 11
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 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.	Section 11.3
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.	Noted
Division 5 - Applications relating to development consent		
20	Additional requirements--application for or to modify development consent (1) The holder of a mining lease must give written notice to the Secretary within 10 days after-- (a) making an application for development consent that relates to the mining area, or (b) making an application for modification of a development consent-- (i) under the Environmental Planning and Assessment Act 1979 , section 4.55(2), and (ii) that proposes to modify a condition of the consent that relates to rehabilitation of the mining area in a way that may affect an obligation under the mining lease relating to rehabilitation of the mining area. (2) This clause does not apply if the development is State significant development.	Noted

Appendix D - Stakeholder Consultation

Stakeholder	Consultation Activities and form of Consultation	Matters Subject to Consultation	Actions Arising from consultation
Muswellbrook Shire Council (MSC)	Submission of an electronic copy of Version 1 of this RMP to MSC via email for comment (3 September 2021).	The development of this RMP in accordance with the requirements of Condition B91 of Schedule 2 of SSD 8642.	No feedback received.
	Provision of draft RMP Version 3 for consultation (November 2025)	Updates to draft RMP Version 3 to reflect approved FLRP and ROBJs	To be completed following consultation feedback.
Department of Planning, Housing and Infrastructure (DPHI)	Submission of an electronic copy of Version 1 of the RMP to (then) DPIE via the Planning Portal for comment prior to finalisation.	The development of the RMP in accordance with the requirements of Condition B91 of Schedule 2 of SSD862.	- DPIE requested future review and any necessary revisions of the RMP to be undertaken following development and approval of the Rehabilitation Strategy. This action is completed. - DPIE requested inclusion of relevant units of measure in Table 6.3. This action is completed.
	Letter from DPHI to Mangoola dated 29/10/2024	Approval to undertake the 2024 update to the RMP (Version 2) without consultation due to the minor administrative nature of the updates.	Nil
	Letter from DPHI to Mangoola dated 14/01/2025	Approval of the RMP version 2	Nil
	Provision of draft RMP Version 3 for consultation (November 2025)	Updates to draft RMP Version 3 to reflect approved FLRP and ROBJs	To be completed following consultation feedback.
Resources Regulator	Approval of the FLRP and ROBJs (December 2023)	Final landform, rehabilitation objectives	Nil
	Targeted Assessment Program (TAP) 12/11/2024	Inspection to assess revegetation	Follow up letter (refer below line item)

Stakeholder	Consultation Activities and form of Consultation	Matters Subject to Consultation	Actions Arising from consultation
	TAP Letter dated 17/03/2025	Letter outlining requested actions arising from the TAP inspection	Requested updates to the Rehabilitation Risk Assessment and RMP. These have been completed.
	MS Teams meeting 08/09/2025	Meeting to discuss the updates to the ROBJs and FLRP	Request to use spatial code K (other) for the 500kV powerline easement. The FLRP and ROBJs were updated to reflect this.
	Approval of the FLRP and ROBJs (October 2025)	Final landform, rehabilitation objectives	Nil

Appendix E - Rehabilitation Objectives and Completion Criteria

Resources Regulator

Department of Primary Industries and Regional Development



ROBJ0001545

Approved rehabilitation objectives statement

Mangoola Coal Mine

28 October 2025

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Application summary

Detail	Approval
Reference	ROBJ0001545
Date of decision	28 October 2025
Mine	Mangoola Coal Mine
Contact	Brooke York
Nominated contact person	Jacob Hundertmark

Important note

While every effort is being made to ensure that documents hosted by the Resources Regulator are WCAG 2.0 Level AA compliant, we acknowledge that not all resources have achieved this. If you require this document in an alternative format, please email industry.engagement@regional.nsw.gov.au

The Resources Regulator may make the information in your application and any supporting information (including this report) available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your application to be confidential, please communicate this to the Resources Regulator via the message function on this application within the Portal.

Rehabilitation Objectives

The following rehabilitation objectives have been approved. Please note the table below will also include any previously approved rehabilitation objectives.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038941	Native Ecosystem	Infrastructure Area	A1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0038960	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0038962	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	Riparian Habitat is established in any diverted and/or re-established creek lines and retained water features.
ROB0038946	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038947	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Grassland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038948	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Ironbark Woodland Complex) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038949	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Paperbark Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038950	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Slaty Box Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038951	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Spotted Gum Open Forest) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038952	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Weeping Myall Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038953	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038954	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Grassland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038955	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Ironbark Woodland Complex) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038956	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Paperbark Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038957	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Slaty Box Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038958	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Spotted Gum Open Forest) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038959	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Weeping Myall Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038983	Native Ecosystem	Infrastructure Area	A1	Ecological rehabilitation	Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038944	Native Ecosystem	Infrastructure Area	A1	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.
ROB0038945	Native Ecosystem	Infrastructure Area	A1	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment
ROB0038936	Native Ecosystem	Infrastructure Area	A1	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0038940	Native Ecosystem	Infrastructure Area	A1	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0038961	Native Ecosystem	Infrastructure Area	A1	Landform stability	Landform designs incorporates relief patterns and design principals consistent with natural drainage that mimic natural topography and mitigate erosion. Designed to maximise surface water drainage to the natural environment
ROB0038939	Native Ecosystem	Infrastructure Area	A1	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038938	Native Ecosystem	Infrastructure Area	A1	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
ROB0038937	Native Ecosystem	Infrastructure Area	A1	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 land use.
ROB0038934	Native Ecosystem	Infrastructure Area	A1	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.
ROB0038978	Native Ecosystem	Infrastructure Area	A1	Retention of infrastructure	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).
ROB0038935	Native Ecosystem	Infrastructure Area	A1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
ROB0038942	Native Ecosystem	Infrastructure Area	A1	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.
ROB0038943	Native Ecosystem	Infrastructure Area	A1	Water approvals	Structures that take water are appropriately licensed.
ROB0038895	Native Ecosystem	Tailings Storage Facility	A2	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0038891	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0038877	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038878	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Grassland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038879	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Ironbark Woodland Complex) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038880	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Paperbark Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038881	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Slaty Box Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038882	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Spotted Gum Open Forest) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038883	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation composition of the rehabilitation (Weeping Myall Woodland) is recognisable as the target vegetation community in

