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GRAYMONT

Rehabilitation Management Plan

Attunga Limestone Mine

Date

8 August 2022

Rev00

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Appendices

Appendix A — Rapid Rehabilitation Survey Form
Appendix B — Trigger Action Response Plan (TARP)

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Reviewed & Authorised by — Adam Bishop		**Date —** 8 August 2022
Graymont accepted by — Damian Power		**Date —** 8 August 2022

Revision History

Rev No.	Description	Prepared by	Reviewed by	Authorised by	Date
A	Draft report	CG	AB	AB	08/07/2022
C	Draft report	CG	AB	AB	01/08/2022
00	Final report	CG	AB	AB	08/08/2022

Summary table

Attunga Limestone Mine – Rehabilitation Management Plan (RMP)	
Name of Mine	Attunga Limestone Mine
RMP Commencement Date	1 August 2022
Revision Date	
Version number	00
Mining Authorisations (Lease/Licence No.)	Mining Lease ML 1394
Name of lease holder(s)	Graymont (NSW) Pty Ltd
Name and Contact Details of the Mine Manager (or equivalent)	Damian Power Garthowen Road, Attunga NSW 2345 02 6761 1211
Name and Contact Details of Environmental Representative	Lizz Norvill Garthowen Road, Attunga, NSW, Australia, 2345 02 6761 1211

1. Introduction

1.1 History of operations

Since the beginning of the last century, mining and processing of limestone have been carried out on the Attunga Limestone Mine (ALM) site. The site began significant levels of lime production in 1967 with the installation of a vertical shaft kiln by Newcastle Lime & Cement Company. A second vertical shaft kiln followed this in 1978. The open-pit at the Attunga site is named the Jackson Pit after the original landowner, and the operation was taken over by David Mitchell – Melcan in 1983.

Up until this point, high grade-limestone used to feed the kiln (kilnstone) had been extracted mainly from the Upper Limestone layer located at the top of the deposit. Further drilling in 1985 proved reserves of suitable stone below this Upper Limestone layer. A Middle and Lower Limestone layer were identified, with the Lower Limestone being of suitable quality for kilnstone and the Middle layer only ideal for crushed rock products.

Limestone from Jackson's deposit continued to be the main supply to the Attunga processing operations until the year 2000. At this point, the recovery of the Middle Limestone was below 50% due to low sales of crushed rock products. As a result, the stripping ratio increased as the majority of Middle Limestone was treated as overburden. To better utilise the Jackson Pit resource, the supply of kilnstone to the Attunga site was supplemented with kilnstone from the nearby Exce lease (ML 1470). This gave the ability to adjust mining of the Middle Limestone layer to align with requirements, which reduced the amount that needed to be rejected and sent to the overburden dump. Since the year 2000, supplies of kilnstone have been drawn from both Attunga and Sulcor quarries.

In November 2002, Unimin Australia Limited acquired the David Mitchell Company. Unimin Australia Limited adopted the parent company name of Sibelco Australia Limited in 2011. Sibelco sold its lime operations, including Attunga, Sulcor and Carey's deposit, to Graymont (NSW) Pty Ltd on 1st August 2019.

The principal objective for the rehabilitation of the Attunga site is to return the site to a condition where its landforms, soils, hydrology, flora and fauna are self-sustaining and compatible with the surrounding land fabric and use. Rehabilitation activities commenced in 1994 at the ALM site's south-eastern corner, known as the R1 area. Further rehabilitation was completed from 1996 to 1998 in the northern and north-western areas of the lease (R2 and R3) to batter and stabilise the waste emplacement areas. Further work was completed on the northern and eastern batters of waste emplacement areas in 2004 and 2010 (R5 and R7). In 2000, area R4 in the western slope was rehabilitated to increase the visual amenity of the operation. Between 2004 and 2010, overburden emplacement areas (R5, R6 and R7) also started to be rehabilitated. In 2019, a rehabilitation trial was commenced on the upper eastern visible bench area (area R8), including pushing overburden and topsoil (in separate strips) against the bench face, ameliorating overburden and hydro mulching the area. In 2020, additional rehabilitation of the north-facing batters of the northern overburden dump was undertaken (area R9). The area was ripped, topsoil applied, track walked (up and downslope) to give roughness, and then hydro mulched.

In 2022, overburden emplacement area R10 will begin the Growth Media Development phase. Overburden emplacement area OEA3, an extension of R10, is currently in the Decommissioning phase and will begin the Landform Establishment phase later this year. Additional information regarding the rehabilitation activities and phases is found in Chapter 6 of this document.

The approved life of the mine date is not specified in the latest development consent MOD0121/2015. The expiry date for Mining Lease 1394 is June 2038.

1.2 Current development consents, leases, and licences

The current development consent, leases, licences, and other approvals are shown in Table 1.