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
					accordance with Appendix 9 of SSD-8642.
ROB0038884	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038885	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Grassland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038886	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Ironbark Woodland Complex) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038887	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Paperbark Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038888	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Slaty Box Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038889	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Spotted Gum Open Forest) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038890	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	The vegetation structure of the rehabilitation (Weeping Myall Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038984	Native Ecosystem	Tailings Storage Facility	A2	Ecological rehabilitation	Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.
ROB0038903	Native Ecosystem	Tailings Storage Facility	A2	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.
ROB0038902	Native Ecosystem	Tailings Storage Facility	A2	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment
ROB0038892	Native Ecosystem	Tailings Storage Facility	A2	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0038896	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0038904	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038893	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038894	Native Ecosystem	Tailings Storage Facility	A2	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
ROB0038897	Native Ecosystem	Tailings Storage Facility	A2	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 land use.
ROB0038898	Native Ecosystem	Tailings Storage Facility	A2	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.
ROB0038979	Native Ecosystem	Tailings Storage Facility	A2	Retention of infrastructure	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).
ROB0038899	Native Ecosystem	Tailings Storage Facility	A2	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
ROB0038900	Native Ecosystem	Tailings Storage Facility	A2	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038901	Native Ecosystem	Tailings Storage Facility	A2	Water approvals	Structures that take water are appropriately licensed.
ROB0038855	Native Ecosystem	Water Management Area	A3	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0038874	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0038876	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	Riparian Habitat is established in any diverted and/or re-established creek lines and retained water features.
ROB0038860	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038861	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Grassland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038862	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Ironbark Woodland Complex) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038863	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Paperbark Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038864	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Slaty Box Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038865	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Spotted Gum Open Forest) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038866	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation composition of the rehabilitation (Weeping Myall Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038867	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038868	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Grassland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038869	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Ironbark Woodland Complex) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038870	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Paperbark Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038871	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Slaty Box Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038872	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Spotted Gum Open Forest) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038873	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	The vegetation structure of the rehabilitation (Weeping Myall Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038985	Native Ecosystem	Water Management Area	A3	Ecological rehabilitation	Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038859	Native Ecosystem	Water Management Area	A3	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.
ROB0038858	Native Ecosystem	Water Management Area	A3	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment
ROB0038850	Native Ecosystem	Water Management Area	A3	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0038854	Native Ecosystem	Water Management Area	A3	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0038875	Native Ecosystem	Water Management Area	A3	Landform stability	Landform designs incorporates relief patterns and design principals consistent with natural drainage that mimic natural topography and mitigate erosion. Designed to maximise surface water drainage to the natural environment
ROB0038853	Native Ecosystem	Water Management Area	A3	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038852	Native Ecosystem	Water Management Area	A3	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
ROB0038851	Native Ecosystem	Water Management Area	A3	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 land use.
ROB0038848	Native Ecosystem	Water Management Area	A3	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.
ROB0038980	Native Ecosystem	Water Management Area	A3	Retention of infrastructure	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).
ROB0038849	Native Ecosystem	Water Management Area	A3	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
ROB0038856	Native Ecosystem	Water Management Area	A3	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.
ROB0038857	Native Ecosystem	Water Management Area	A3	Water approvals	Structures that take water are appropriately licensed.
ROB0038912	Native Ecosystem	Overburden Emplacement Area	A4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0038931	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0038933	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	Riparian Habitat is established in any diverted and/or re-established creek lines and retained water features.
ROB0038917	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038918	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Grassland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038919	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Ironbark Woodland Complex) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038920	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Paperbark Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038921	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Slaty Box Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038922	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Spotted Gum Open Forest) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038923	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Weeping Myall Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038924	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038925	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Grassland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038926	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Ironbark Woodland Complex) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038927	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Paperbark Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038928	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Slaty Box Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038929	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Spotted Gum Open Forest) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038930	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Weeping Myall Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0038986	Native Ecosystem	Overburden Emplacement Area	A4	Ecological rehabilitation	Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.
ROB0038915	Native Ecosystem	Overburden Emplacement Area	A4	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.
ROB0038916	Native Ecosystem	Overburden Emplacement Area	A4	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment
ROB0038907	Native Ecosystem	Overburden Emplacement Area	A4	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0038911	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0038932	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	Landform designs incorporates relief patterns and design principals consistent with natural drainage that mimic natural topography and mitigate erosion. Designed to maximise surface water drainage to the natural environment.
ROB0038910	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038909	Native Ecosystem	Overburden Emplacement Area	A4	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038908	Native Ecosystem	Overburden Emplacement Area	A4	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 land use.
ROB0038905	Native Ecosystem	Overburden Emplacement Area	A4	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.
ROB0038981	Native Ecosystem	Overburden Emplacement Area	A4	Retention of infrastructure	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).
ROB0038906	Native Ecosystem	Overburden Emplacement Area	A4	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
ROB0038913	Native Ecosystem	Overburden Emplacement Area	A4	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.
ROB0038914	Native Ecosystem	Overburden Emplacement Area	A4	Water approvals	Structures that take water are appropriately licensed.
ROB0038995	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0039001	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0039002	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	Riparian Habitat is established in any diverted and/or re-established creek lines and retained water features.
ROB0039023	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation composition (Grassland) of the rehabilitation is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039025	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation composition (Ironbark Woodland Complex) of the rehabilitation is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039027	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation composition (Swamp Oak Forest) of the rehabilitation is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039021	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039022	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039024	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Grassland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039026	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Ironbark Woodland Complex) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039028	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	The vegetation structure of the rehabilitation (Swamp Oak Forest) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039003	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Ecological rehabilitation	Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.
ROB0038998	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038999	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment
ROB0038990	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0038994	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0039000	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Landform stability	Landform designs incorporates relief patterns and design principals consistent with natural drainage that mimic natural topography and mitigate erosion. Designed to maximise surface water drainage to the natural environment
ROB0038993	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038992	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
ROB0038991	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	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 land use.
ROB0038987	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.
ROB0038989	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Retention of infrastructure	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).
ROB0038988	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
ROB0038996	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.
ROB0038997	Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	Water approvals	Structures that take water are appropriately licensed.
ROB0039012	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0039017	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0039019	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	Riparian Habitat is established in any diverted and/or re-established creek lines and retained water features.
ROB0039031	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation composition (Grassland) of the rehabilitation is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039033	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation composition (Ironbark Woodland Complex) of the rehabilitation is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039035	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation composition (Swamp Oak Forest) of the rehabilitation is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039029	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation composition of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as the target vegetation community in accordance with Appendix 9 of SSD-8642.

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0039030	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Forest Redgum Riparian Woodland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039032	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Grassland) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039034	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Ironbark Woodland Complex) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039036	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	The vegetation structure of the rehabilitation (Swamp Oak Forest) is recognisable as, or is trending towards (based on ongoing monitoring data) the target vegetation community in accordance with Appendix 9 of SSD-8642.
ROB0039020	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Ecological rehabilitation	Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.
ROB0039015	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.
ROB0039016	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment
ROB0039007	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0039011	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0039018	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Landform stability	Landform designs incorporates relief patterns and design principals consistent with natural drainage that mimic natural topography and mitigate erosion. Designed to maximise surface water drainage to the natural environment.
ROB0039010	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0039009	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
ROB0039008	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	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 land use.
ROB0039004	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.
ROB0039006	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Retention of infrastructure	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).
ROB0039005	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.
ROB0039013	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.
ROB0039014	Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	D4	Water approvals	Structures that take water are appropriately licensed.
ROB0038975	Final Void	Active Mining Area (Open cut void)	J5	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation

Number	Final land use domain	Mining domain	Spatial ref	Rehabilitation objective Category	Rehabilitation objective
ROB0038977	Final Void	Active Mining Area (Open cut void)	J5	Groundwater	Designed to be long term groundwater sinks to limit the release of saline water into the surrounding environment. Optimised size and depth to ensure the final landform is stable and non-polluting.
ROB0038971	Final Void	Active Mining Area (Open cut void)	J5	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality.
ROB0038972	Final Void	Active Mining Area (Open cut void)	J5	Groundwater	Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment.
ROB0038965	Final Void	Active Mining Area (Open cut void)	J5	Land contamination	There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.
ROB0038974	Final Void	Active Mining Area (Open cut void)	J5	Landform stability	Landform design minimises post mining fugitive emissions from exposed coal seams
ROB0038969	Final Void	Active Mining Area (Open cut void)	J5	Landform stability	Landform design minimises the surface water flows and impacts on threatened Orchid species
ROB0038973	Final Void	Active Mining Area (Open cut void)	J5	Landform stability	Landform designs incorporates relief patterns and design principals consistent with natural drainage that mimic natural topography and mitigate erosion. Designed to maximise surface water drainage to the natural environment.
ROB0038968	Final Void	Active Mining Area (Open cut void)	J5	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0038967	Final Void	Active Mining Area (Open cut void)	J5	Landform stability	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.
ROB0038966	Final Void	Active Mining Area (Open cut void)	J5	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 land use.
ROB0038963	Final Void	Active Mining Area (Open cut void)	J5	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials
ROB0038982	Final Void	Active Mining Area (Open cut void)	J5	Retention of infrastructure	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).
ROB0038964	Final Void	Active Mining Area (Open cut void)	J5	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community
ROB0038976	Final Void	Active Mining Area (Open cut void)	J5	Surface water	Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land.
ROB0038970	Final Void	Active Mining Area (Open cut void)	J5	Water approvals	Structures that take water are appropriately licensed.
ROB0050728	Other - Infrastructure	Infrastructure Area	K1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.
ROB0050730	Other - Infrastructure	Infrastructure Area	K1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self sustainable.
ROB0050729	Other - Infrastructure	Infrastructure Area	K1	Ecological rehabilitation	The vegetation composition of the rehabilitation (Grassland) is recognisable as the target vegetation community.
ROB0050731	Other - Infrastructure	Infrastructure Area	K1	Landform stability	The final landform is integrated with the surrounding natural landforms and the other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.
ROB0050732	Other - Infrastructure	Infrastructure Area	K1	Removal of infrastructure	All infrastructure that is not to be used as part of the final land use is removed and rehabilitated to ensure the site is safe and free of hazardous materials.

POST MINING Land Use (FINAL LAND USE DOMAIN)	MINING DOMAIN	REHABILITATION OBJECTIVES	COMPLETION CRITERIA	PERFORMANCE INDICES	EXAMPLE OF JUSTIFICATION/ SOURCE / VALIDATION METHODS	Status at commencement of RMP
Native Ecosystem Rehabilitation Biodiversity Offset Area Other (Infrastructure)	Infrastructure Tailings Storage Facilities Water Management Areas Overburden Emplacement Area Void (Open Cut void)	<u>Infrastructure</u> All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials	Removal of all services (power, water, communications) that have been connected on the site as part of the operation	Infrastructure removed	Statement provided to confirm completion, utility service disconnection record	Nil services planned to be removed during RMP/FP period.
			All demolition work has been carried out in accordance with <i>Australian Standard AS 26011-2001: The Demolition of Structures</i> , or its latest version	Demolition of infrastructure	Demolition compliance certificates Records of removal/waste tracking	Nil removal planned during RMP period.
			Heritage obligations (e.g. development consent under the <i>Environmental Planning and Assessment Act 1979</i> , approvals under the <i>Heritage Act 1997</i> , etc) have been met (e.g. archival recording, building retention or building demolition with footings preserved)	Permits and approval documents issues, archival reports (where required) complete and submitted	Copy of any relevant approval documentation	
			Removal of all plant, equipment and associated infrastructure including processing facilities, stockpile areas, rail infrastructure and loading facilities, Wybong Road and Big Flat Creek haul road overpass, office complex, portable offices, exploration core samples, storage racks, samples.	Infrastructure removed	As-constructed final landform plan, photos etc. Records of removal	
			Removal of all footings or footings covered to an appropriate depth	Infrastructure removed	As-constructed final landform plan, photos etc. Records of removal	
			Removal of all water management infrastructure (including pumps, pipes and power)	Infrastructure removed	Statement provided and before/after photos	
			All drill cores have been removed and either taken to authorised storage or disposal location	Cores removed	Statement provided to confirm completion	
			Surveying and sealing of all drill holes and boreholes in accordance with departmental guidelines and relevant standards.	Sealing complete.	Engineering report/statement, plug and abandonment log, photos etc.	
Native Ecosystem Rehabilitation Biodiversity Offset Area	All Domains	<u>Infrastructure to Remain</u> All infrastructure that is to remain as part of the final land use is safe and agreed to by the Resources Regulator	Where applicable, necessary approvals are in place (e.g. development consent under the <i>Environmental Planning and Assessment Act 1979</i>) where buildings and infrastructure are to be retained as part of final land use.	Permits and approval documents issued.	Copy of any relevant approvals.	
			Potential hazards (e.g. electrical, mechanical) have been effectively isolated.	Hazards isolated	Statement provided to confirm completion	
			Access tracks that are to remain are in a trafficable condition that is suitable for their intended purposes.	Any required repairs or upgrades complete.	Copy of any relevant plans, photos etc.	

POST MINING Land Use (FINAL LAND USE DOMAIN)	MINING DOMAIN	REHABILITATION OBJECTIVES	COMPLETION CRITERIA	PERFORMANCE INDICES	EXAMPLE OF JUSTIFICATION/ SOURCE / VALIDATION METHODS	Status at commencement of RMP
			Heritage obligations as required under the <i>Environmental Planning and Assessment Act 1979, Heritage Act 1977</i> , etc. have been met (e.g. archival recording, building retention and restoration).	Permits and approval documents issued, archival reports (where required) complete and submitted.	Copy of any relevant approval documentation.	
			The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be safe for the intended final land use (to an engineering standard).	Engineering report/statement, photos etc.	
			If any underground pipelines or other infrastructure are to remain in situ, they do not pose a hazard for the intended final land use.	The location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig where this is required by the Council or the relevant authority.	Surveyed and marked on the as-constructed final landform plan. Copy of notification to or correspondence with local Council and Dial Before You Dig.	
			Ensure public safety	Remaining infrastructure is safe and secure from public access.	Records of fencing, access points etc.	
Native Ecosystem Rehabilitation Biodiversity Offset Area Other – Infrastructure	All Domains	<u>Land Contamination</u> There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Contamination will be appropriately remediated to a condition that does not pose a threat of environmental harm or constrain the final land use.	Contamination will be appropriately remediated so that appropriate guidelines for land use are met, e.g. Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999).	Contamination Remediation Report prepared by Land Contamination Consultant. Site Contamination Audit Report and Site Audit Statement prepared by EPA Accredited Auditor (where required).	
			Residual waste materials stored on site (e.g. tailings dams) will be appropriately contained/encapsulated so it doesn't pose any threat of environmental harm or constrain the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use and does not pose threat of environmental harm.	Engineered capping design with specifications	
		<u>Landform Stability</u> The final landform is stable and sustainable for future land use and does not present a risk of environmental harm downstream/ downslope of the site or a safety risk to the public/stock/native fauna.	Any areas of active erosion are within the parameters for safe and stable landform. Discharge points from rehabilitated landform to natural channels are stable. Erosion rills are vegetated, stable and less than 20cm x 20cm in size. Drainage structures are stable and there is no	The final landform has been constructed in general accordance with the approved Final Landform and land use. Drainage structures are classified as stable at mine closure.	Before and after photos, rehabilitation monitoring reports, as-constructed surveys, erosion surveys, independent reports that demonstrate long term stability of rehabilitated landform.	

POST MINING Land Use (FINAL LAND USE DOMAIN)	MINING DOMAIN	REHABILITATION OBJECTIVES	COMPLETION CRITERIA	PERFORMANCE INDICES	EXAMPLE OF JUSTIFICATION/ SOURCE / VALIDATION METHODS	Status at commencement of RMP
			evidence of overtopping or scouring.		Depending on the nature, scale and risks associated with a specific site, stability will need to be evaluated over a number of years (e.g. 5 years).	
		<u>Integration with Surrounding Land</u> The final landform is integrated with the surrounding natural landforms and other mine rehabilitated landforms, to the greatest extent practicable. Minimising visual impacts where practicable.	The final landform is constructed generally in accordance with approved final landform design.	The final landform has been constructed in general accordance with the approved final landform.	As constructed survey report	
		<u>Incorporation of Natural Drainage Design</u> Landform design incorporates relief patterns and design principles consistent with natural drainage that mimics natural topography and mitigate erosion. Designed to maximise surface water drainage	The final landform is constructed generally in accordance with approved final landform design and detailed drainage design plans.	The final landform has been constructed in general accordance with the approved final landform	As constructed survey report. Rehabilitation monitoring reports	
Final Void	Active Mining Area	<u>Post Mining Fugitive Emissions</u> Landform design minimises post mining fugitive emissions from exposed coal seams	The final landform is constructed generally in accordance with approved final landform design.	The final landform has been constructed in general accordance with the approved final landform.	As constructed survey report. Rehabilitation monitoring reports.	
		<u>Bushfire</u> The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Bushfire management plan developed in consultation with the NSW Rural Fire Service.	Bushfire hazard controls implemented appropriate to the final land use.	Statement provided and before/after photos. Evidence of consultation of the Bushfire Management Plan with NSW RFS.	
		<u>Surface Water Quality</u> Runoff water quality is similar to, or better than the pre-mining disturbance runoff water quality and is suitable for receiving waters. Water retained on the site is fit for the intended post-mining land use	Runoff water quality from rehabilitation areas represent an acceptable level of change from a background condition (baseline study) and statutory requirements.	Assessment of runoff water quality against local background water quality including: - EC - TSS - pH - Metals - Biological health in accordance with Australian River Assessment System (AUSRIVAS) or equivalent.	Water quality monitoring reports Independent biological health assessment report.	
		<u>Water Approvals</u> Structures that take water are appropriately licensed.	Licenses held, where required.	Hydrological and hydro-geological assessments are undertaken to determine water take at completion from the relevant	Confirmation from relevant Government agency (e.g. DPI Water) that licences are held.	

POST MINING Land Use (FINAL LAND USE DOMAIN)	MINING DOMAIN	REHABILITATION OBJECTIVES	COMPLETION CRITERIA	PERFORMANCE INDICES	EXAMPLE OF JUSTIFICATION/ SOURCE / VALIDATION METHODS	Status at commencement of RMP
				water sources to confirm that sufficient allocations are held.		
		Designed to be long term groundwater sinks to limit the release of saline water into the surrounding environment. Optimised size and depth to ensure the final landform is stable and non-polluting. Minimise to the greatest extent practicable: The size and depth of voids, the drainage catchment of final voids Any highwall instability risks Risks of flood interaction Exposure of carbonaceous material Ensure Public Safety. Maximise potential for beneficial reuse, where practicable.	Evidence provided to show void is safe stable and non-polluting. Final voids have been assessed by a qualified geotechnical engineer to validate that it is stable and does not pose a safety risk. Inspection conducted by a suitably qualified person to verify that coal seams and other carbonaceous materials have been adequately sealed and covered if required.	Mining plan in place to minimise voids and control drainage. Flood studies demonstrate no interaction with maximum probable flood. Geotechnical study shows highwall is long term stable. Fencing or public safety risk assessment.	As constructed survey reports, geotechnical and flood study reports. Evidence of fencing and restricted access points.	
			Water quality in any approved final voids does not pose a risk to the final land use. Water quality is within range as predicted in environmental assessments.	Final void study completed, which includes predicted water quality and assessment of toxicity.	Independent report, water quality monitoring reports.	
Native Ecosystem Rehabilitation Biodiversity Offset Area Other – Infrastructure	All Domains	<u>Rehabilitation Materials</u> Materials including topsoils, substrate and seeds that are disturbed in the project areas are to be recovered, managed and reused as rehabilitation resources, to the greatest extent practicable.	All recoverable rehabilitation materials are recovered, managed and used to the greatest extent possible.	Inventories indicate rehabilitation materials are recovered and have been used in rehabilitation in accordance with relevant ground disturbance permits and rehabilitation establishment records.	Ground Disturbance Permits detailing material recovery requirements. Topsoil Inventory. Rehabilitation Establishment records	
		<u>Vegetation Composition and Coverage</u> Establish/restore native woodland ecosystems with local plant community types.	For Woodland Areas: -20-60% canopy for Woodland areas. -10-60% understorey - 40-80% groundcover For Grassland areas : -0-20% canopy -60-90% Groundcover Native plant species richness assessed for each growth form in accordance with BAM calculator.	Rehabilitation areas contain flora species assemblage's characteristic of each growth form for the target native vegetation communities. NOTE: Includes consideration of weed load and pest animal impacts.	Rehabilitation monitoring reports, independent ecological reports (where required).	
			Indicative final minimum total woodland tree/shrub densities for seeded areas to be 400 stems/ha. More than 75% of trees are healthy and growing as indicated by long term monitoring. and/or	Tree and shrub densities monitored for establishment and survival.	Rehabilitation monitoring reports, independent ecological reports (where required).	