Table 1: Current Consents, leases and Licences

Documentation, Condition or Licence	Approval Authority	Status
DA95/77 & EIS (June 1995) for Attunga Limestone Mine	Tamworth Regional Council (Parry Shire Council)	DA Modification to extend the open pit to the south by 1.4Ha and remove time restrictions granted on 17/9/2015
Mining Lease Conditions of Authority	Dept. of Primary Industries – Mineral Resources	ML 1394 granted 4/6/96. Lease renewal in 2017 to 04 June 2038
Environment Protection Licence.	EPA	EPA Licence 905 granted
Water Access Licence 21083 (old bore water licence 90BL246713)	NSW Office of Water	Licence issued 28/3/12
Water Supply Work Approval 90CA814652	NSW Office of Water	Date of effect July 2010 Expiry date January 2025
Explosives Licensing	WorkCover Authority	Relevant employees licensed
Dangerous Goods Licence	WorkCover Authority	Licence no. 35/023522 granted

1.3 Land ownership and land use

The Mining Lease ML 1394 encloses a total of 75.01ha of land area. Approximately 58ha of this land area is company-owned land (Lot 10 DP 788950 and Lot 1,2 and 3 DP 513891) with Mr Lex Wiseman owning the remaining 17 ha of land in the form of two-part Lots (Lot 11 DP 788950 and Lot 146 DP 753830).

Table 2 provides an overview of the land ownership and land use of the mining lease.

Table 2: Land ownership and land use

Lease	Lot/DP	Land Owner	Area (ha)	Historic Land Use	Current Land Use	Proposed Final Land Use	Land Tenure	ML Expiry Date
ML 1394	Lot 10 DP 788950 Lot 1,2 and 3 DP 513891	Graymont (NSW) Pty Ltd	58	Open grazing land	Mining and Overburden Emplacement	Mixed grazing and nature conservation	Freehold	4/6/2038
ML 1394	Lot 11 DP 788950 and Lot 146 DP 753830	L. Wiseman	17	Open grazing land	Mining and Overburden Emplacement	Mixed grazing and nature conservation	Freehold	4/6/2038

1.3.1 Land ownership and land use figure

Figure 1 describes the land ownership and land use in proximity to the mine site.

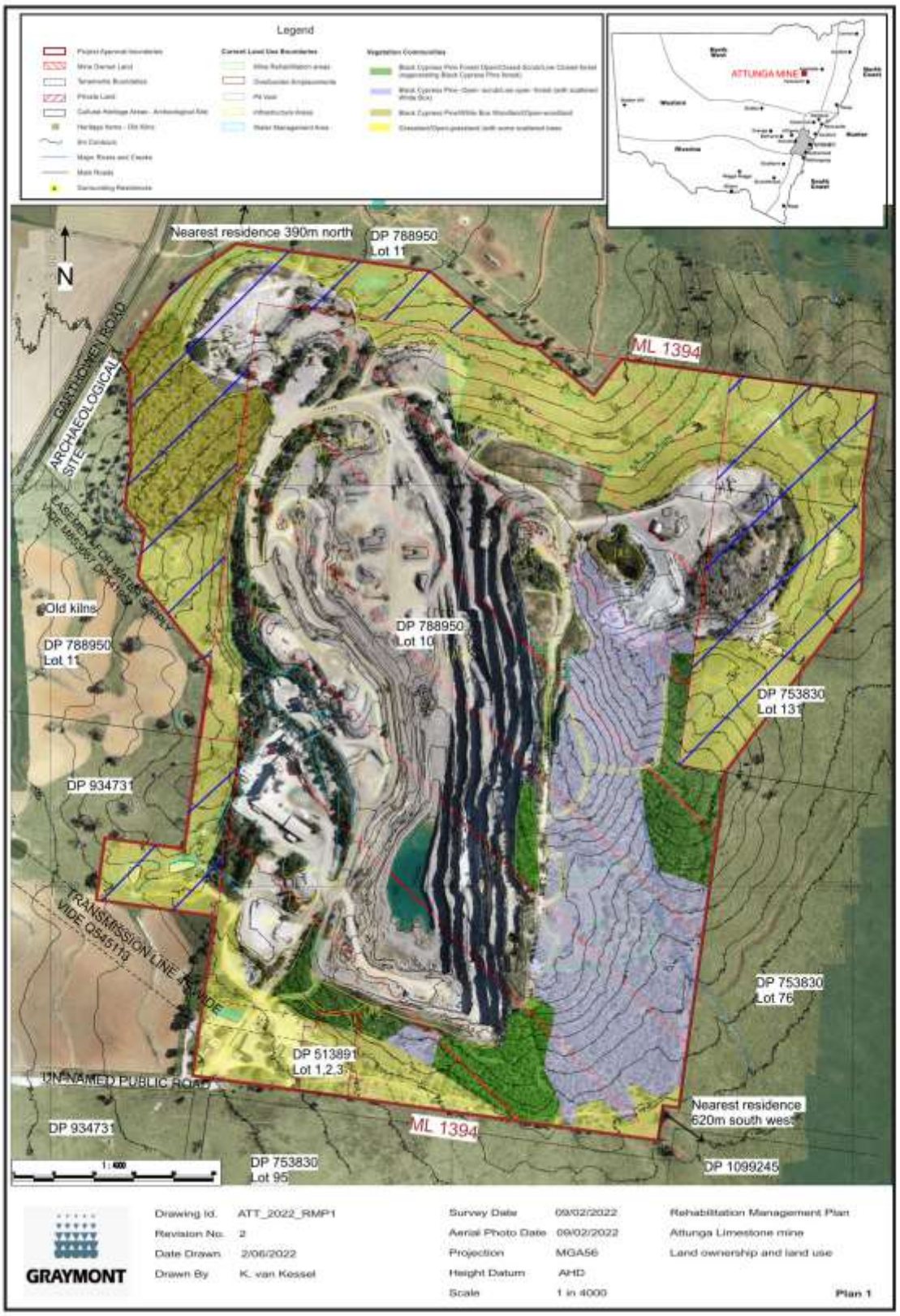

Figure 1: Land ownership and land use

2. Final land use

2.1 Regulatory requirements for rehabilitation

Table 3 outlines regulatory requirements relating to rehabilitation contained in development consent DA 95-77 MOD 0121-2015.

Table 3: Regulatory requirements

Development Consent Condition No.	Conditions	Timing	Application	Addressed in RMP
27 (h)	Provide a rehabilitation program which clearly demonstrates the effective rehabilitation/revegetation of all fill batters and disturbed areas extending from the plant site to the main rock emplacement area	n/a	ML1394	Chapter 6

As of July 2022, the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021* introduced a standard set of rehabilitation conditions for all mining leases in NSW. These conditions are now located in Schedule 8A of the Mining Regulation 2016 and commenced on 2 July 2022 for large mines. The new conditions require progressive rehabilitation, rehabilitation risk assessment, annual reporting and detailed rehabilitation management planning, and apply to all of ML1394.

A summary of the new rehabilitation conditions is provided in Table 4.

Table 4: Standard Rehabilitation Conditions for Mining Leases under Schedule 8A

Condition No.	Condition Title	Summary	How Addressed
1	Definitions	Defines words and terms used I the schedule	n/a
2	Functions of Secretary – approval of Rehabilitation Outcome Documents	Outlines functions of the Secretary in approving rehabilitation outcome documents and notifying the lease holder	n/a
3	Assessments and documents may relate to more than 1 Mining Lease	Outlines functions of the Secretary in treating multiple leases relating to a single mine as a single lease	n/a
4	Must prevent or minimise harm to the environment	Outlines obligations of the lease holder to prevent or minimise harm to the environment	This plan
5	Rehabilitation to occur as soon as reasonably practicable after disturbance	Outlines obligations of the lease holder to rehabilitate land and water as soon as reasonably practicable after disturbance occurs	This plan
6	Rehabilitation must achieve final land use	Outlines obligations of the lease holder to achieve the final land use	This plan

Condition No.	Condition Title	Summary	How Addressed
7	Rehabilitation Risk Assessment	Outlines obligations of the lease holder to document a Rehabilitation Risk Assessment	This plan
8	Application of division	Outlines the application of Division 3 in relation to rehabilitation documents	n/a
9	General requirements for documents	Outlines the application of Division 3 in relation to the form of rehabilitation documents	n/a
10	Rehabilitation Management Plans for large mines	Outlines obligations of the lease holder in relating to preparing and implementing a Rehabilitation Management Plan	This plan
11	Amendment of Rehabilitation Management Plans	Outlines obligations of the lease holder to amend a Rehabilitation Management Plan when directed	Chapter 11 of this RMP
12	Rehabilitation Outcome Documents	Outlines obligations of the lease holder to prepare Rehabilitation Outcome Documents including: • rehabilitation objectives statement • rehabilitation completion criteria statement; and • final landform and rehabilitation plan	This plan including related submissions
13	Forward Program and Annual Rehabilitation Report	Outlines obligations of the lease holder to prepare a Forward Program and Annual Rehabilitation Report	n/a
14	Amendment of Rehabilitation Outcome Documents and Forward Program	Outlines obligations of the lease holder as to when and how Rehabilitation Outcome Documents and Forward Program may be amended	n/a
15	Times at which documents must be prepared and given	Outlines timing required for preparation of various documents under Schedule 8A	n/a
16	Certain documents to be publicly available	Outlines obligations of the lease holder to make publicly available a Rehabilitation Management Plan, a Forward Program and an Annual Rehabilitation Report	n/a
17	Records demonstrating compliance	Outlines obligations of the lease holder to create and maintain records that demonstrate compliance with Schedule 8A	n/a
18	Report on non-compliance	Outlines obligations of the lease holder to report on a non-compliance with the mining lease or of the Act or Regulation	n/a
19	Nominated contact person	Outlines obligations of the lease holder to nominate a contact person with who the Secretary can communicate in relation to the mining lease	n/a
20	Additional requirements – application for or to modify development consent	Outlines obligations of the lease holder in relation to a modification of or application for development consent	n/a

2.2 Final land use options assessment

The final land use was defined on the development consent DA 95-77 and described in the Environmental Impact Statement (1995). The final land use is to be mixed grazing and nature conservation. No further options assessment has been undertaken.