POST MINING Land Use (FINAL LAND USE DOMAIN)	MINING DOMAIN	REHABILITATION OBJECTIVES	COMPLETION CRITERIA	PERFORMANCE INDICES	EXAMPLE OF JUSTIFICATION/ SOURCE / VALIDATION METHODS	Status at commencement of RMP
			At least 700ha of native grassland established in final rehabilitated landform.			
			Less than 30% weed coverage	Weed presence in rehabilitation areas comparable to surrounding land areas.	Rehabilitation monitoring reports, ecological reports.	
		The rehabilitation is self-sustaining in perpetuity (as conditioned by conservation agreements and other covenants implemented under the Biodiversity Offset Strategy).	Evidence of flowering and seeds or second-generation seedlings for trees and shrubs or likely to be, based on comparable older rehabilitation sites.	Trees and shrubs are monitored for evidence of ecological succession and evidence of flowers and seeds.	Rehabilitation monitoring reports, independent ecological reports (where required).	
		Riparian Habitat is established in any diverted and/or re-established creek lines and retained water features.	Monitoring data provides evidence of riparian habitat establishment.	Riparian Habitat are established and consistent with target vegetation community compositions, as required by Approvals.	Rehabilitation/Riparian monitoring reports	
		Habitat, feed and foraging resources established for fauna species.	Monitoring data provides evidence of a range of structural habitats similar to pre mining fauna communities are evident in rehabilitation areas. Between 1 and 10 nest boxes/hollows per hectare.	Native rehabilitation areas provide a range of structural features (e.g. trees, shrubs, ground cover, developing litter layer etc.). Habitat features (e.g. logs, rocks and nest boxes), including structures suitable for target species are incorporated into rehabilitation areas at required densities, as required by Approvals	Rehabilitation monitoring reports, independent ecological reports (where required).	
		Vegetation and wildlife corridor connectivity established as far is reasonable and feasible.	Habitat Corridors established as required by approvals.	Habitat corridors are established and consistent with target vegetation community compositions, as required by approvals.	Rehabilitation monitoring reports, independent ecological reports (where required). GIS spatial records.	
		Target fauna assemblages and habitat in rehabilitation areas.	Ecological monitoring confirms target native fauna species are recorded utilising rehabilitation areas or habitat suitable for target species is present, as required by Approvals. Pest species presence is comparable to surrounding landholdings.	Rehabilitation areas provide a range of structural habitats similar to pre mining fauna communities. Fauna pest species are managed and controlled. Pest species are not having a detrimental impact on the establishment of the rehabilitation.	Rehabilitation monitoring reports, independent ecological reports (where required). Pest management reports	
		Provide soil chemical and physical properties comparable with the reference sites, or alternate growth medium that is suitable for the	Approximately 10 cm topsoil depth to be incorporated into subsoil material. Rehabilitation monitoring reports verify that soil pH is in the range of 5.5 to 8.5.	Rehabilitation establishment or monitoring reports provide evidence that topsoil or suitable alternatives have been spread	Rehabilitation monitoring reports, independent ecological reports (where required).	

POST MINING Land Use (FINAL LAND USE DOMAIN)	MINING DOMAIN	REHABILITATION OBJECTIVES	COMPLETION CRITERIA	PERFORMANCE INDICES	EXAMPLE OF JUSTIFICATION/ SOURCE / VALIDATION METHODS	Status at commencement of RMP
		establishment and maintenance of the selected vegetation species.	Cation Exchange Capacity between 4 and 36 cmol+/kg.	uniformly over the rehabilitation surface. Soil chemistry is appropriate to support vegetation growth.	Rehabilitation establishment methodology forms.	
		<u>Surface water flows</u> Landform design minimises the surface water flows and impacts on threatened Orchid species.	The final landform is constructed generally in accordance with approved final landform design. Drainage structures are stable and there is no evidence of overtopping, scouring or impact to threatened Orchid species.	The final landform has been constructed in general accordance with the approved Final Landform. Signs of erosion and or land instability are recorded, measured, assessed and remediated where required. Drainage structures are classified as stable at mine closure.	As constructed survey report. Rehabilitation monitoring reports. Depending on the nature, scale and risks associated with a specific site, stability will need to be evaluated over a number of years (e.g. 5 years)	
Native Ecosystem/Rehabilitation Biodiversity Offset Area	Overburden Emplacement Area	Restore the self-sustaining ecological and hydrological function of the creek (Anvil Creek) Engineered to be hydraulically and geomorphologically stable. Incorporation of erosion control measures based on vegetation and engineering revetments. Incorporation of structures for aquatic habitat. Revegetation with suitable native species.	Installation of a self-sustaining and hydrologically functioning creek.	Ecological and erosion monitoring	Rehabilitation monitoring reports, independent ecological reports (where required). Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15 years).	

Appendix F - Rehabilitation Risk Assessment

Risk Ref.	Asset/Site/Project/Department (If Applicable)	Step 3 - Identify the risks, causes and potential consequences		Step 5 - Identify the existing controls	6 - Determine the Risk Control Effectiveness	Step 7 - Determine the Expected Consequence			Step 8	Step 9	Step 11 - Treat the Risk			
		Risk Event Description (Risk of...)	Consequence (Resulting in...)	Existing Controls	Risk Control Effectiveness	Current Risk with Existing Controls		Highest Consequence	Likelihood	Residual Risk Rating	Risk Treatment/Actions			
						Consequence Categories	Drop-down list				Risk Treatment/ Actions	Target Completion Date	Name	Position
<auto generates when column C completed>	<Can also use this to enter steps of process if for one site/project>	<free text>	<free text>	<free text>	<select from drop-down list>	<select from drop-down list>	<select from drop-down list>	<select from drop-down list>	<select from drop-down list>	<formula>	<free text>	<xx/xx/xxxx>	<free text>	<free text>
1	Rehabilitation - General/All Phases	Insufficient skills and experience of rehabilitation personnel / Lack of clearly defined responsibilities	Poor quality rehabilitation	Engage suitably qualified contractors / practitioners to undertake rehabilitation. Engage suitably qualified consultants / practitioners for design assessment / monitoring of rehab. Preparation of the RMP which contains defined responsibilities. Position descriptions. Competencies with operator, including responsibilities for rehab. Quality Control and Supervision of Rehab Contractors	Satisfactory	Financial	3	D	9	No further treatment plans				
2	Rehabilitation - General/All Phases	Failure to use suitably qualified and experienced revegetation experts.	Poor quality rehabilitation	Engage suitably qualified contractors / practitioners to undertake rehabilitation. Engage suitably qualified consultants / practitioners for monitoring of rehab. Competencies with operators, including responsibilities for rehab. Quality Control and Supervision of Rehab Contractors	Satisfactory	Financial	3	D	9	No further treatment plans				
3	Rehabilitation - General/All Phases	Insufficient funding for prioritisation of rehabilitation activities.	Poor quality rehabilitation.	RMP ARCP Mine Planning Process Rehabilitation included in annual budget and LOM planning. Rehabilitation Cost Estimate / Financial Provision.	Satisfactory	Financial	3	D	9	No further treatment plans				
4	Rehabilitation - General/All Phases	Failure to identify or comply with all legal and other obligations relating to rehabilitation	Poor quality rehabilitation and not meeting completion criteria.	Rehabilitation Management Plan (RMP) and ARR/FP Conceptual Mine Closure Plan ARCP Keep detailed records of rehabilitation process e.g. Seed mix, topsoil/fertiliser rate etc. GIS System Track progress against completion criteria (draft). Rehabilitation monitoring.	Satisfactory	Financial	3	D	9	No further treatment plans				
5	Rehabilitation - Active Mining Phase	Contaminated soil is not managed to regulatory expectations.	Long-term environmental impacts. Costs to manage contamination issues.	Bioremediation Area Fuelling Procedures Maintenance Procedures and Equipment Strategies Spill Response Procedure ChemaAlert Monthly Environmental Inspection form Operator training	Satisfactory	Financial	2	D	5	No further treatment plans				
6	Rehabilitation - Active Mining Phase	Less than adequate biological resource salvage and maintenance (e.g. rocks, habitat resources) through clearing, salvage and handling practices.	Loss of biological resources which affects tracking against rehabilitation criteria.	GDP process and Pre-clearing survey 'LOM seed inventory GIS LOM seed inventory plan Seed collection from rehab and offset areas - seed inventory Pre-clearance Survey, Land Clearing and Topsoil Stripping Procedure	Satisfactory	Financial	3	E	6	Update the LOM Seed Inventory	30/06/2026	BY	E&C Coordinator	
7	Rehabilitation - Active Mining Phase	Clearing in adverse seasonal and weather conditions when salvaging biological resources (e.g. topsoil stripping in strong wind, excessively wet or excessively dry conditions)	Loss of biological resources which affects tracking against rehabilitation criteria.	GDP process and Pre-clearing survey Pre-clearance Survey, Land Clearing and Topsoil Stripping Procedure Review of weather for operational and rehab activities. Air quality monitoring system/dust alarms.	Satisfactory	Financial	1	D	2	No further treatment plans				
8	Rehabilitation - Active Mining Phase	Adverse geochemical/chemical composition of materials such as overburden, interburden, processing wastes, subsoils and topsoils and imported cover materials.	Long-term environmental impacts. Rehabilitation bond is not returned.	No PAF(EGI, 2019) No imported cover materials Use of ameliorants (gypsum) Geochem testing (EIS/historical sampling) Dumping procedure.	Satisfactory	Financial	3	D	9	No further treatment plans				
9	Rehabilitation - Active Mining Phase	Adverse surface and groundwater quality and quantity.	Long-term environmental impacts in terms of closure environment.	Groundwater model. Geochemical testing (EGI, 2019) Surface and Groundwater Monitoring Water Management Plan Hydrocarbon Management Plan Conceptual Mine Closure Plan Environmental Inspections / Monitoring	Satisfactory	Financial	3	D	9	No further treatment plans				

Risk Assessment Title:

Mangoola RMP Risk Assessment 2025

Risk Ref.	Asset/Site/Project/Department (If Applicable)	Step 3 - Identify the risks, causes and potential consequences		Step 5 - Identify the existing controls	6 - Determine the Risk Control Effectiveness	Step 7 - Determine the Expected Consequence		Step 8	Step 9	Step 11 - Treat the Risk			
		Risk Event Description (Risk of....)	Consequence (Resulting in...)	Existing Controls		Current Risk with Existing Controls		Residual Risk Rating	Risk Treatment/Actions				
						Consequence Categories	Highest Consequence		Risk Treatment/ Actions	Target Completion Date	Name	Position	
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10	Rehabilitation - Active Mining Phase	Inappropriate management/disposal of waste during operations (including waste tyres).	Waste issues at closure	Hydrocarbon Management Plan Waste Management Plan Tyre dumping procedure. Conceptual Mine Closure Plan Waste Contractor / Environmental Inspections Training - Waste Management Spill Kits	Satisfactory	Financial	2	D	5	No further treatment plans			
11	Rehabilitation - Active Mining Phase	Less than adequate management of exploration activities which poses a risk to future rehabilitation.	Additional rehabilitation costs at closure.	GDP Process Locations of exploration holes are known.	Satisfactory	Financial	1	E	1	No further treatment plans			
12	Rehabilitation - Active Mining Phase	Inadequate progressive rehab resulting in a large rehabilitation backlog at closure	Large costs at closure. Large material hauls due to large amount of rehabilitation.	LOM Plan RMP GIS Rehabilitation schedule CMCP Annual Rehabilitation and Closure Plan (ARCP) Budget Planning Process	Satisfactory	Financial	2	D	5	No further treatment plans			
13	Rehabilitation - Active Mining Phase	Less than adequate management of cultural and heritage sites during operations/lack of awareness of cultural heritage obligations.	Not operating in accordance with the Aboriginal and Historical Heritage MPs; Financial and reputation impacts.	ACHMP/Historic Heritage MP GIS database Due diligence surveys Keeping place Ground Disturbance Permit process Training and awareness Inspections / Monitoring	Satisfactory	Financial	1	D	2	No further treatment plans			
14	Rehabilitation - Decommissioning Phase	Generation of hazardous material and waste products from the demolition process.	Additional rehabilitation costs at closure.	Rehabilitation Cost Estimate / Financial Provision Existing Mangoola Waste Management Plan GCAA Closure Planning Protocol Conceptual Mine Closure Plan Consent and RMP outlines removal of surface infrastructure. Demolition plan to be developed at closure as per GCAA Closure Standard.	Satisfactory	Financial	1	C	4	No further treatment plans			
15	Rehabilitation - Decommissioning Phase	Public safety risks due to less than adequate site security during decommissioning.	Risk to public	Bund and fence for final highwalls Hazard identification and risk management procedure Locks on gates and key register Conceptual Mine Closure Plan Security process implemented (e.g. sign in/ out, tags to get through gates) Supervision Security plan	Satisfactory	Health & Safety	3	E	6	No further treatment plans			
16	Rehabilitation - Decommissioning Phase	Less than adequate decommissioning/ removal/augmentation of the mine water management system including dams prescribed by the Dams Safety Act 2015.	Rehabilitation bond is not returned.	Operational Water Management Plan Conceptual Mine Closure Plan Mine Closure Protocol	Satisfactory	Financial	3	D	9	No further treatment plans			
17	Rehabilitation - Landform Establishment Phase	Proposed final landform designs are not long-term stable (to allow relinquishment) including Tailings cap, high-walls, landforms, drainage, borehole plug seals etc.	Long-term environmental impacts. Rehabilitation bond is not returned.	CMCP RMP and FLRP - Geofluv Natural Landform Design Rehabilitation Construction QC and conformance to design check Site geotechnical inspection process Annual rehabilitation monitoring and walkover inspection. ARCP	Satisfactory	Financial	3	D	9	Review the need for ongoing landform stability monitoring.	30/06/2026	BY	E&C Coordinator
18	Rehabilitation - Landform Establishment Phase	Drainage/ flow lines in rehabilitation failure or cause erosion that threatened rehabilitation during final landform establishment	Poor quality rehabilitation. Inability to achieve completion criteria.	Rehabilitation Construction QC and conformance to design check Annual rehabilitation walkover inspection report Rehabilitation and Establishment Methodology Forms Annual rehabilitation monitoring/RRC Annual rehabilitation GCAA inspection	Satisfactory	Financial	3	C	13	No further treatment plans			
19	Rehabilitation - Landform Establishment Phase	Failure of Anvil Creek reinstatement	Poor quality rehabilitation. Inability to achieve completion criteria.	Anvil Creek realignment design and contractor scope of work Selective placement of material for compaction - dump to design Rehabilitation Construction QC and conformance to design check Rehabilitation Establishment methodology form Compaction testing. Annual walkover inspection	Satisfactory	Financial	3	D	9	No further treatment plans			