2.3 Final land use statement

The defined final land use is mixed grazing and native ecosystem, which is compatible with the surrounding land use being agriculture including livestock production and cropping.

2.4 Final land use and mining domains

2.4.1 Final land use domains

The principal objective for the rehabilitation of Attunga Limestone Mine is to return the site to a condition where its landform, soils, hydrology, flora and fauna are self-sustaining and compatible with the surrounding land use. The final land use domains are listed and defined in Table 5.

Table 5: Final land use domains

Final land use domain	Attunga Limestone Mine
Infrastructure (includes built infrastructure proposed to be retained for future use)	Some roads and tracks will be retained for property access, bushfire fighting and rehabilitation monitoring purposes. The lime kilns and associated lime processing equipment would be retained in operation upon closure of mining activities at Attunga.
Agricultural – grazing	Land suitable for low intensity grazing. The maximum slopes of the landform would be 18° or 1:3 (V:H)) with mid-slope benches to achieve long term geotechnical stability and minimise erosion.
Native ecosystem	Land unsuited to grazing and to be restored to native vegetation post mining. The maximum slopes of the landform would be 18° or 1:3 (V:H)) with mid-slope benches to achieve long term geotechnical stability and minimise erosion.
Water management areas	It is intended that dams WMA1 and WMA2 will be retained for stock watering, as requested by the current landowner. These dams are on private land. WMA3 is also envisaged to be retained; however, it will be agreed between Graymont and the future landowner.
Final Void	The final void will be retained in a form similar to present as a series of benches and semi-vertical batters. The northern part of the void will be partially filled with waste rock and overburden. A wet sump would be retained in the southern part of the void and used for stock water. The anticipated final elevation of the permanent waterbody is approximately 385m AHD.

2.4.2 Mining domains

Table 6 provides information regarding the current mining domains at ALM site

Table 6: Mining domains

Mining domain	Attunga Limestone Mine
Infrastructure area	This mining domain currently contains equipment and assets including, kilns, dust collection, conveyors, milling equipment, crusher, product bins, electrical infrastructure, access roads within the site, relocatable and permanent buildings, sheds, weighbridge, above ground storage tanks, and scrap yard.
Beneficiation facility	This area includes crushing equipment, the burnt lime plant and hydrator, and an office building.
Active mining (Open pit void)	The open pit progresses to the south from the existing working face as shown in Figure 1. Open pit mining utilises conventional drill & blast and load & haul techniques to extract limestone. The process includes the following: • Holes are drilled, loaded with explosives, stemmed with gravel, and blasted to fragment the rock • Depending on production requirements and the rock quality, the blasted material is loaded onto haul trucks and transported to one of the following areas: ○ ROM pad – rock of suitable quality for calcination is fed direct to the crusher or stored on the ROM pad for later use ○ To Road-base Production – the rock that is not suitable for calcination is either crushed into road- making materials by the fixed plant, the mobile plant, or stored on the Road Base ROM stockpile; and ○ To waste – the rock that is not of suitable quality for either application is carted directly to the waste emplacements.
Water management area	The majority of runoff from the active mining area reports to the open pit sump. This area captures dirty water and allows sediment to settle out. The areas outside the main open pit area all drain via sediment catchment dams.
Overburden emplacement area	The emplacement areas are located at the North East of the mine and the northern end of the open pit. Waste rock is used to backfill the Northern end of the open pit, while overburden material and excess waste rock are placed on the North-Eastern Overburden Dumps.

3. Rehabilitation risk assessment

The Attunga Lime Mine has undertaken a rehabilitation risk assessment and identified appropriate controls for potential risks during each mining rehabilitation phase, as listed below.

- Active mining and production
- Decommissioning
- Landform Establishment
- Growth medium development
- Ecosystem establishment; and
- Ecosystem and land use development.

The risk rating was developed in accordance with the likelihood criteria (Table 7), consequence table (Table 8) and risk matrix (Table 9). The method and findings of the risk assessment process is presented as a risk register in Table 10.

Table 7; Likelihood criteria

Level	Rating	Description This is a subjective judgement based on our knowledge and experience.	Frequency
5	Almost Certain	The event is expected to occur in most circumstances	More than once a year
4	Likely	The event will probably occur in most circumstances	At least once per year
3	Possible	The event should occur at some time	At least once in 3 years
2	Unlikely	The event could occur at some time	At least once in 10 years
1	Rare	The event may only occur in exceptional circumstances	Less than once in 15 years