Risk Ref.	Asset/Site/Project/Department (If Applicable)	Step 3 - Identify the risks, causes and potential consequences		Step 5 - Identify the existing controls	6 - Determine the	Step 7 - Determine the Expected Consequence		Step 8	Step 9	Step 11 - Treat the Risk			
		Risk Event Description (Risk of....)	Consequence (Resulting in..)	Existing Controls	Risk Control Effectiveness	Current Risk with Existing Controls		Likelihood	Residual Risk Rating	Risk Treatment/Actions			
						Consequence Categories	Highest Consequence			Risk Treatment/ Actions	Target Completion Date	Name	Position
<auto generates when column C completed>	<Can also use this to enter steps of process if for one site/project>	<free text>	<free text>	<free text>	<select from drop-down list>	<select from drop-down list>		<select>	<formula>	<free text>	<xx/xx/xxxx>	<free text>	<free text>
20	Rehabilitation - Landform Establishment Phase	Inadequate volume of suitable capping material available to cap tailing dams.	Additional rehabilitation costs at closure.	OOPD - capping material stockpiled and rehabbed south of TD4 Slope Stability Management Plan Geotech design guidelines Strata Failure Management Plan Long Term Highwall Design Geotechnical Report Capping to meet EIS commitments FLRP	Satisfactory	Financial	3	E	6	No further treatment plans			
21	Rehabilitation - Landform Establishment Phase	Less than adequate impoundment and encapsulation of geochemical and geotechnically unsuitable tailings, reject and overburden materials.	Poor quality rehabilitation. Inability to achieve completion criteria.	Spontaneous Combustion Management Plan Environmental Assessment + Specialist EA documents Tailings Capping Design (TD1/TD2) Concept Design for TD4 Dumping procedures Designated dumps low in pit for emplacement of carbonaceous waste ,materials	Satisfactory	Financial	2	D	5	No further treatment plans			
22	Rehabilitation - Landform Establishment Phase	Settlement of tailings dam creates drainage issues	Poor quality rehabilitation. Inability to achieve completion criteria.	Assessment of settling has been undertaken Walkover inspections and monitoring undertaken Inspected biannually by external Engineer of Record (EOR). Settlement prediction completed as part of detailed design for capping of TD1 and TD2 Settlement survey monitoring	Satisfactory	Financial	2	D	5	No further treatment plans			
23	Rehabilitation - Landform Establishment Phase	Inadequate settlement and desiccation of tailings to support capping material	Poor quality rehabilitation. Inability to achieve completion criteria.	Operations and Dam Maintenance Manuals Design criteria Staged capping Double floccing Dedicated TD4 decant dam Surface water management HRA TD1 and TD2 (Detailed design reports)	Satisfactory	Financial	2	D	5	No further treatment plans			
24	Rehabilitation - Landform Establishment Phase	Final landform not consistent with planning approval or slope criteria	Poor quality rehabilitation. Inability to achieve completion criteria.	Survey conformance records No applicable slope criteria RMP TARP Rehabilitation objectives included in Development Consent Geofluv natural landform design - approved FLRP Bulk shaping and final trim handover records	Satisfactory	Financial	3	E	6	No further treatment plans			
25	Rehabilitation - Growth Medium Development Phase	Insufficient volume of topsoil to rehabilitate site	Poor quality rehabilitation. Increased costs.	Pre-clearance Survey, Land Clearing and Topsoil Stripping Procedure Annual Rehabilitation and Closure Plan (ARCP) Annual topsoil balance/inventory calculation for ARCP Rehabilitation Construction Quality Control Form Capping material and topsoil balances note that there is not a capping material or topsoil deficit.	Satisfactory	Financial	3	E	6	No further treatment plans			
26	Rehabilitation - Growth Medium Development Phase	Topsoil quality not suitable for final landuse	Poor quality rehabilitation. Increased costs.	Pre-clearance Survey, Land Clearing and Topsoil Stripping Procedure Topsoil testing reports - EA/EIS/ACARP/Stockpile studies Rehabilitation and Establishment Methodology Forms. Amelioration processes (gypsum). Direct placement of topsoil where possible to minimise time in stockpile Long-term stockpiles shaped to 3m height, ripped and seeded with cover crop or grassland and shrub mix depending on timeframe for long-term stockpiles	Satisfactory	Financial	3	E	6	No further treatment plans			
27	Rehabilitation - Growth Medium Development Phase	Less than adequate use of mechanical treatments (e.g. deep ripping) required to maximise water infiltration into the substrate and to provide for an adequate seed bed.	Flora development struggles. Poor quality rehabilitation.	RMP Double ripping - rehab contract Quality Control and Supervision of Rehab Contractors Seeding is scheduled as soon following ripping as possible Rain forecast discussed during rehabilitation planning Rehabilitation and Establishment Methodology Forms	Satisfactory	Financial	1	D	2	No further treatment plans			
28	Rehabilitation - Ecosystem and Land Use Establishment Phase	Lack of availability and quality of target seed resources, including genetic integrity.	Poor quality rehabilitation. Increased costs.	LOM seed inventory GIS ARCP including endemic seed collection program Specialist contract horticulturalist collecting endemic seed including QA process Annual site walkover inspection Annual ecological monitoring Additional seed collected during favourable conditions for target species	Satisfactory	Financial	1	D	2	No further treatment plans			
29	Rehabilitation - Ecosystem and Land Use Establishment Phase	Unsuitability or unviability of the seed mix to achieve compositional requirements of the various target PCTs	Poor quality rehabilitation. Increased costs.	LOM seed inventory GIS ARCP including endemic seed collection program Specialist contract horticulturalist collecting endemic seed including QA process Annual site walkover inspection Annual ecological monitoring Additional seed collected during favourable conditions for target species	Satisfactory	Financial	1	D	2	No further treatment plans			