Table 8: Consequence table

	Rehabilitation, Environment and Community	Health and Safety	Financial
Catastrophic (5)	Permanent impacts to populations of rare or threatened flora or fauna; or Adverse impacts (i.e. damage, destruction or removal) to state or nationally listed indigenous or non-indigenous heritage item; or Complete removal of habitat of threatened species; or Significant impairment of ecosystem function; or Multiple negative media reports; or Legal action initiated by members of the community.	One or more fatalities	>$1M business impact
Major (4)	Removal, destruction or loss of whole populations of common native flora and/or fauna; or Substantial offsite discharge of pollutants impacts surrounding lands, waters or ecosystems; or Adverse impacts to non-listed or locally significant indigenous or non-indigenous heritage items; or Negative media report or multiple community complaints.	Injury or illness that requires hospitalisation and/or results in permanent impairment	$100k-$1M business impact
Moderate (3)	Loss of individual of rare or threatened species; or Moderate impacts on soil, air or water that requires coordinated clean-up; or Offsite discharges/emissions outside of advised levels (e.g. licence limit, or environmental advisor / consultant advice) with an impact that is short term; or Individual community complaint.	Injury or illness more severe than a sprain, strain or superficial wound that requires medical treatment and/or a temporary work restriction (e.g. breaks, fractures, lacerations, burns, torn ligaments)	$10-$100k business impact
Minor (2)	Contamination of any on-site water body or impacts on soil and air quality beyond immediate work area but contained onsite; or Loss of individuals of common (not threatened) native flora or fauna.	Sprain, strain or superficial wound (i.e. bruise, cut, abrasion) that requires medical treatment and/or a temporary work restriction	$1-$10k business impact
Insignificant (1)	Direct impacts on soil or air within immediate work area and immediately cleaned up with no residual contamination.	Injury or illness that requires no more than first aid treatment and no work restriction	$1k business impact

Table 9: Risk matrix

	CONSEQUENCE						
			CATASTROPHIC	MAJOR	MODERATE	MINOR	INSIGNIFICANT
			5	4	3	2	1
LIKELIHOOD	ALMOST CERTAIN	5	25 High	23 High	20 High	16 Medium	11 Medium
	LIKELY	4	24 High	21 High	17 Medium	12 Medium	7 Low
	POSSIBLE	3	22 High	18 Medium	13 Medium	8 Low	4 Low
	UNLIKELY	2	19 Medium	14 Medium	9 Low	5 Low	2 Low
	RARE	1	15 Medium	10 Low	6 Low	3 Low	1 Low

Table 10: Rehabilitation risk assessment

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating	
1. General										
1.1	Rehabilitation skills	Insufficient skills and experience of rehabilitation personnel affects achievement of closure criteria and final land use goals.	4	3	17	• Ensure relevant site personnel are appropriately trained in rehabilitation planning, design and review; and • Seek specialist advice when designing and implementing rehabilitation plan.	2	2	5	• Engage experienced staff or contractors to review rehabilitation outcomes, revise plans and develop actions for restoration as required; and • Initiate additional and targeted rehabilitation supervision, monitoring and reporting.
1.2	Rehabilitation responsibilities	Lack of clearly defined responsibilities leads to poor planning and implementation of rehabilitation activities.	3	2	8	• Define rehabilitation responsibilities in personnel role descriptions and in operational and rehabilitation management plans; and • Assign rehabilitation responsibilities to personnel with the required knowledge, experience, capability and capacity to ensure successful implementation.	2	2	5	• Review personnel responsibilities and rehabilitation plans; and • Initiate additional and targeted rehabilitation supervision, monitoring and reporting.
1.3	Rehabilitation funding	Insufficient funding for or prioritisation of rehabilitation leads to poor planning and implementation of rehabilitation activities.	2	3	9	• Rehabilitation targets to be reviewed annually and reported in AEMRs • Set rehabilitation budgets and targets annually; and • Rehabilitation KPIs to be part of management discussions and success reported annually.	1	3	6	• Escalate financial constraints to senior management.

1.4	Rehabilitation success	Rehabilitation monitoring is poorly planned or implemented, leading to poor performance and delays to necessary intervention.	3	3	13	• Implement annual rehabilitation surveys as part of an integrated rehabilitation monitoring program. Monitoring program to:
						  ○ Compare results against rehabilitation objectives and targets
						  ○ Identify possible trends and continuous improvement
						  ○ Link to records of rehabilitation to determine causes and explain results
						  ○ Assess effectiveness of environmental controls implemented
						  ○ Where required, identify modifications required for the monitoring and rehabilitation program
						  ○ Identify practices or areas requiring research
							2	3	9	• Initiate additional and targeted rehabilitation supervision, monitoring and reporting; and
										• Seek specialist advice and implement targeted rehabilitation response to address the threat