		Step 3 - Identify the risks, causes and potential consequences		Step 5 - Identify the existing controls	6 - Determine the	Step 7 - Determine the Expected Consequence		Step 8	Step 9	Step 11 - Treat the Risk			
Risk Ref.	Asset/Site/Project/Department (If Applicable) <Can also use this to enter steps of process if for one site/project>	Risk Event Description (Risk of...) <free text>	Consequence (Resulting in...) <free text>	Existing Controls <free text>	Risk Control Effectiveness <select from drop-down list>	Current Risk with Existing Controls				Risk Treatment/Actions			
						Consequence Categories <select from drop-down list>	Highest Consequence	Likelihood <select>	Residual Risk Rating <formula>	Risk Treatment/ Actions <free text>	Target Completion Date <xx/xx/xxxx>	Name <free text>	Position <free text>
30	Rehabilitation - Ecosystem and Land Use Establishment Phase	Ant and insect predation of seed.	Poor quality rehabilitation. Increased costs.	RMP/ARCP Antecide added to seed mix as required Ant/insect predation considered low risk in new rehabilitation areas not adjoining established/remnant vegetation	Satisfactory	Financial	1	D	2	No further treatment plans			
31	Rehabilitation - Ecosystem and Land Use Establishment Phase	Poor quality tubestock.	Poor quality rehabilitation. Increased costs.	ARCP Limited tubestock used in rehabilitation Tubestock mainly used for recalcitrant species or infill planting Collected endemic seed supplied to nursery for tubestock germination Annual ecological monitoring Annual walkover inspection	Satisfactory	Financial	1	D	2	No further treatment plans			
32	Rehabilitation - Ecosystem and Land Use Establishment Phase	Inadequate weed and feral animal management in rehabilitation results in failure to meet final landuse.	Poor quality rehabilitation. Increased costs.	Weed management reports Pest animal control reports Pest animal register Annual ecological monitoring report Annual rehabilitation walkover inspection report Pest animal action plan Contractor management	Satisfactory	Financial	2	D	5	No further treatment plans			
33	Rehabilitation - Ecosystem and Land Use Establishment Phase	Seed mix sown in incorrect areas on final landform	Failure to meet closure criteria.	RMP/ARCP Rehabilitation and Establishment Methodology Forms Conceptual revegetation plan GIS spatial system seed area planning Contractor management	Satisfactory	Financial	2	D	5	No further treatment plans			
34	Rehabilitation - Ecosystem and Land Use Establishment Phase	Failure of rehabilitation to adapt to variation in the climate	Poor quality rehabilitation. Increased costs.	Annual ecological monitoring report Rehabilitation Report Card Annual rehabilitation walkover report Species diversity in seed mix Endemic seed collection program	Satisfactory	Financial	2	E	3	No further treatment plans			
35	Rehabilitation - Ecosystem and Land Use Establishment Phase	Inadequate habitat to support fauna in rehabilitation	Poor quality rehabilitation. Increased costs.	RMP/ARCP Rehabilitation and Establishment Methodology Forms Rehabilitation construction quality control form Habitat trees and other habitat structures salvaged from pre-strip areas Pre-clearance Survey, Land Clearing and Topsoil Stripping Procedure Nest box installation and monitoring Contractor management	Satisfactory	Financial	2	E	3	No further treatment plans			
36	Rehabilitation - Ecosystem and Land Use Establishment Phase	Availability of areas for revegetation in optimal seasonal conditions	Poor quality rehabilitation. Increased costs.	ARCP provides rehabilitation scheduling targets RMP Endemic seed used Significant rehab completed to date - seasonal variation in rehabilitation has not been identified as an inhibitor to rehabilitation success. Rehabilitation and Establishment Methodology Forms Rehabilitation construction quality control form	Satisfactory	Financial	1	E	1	No further treatment plans			
37	Rehabilitation - Ecosystem and Land Use Establishment Phase	Lack of Infrastructure to support intended final land use (e.g. dams, fences, watering facilities)	Poor quality rehabilitation. Increased costs.	ARCP (includes LOM planning process) To be included as part of detailed mine closure planning LOM Planning process Approved FLRP	Satisfactory	Financial	1	E	1	No further treatment plans			
38	Rehabilitation - Ecosystem and Land Use Development	Long term water quality and quantity issues (e.g. acid-drainage, high salinity).	Impacts to regional water courses Poor quality rehabilitation and financial implications.	EIS geochemical testing notes no acid forming materials or salinity issues (EGI, 2019) Water Management Plan RMP CMCP Water sampling/monitoring Environmental inspections	Satisfactory	Environment	2	D	5	No further treatment plans			
39	Rehabilitation - Ecosystem and Land Use Development	Rehabilitation failure due to impacts of bushfire as a result of inadequate response / fuel load management.	Poor quality rehabilitation. Increased costs.	Bushfire Management Plan Annual bushfire hazard inspection Annual rehabilitation walkover inspection report Fire trail access network for bushfire response Slashing, clearing and grading of rehabilitation access tracks Cool burn trial August 2022	Satisfactory	Financial	2	D	5	No further treatment plans			

Risk Assessment Title: Mangoola RMP Risk Assessment 2025

Risk Ref.	Asset/Site/Project/Department (If Applicable)	Step 3 - Identify the risks, causes and potential consequences		Step 5 - Identify the existing controls	6 - Determine the	Step 7 - Determine the Expected Consequence		Step 8	Step 9	Step 11 - Treat the Risk			
		Risk Event Description (Risk of....)	Consequence (Resulting in..)	Existing Controls	Risk Control Effectiveness	Current Risk with Existing Controls				Risk Treatment/Actions			
						Consequence Categories	Highest Consequence	Likelihood	Residual Risk Rating	Risk Treatment/ Actions	Target Completion Date	Name	Position
<auto generates when column C completed>	<Can also use this to enter steps of process if for one site/project>	<free text>	<free text>	<free text>	<select from drop-down list>	<select from drop-down list>		<select>	<formula>	<free text>	<xx/xx/xxxx>	<free text>	<free text>
40	Rehabilitation - Ecosystem and Land Use Development	Damage to rehabilitation (e.g. fauna, domestic stock, vandalism, vehicular interactions, insects and plant disease)	Poor quality rehabilitation. Increased costs.	ARCP RMP Site security including existing fencing and signage with locked gates. Pest animal control programs	Satisfactory	Financial	1	E	1	No further treatment plans			
41	Rehabilitation - Ecosystem and Land Use Development	Unplanned re-disturbance of established rehabilitation areas	Poor quality rehabilitation. Increased costs.	ARCP/RMP Ground Disturbance Permit process Dedicated access roads incorporated into final rehabilitation Traffic network plan and communication to mine operators	Satisfactory	Financial	1	E	1	No further treatment plans			
42	Rehabilitation - Ecosystem and Land Use Development	Rehabilitation quality is not to external expectations (regulatory and/or community).	Poor quality rehabilitation. Increased costs.	Rehabilitation Management Plan Annual Rehabilitation and Closure Plan Mine Planning Process Quality Control and Supervision of Rehab Contractors Rehabilitation monitoring Annual RRC and Ecological Monitoring report - incorporating rehab objectives and draft completion criteria	Satisfactory	Financial	3	D	9	Develop Completion Criteria for approval by Resources Regulator.	30/06/2026	BY	E&C Coordinator