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
						○ Compare flora species present against original seed mix and/or reference sites ○ Assess vegetation health; and ○ Assess vegetation structure (e.g. upper, mid and lower storey).				
2. Mining / Production										
2.1	Site contamination	Contamination resulting from mining, processing and associated activities impacts the ability to achieve successful rehabilitation and a safe final land use (e.g. storage and use of hydrocarbons/chemicals; drilling fluids; spillage of dirty or produced saline water; brine; sewage etc.).	3	2	8	• Store hazardous materials in covered and bunded containers, in accordance with relevant Australian Standards • Inspect storage areas and assess integrity, as part of weekly environmental inspections • Clean-up spills promptly and dispose of contaminated materials. Undertake follow up validation of clean-up of affected areas, as required • Undertake regular water monitoring to assess contamination risks; and • Take action to control the contaminant source and remediate affected waters ahead of rehabilitation works.	2	2	5	• Undertake targeted contamination assessment to characterise risks and develop appropriate remedial actions; and • Implement remedial action plan.
2.2	Waste materials storage	Disposal or stockpiling of processing waste materials from the hydration and calcination process including unburnt core, leading to pollution or poor growing conditions, and poor rehabilitation outcomes.	3	3	13	• Test any wastes against relevant acceptance criteria before incorporating into final landform or blending with growth media. • Obtain specialist advice from soil scientist, agronomist or similar; and • Ameliorate materials to overcome physical or chemical constraints.	2	3	9	• Obtain specialist advice and develop appropriate remedial actions which could include removal or amelioration of unsuitable materials.
2.3	Geotechnical and chemical constraints	Adverse geochemical/chemical composition of materials such as overburden/interburden, processing wastes, subsoils and topsoils and imported cover materials leading to pollution or poor growing conditions, and poor rehabilitation outcomes.	3	3	13	• Test materials against relevant acceptance criteria before incorporating into final landform or blending with growth media • Obtain specialist advice from soil scientist, agronomist or similar; and • Ameliorate materials to overcome physical or chemical constraints.	2	3	9	• Obtain specialist advice and develop appropriate remedial actions which could include removal or amelioration of unsuitable materials.
2.4	Landform development	Mining landform results in complex or unsafe conditions that are inconsistent with final landform goals	3	4	18	• Ensure final landform goals are factored into development and implementation of mine plans; and • Incorporate staged rehabilitation into mine planning.	2	4	14	• Obtain specialist advice and review final landform goals. Amend rehabilitation and closure plans as required.

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
3. Decommissioning										
3.1	Contamination from waste materials	Contamination resulting from residual wastes and associated activities (e.g. removal of fuel and chemical storage containers, underground fuel tanks, removal of asbestos materials) leading to pollution or poor growing conditions, and poor rehabilitation outcomes.	3	3	13	• Incorporate appropriate procedures for removal of hazardous materials including final verification; and • Employ suitably qualified demolition contractors.	2	2	5	• Undertake validation sampling and analysis of any residual contamination risks and develop appropriate remedial actions; and • Implement remedial action plan.
3.2	Waste material removal	Inadequate clean-up and removal of building and infrastructure materials generates residual wastes, causing inability to achieve closure criteria.	3	3	13	• Conduct final inspection of decommissioning and clean-up with Hold Points and release criteria for demolition contractors; and • Incorporate appropriate hold points and performance criteria and demolition and waste removal contracts.	3	2	8	• Obtain specialist advice and develop appropriate remedial actions which could include removal or amelioration of unsuitable materials.
3.3	Waste storage	Adverse geotechnical and or geochemical issues associated with process waste storage facilities (e.g. tailings, reject emplacements, overburden and waste rock dumps etc) leading to pollution or poor growing conditions, and poor rehabilitation outcomes.	3	3	13	• Seek specialist geotechnical assessment as part of final landform design; and • Design and construct suitable emplacements for geochemically hazardous materials.	2	3	9	• Obtain specialist advice and develop appropriate remedial actions which could include removal or amelioration of unsuitable materials.
3.4	Demolition and decommissioning of buildings and infrastructure	Inadequate planning and funding of decommissioning activities leads to delays or compromised final landform outcomes.	3	3	13	• Prepare a demolition plan that ensures achievement of the final landform and rehabilitation goals; and • Rehabilitation plans to clearly identify any infrastructure to be retained including for example, services, concrete slabs, roads and water management infrastructure.	2	3	9	• Obtain specialist advice and develop remedial action plan to address any decommissioning failures and update rehabilitation and closure plans as required.
4. Landform Establishment										
4.1	Rehabilitation resources	Use of inappropriate rehabilitation machinery and equipment, compromises ability to achieve rehabilitation outcomes or desired final landform.	3	3	13	• Final landform including roads to be designed by suitably qualified personnel • Hire specialised plant and contractors to undertake major bulk earthworks; and • Supervise rehabilitation activities and intervene promptly if damage or poor performance is occurring.	2	3	9	• Assess damage, develop and implement remedial actions that could include actions like scarification to soil surfaces, respreading topsoil and resowing seed.

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
4.2	Landform stability	Instability of highwalls and benches compromises ability to achieve the desired final landform.	3	3	13	• Seek specialist geotechnical advice for final landform design, to specifically advise on measures such as bench and batter widths, heights and highwall stability and protection; and • Consider measures such as scaling or rock bolting to improve long term stability.	2	3	9	• Implement repairs as necessary; and • Obtain specialist advice and review final landform goals. Amend rehabilitation and closure plans as required.
4.3	Landform stability	Final landform instability (e.g. Steep slopes, long slopes, erosion etc.) affecting revegetation and final land use capability.	3	3	13	• Undertake survey of final landforms prior to the placement of subsoil and topsoil, to verify establishment of desired grades and levels; and • Seek specialist advice for advice on aspects such as batter grades, drainage measures, slope lengths and slope curvature, and placement of mid-slope berms and drains.	2	3	9	• Implement repairs as necessary; and • Obtain specialist advice and review final landform goals. Amend rehabilitation and closure plans as required.
4.4	Landform suitability	Final landform unsuitable for intended land use (e.g. Slopes too steep for grazing, large rocks present affecting cultivation, settlement and surface subsidence leading to extended ponding etc.).	3	3	13	• Seek specialist advice and undertake agricultural land capability assessment. Agronomist to advise on aspects of landform development where a final land use of light grazing is sought; and • Quality control of landform preparation to ensure appropriate surface preparation, achievement of desired grades and drainage control.	2	3	9	• Implement repairs as necessary; and • Obtain specialist advice and review final landform goals. Amend rehabilitation and closure plans as required
4.5	Landform suitability	Landform aspect not properly considered when selecting target plant species, leading to poor rehabilitation outcomes.	3	3	13	• Aspect to be factored into revegetation design (eg use more drought tolerant species on exposed north facing slopes). Specialist advice to be sought when preparing revegetation plans.	2	3	9	• Seek specialist advice and revise revegetation program; and • Implement remedial actions such as resowing and implementing a watering program.
4.6	Water availability	Water availability inadequate for landform preparation	2	3	9	• If water supply is inadequate for proper landform preparation during earthworks, consider either suspending the action or ordering in supplemental water; and • Design the final landform with passive drainage as far as practicable and incorporate elements to encourage moisture infiltration and reduce runoff.	1	3	6	• Employ specialist contractor to undertake repairs ensuring; and • Obtain supplemental water to utilise during earthworks and landscape forming.
4.7	Dams and drains	Dams or major water conveyance structures inadequately designed or constructed for long term stability	3	4	18	• Final landform to be designed by suitably qualified personnel • Use experienced civil contractors and supervise works during major earthworks or drainage projects	2	3	9	• Seek specialist civil/geotechnical advice; and • Remedial measures to be implemented where dam or drain integrity is at risk. May involve repairs or complete rebuild.

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
						• Review of dam safety and integrity to be undertaken as part of final landform geotechnical assessment; and • Construction of major water storages or drains to be supervised and certified by suitably qualified personnel on completion.				
4.8	Access roads	Poor design or construction of retained access roads (including road drainage) causing ongoing erosion or instability issues	3	3	13	• Final landform including roads to be designed by suitably qualified personnel; and • Use experienced civil contractors and supervise works during major earthworks or drainage projects.	2	3	9	• Review stormwater drainage and assess need for new controls such as earth bunds and cross banks • Install new controls to manage surface water flows • Reconstruct damaged roads; and • Rehabilitate and revegetate disused tracks to stabilise soil surface and minimise the need for ongoing maintenance.
5. Growth Medium Development										
5.1	Soil resources	Poor knowledge and record keeping of subsoil and topsoil resources affects quality or availability of soil materials for rehabilitation.	3	3	13	• Audit and maintain up to date records of material type (topsoil and subsoil) quantity, quality and locations • Analyse stored topsoil prior to use to establish quality and amelioration requirements. A suitable guide to topsoil quality assessment would be used, eg *Guide for Selection of Topdressing Material* (Elliot & Veness, 1981). Test topsoil and subsoil materials • Assess availability of growth media against rehabilitation requirements and develop plans to address deficiencies; and • Conduct trials of blending processing wastes, overburden and other materials to produce desirable growing media. Testing to evaluate material physical and chemical properties. Specialist advice should be sought (e.g. agronomist or soil scientist).	2	3	9	• Seek specialist advice on growth media development where site resources are inadequate or perform poorly • Work with local suppliers to obtain and import topsoil to address any deficit; and • Ensure imported soil is of suitable quality, weed free and managed and spread to achieve rehabilitation goals.
5.2	Soil resources	Inadequate topsoil quality and volume available to achieve the desired final landform and rehabilitation plans	4	4	21	• Store topsoil appropriately to maintain optimum physical and chemical qualities, e.g. stockpile heights to be kept <3m high where practicable • Seed and fertilise stockpiles with an annual cover crop or with desirable native species,	3	3	13	• Work with local suppliers to obtain and import topsoil to address any deficit; and • Ensure imported soil is of suitable quality, weed free and managed and spread to achieve rehabilitation goals

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
						to help minimise weed infestation and improve organic matter • If practicable, revegetate topsoil stockpiles with native grasses to generate a seed bank of desirable species • When planning rehabilitation works, use the highest value growth media materials (i.e. topsoils) in situations where they will achieve maximum effect • Minimise wastage of high quality growing media, e.g. avoid use of topsoils in situations where lower quality materials would suffice, such as in creation of bunds; and • Seek specialist advice on growth media development where site resources are inadequate or perform poorly.				
5.3	Soil resources	Substrate inadequate to support achievement of native revegetation or agricultural land capability (e.g. inadequate soil depth, adverse soil chemical or physical properties, lack of organic matter, nutrient deficiency, lack of soil biota, and any other factors impeding the effective rooting depth, fertility or moisture holding capacity).	4	3	17	• Seek specialist advice when designing rehabilitation plans • Ameliorate subsoil and topsoil materials as determined necessary by material testing; and • Undertake revegetation trials to assess adequacy of growth media prior to larger scale establishment of growth medium across rehabilitation areas.	2	3	9	• Supplement onsite materials with imported topsoil, fertiliser and compost/mulch to improve soil fertility, soil biota and to make up deficit in topsoil volumes.
6. Ecosystem Establishment										
6.1	Seed quality	Poor seed viability, seed dormancy or poor germination, reduce revegetation success.	3	3	13	• Conduct germination testing and review of seed spreading and topsoil preparation techniques; and • Monitor revegetation performance.	2	3	9	• Review and adjust seeding rate or species type; and • Source alternate seed supply or increase seeding rate to account for lower germination rates.
6.2	Seed predation	Ant, insect or bird predation of seed reduce revegetation success.	2	2	5	• Monitor for predation and consider alternative seasons for plant establishment if significant predation occurs.	1	2	3	• Increase seeding rates and re-sow as necessary if seed predation is an issue.
6.3	Fertiliser	Damage to seed by mixing with fertilisers reduce revegetation success.	2	2	5	• Follow supplier's recommendations; and • Avoid over-fertilising soils where native plants are being established.	1	2	3	• Re-sow as necessary in response to poor germination.
6.4	Destructive weather events	Destructive weather and climatic events (e.g.	4	3	17	• Incorporate preventative measures (eg fire breaks, good drainage) into landform design	3	3	13	• Obtain specialist advice and prepare remediation plan to

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
		Drought; intense rainfall events; flood; bushfire etc.) causes damage to landform, soils or ecology of rehabilitation areas.				• Incorporate water storage into final landform design to assist resilience to drought and provide water for irrigation during vegetation establishment • Review weather forecasts regularly and adapt revegetation planning accordingly • Suspend revegetation work during extreme drought conditions if alternate water supply cannot be obtained; and • Plan for provision of supplementary water for irrigation always as part of revegetation planning.				address significant damage to ecology or landforms bought about due to climatic extremes; and • Implement remedial repairs.
6.5	Rehabilitation resources	Use of inappropriate rehabilitation machinery and equipment compromises ability to achieve rehabilitation outcomes or desired final landform.	3	3	13	• Hire specialised plant and contractors to undertake key rehabilitation tasks, such as seed spreaders, hydromulchers • Final landform including roads to be designed by suitably qualified personnel; and • Supervise rehabilitation activities and intervene promptly if damage or poor performance is occurring.	2	3	9	• Assess damage, develop and implement remedial actions that could include actions like scarification to soil surfaces, respreading topsoil and resowing seed.
6.6	Rehabilitation resources	Lack of resources for rehabilitation maintenance leading to failure to achieve rehabilitation and closure criteria.	4	3	17	• Rehabilitation inspection and maintenance to be an integral part of the site's operational management and monitoring system • Undertake formal annual rehabilitation surveys; and • Undertake regular inspections of rehabilitation areas (for example, as part of a weekly environmental inspection) to promptly identify risks and also success factors. Incorporate feedback into future rehabilitation planning.	2	3	9	• Engage specialist contractors in rehabilitation and maintenance.
6.7	Weeds	Weed infestation associated with both introduction and control (or lack thereof) within rehabilitation areas compromises rehabilitation targets and closure criteria.	4	3	17	• Visually screen rehabilitation seed mix to confirm free of weed seed • Obtain only high quality compost, mulches or manures that are certified weed free • Undertake weed inspection and control program (at least annually) as part of the Weed Management Plan and routine rehabilitation monitoring; and • Avoid use of topsoil material from stockpiles infested with weeds.	3	3	13	• Implement targeted weed eradication program employing specialist contractors.
6.8	Revegetation stresses	Damage or overgrazing from fauna (e.g. kangaroos, feral goats, etc.) and livestock	3	3	13	• Install exclusion fencing; and • Implement feral animal controls in consultation with relevant authorities.	2	3	9	• Implement feral animal controls in consultation with relevant authorities; and

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
		reducing vegetation establishment, reducing stability and causing erosion.								• Undertake revegetation repairs.
6.9	Infrastructure	Lack of infrastructure to support intended final land use (e.g. Dams, fences, watering facilities etc.).	3	3	13	• Assess infrastructure needs and incorporate details within the rehabilitation plans; and • Ensure infrastructure needs are accounted for in calculation of rehabilitation bonds.	2	3	9	• Review infrastructure needs as part of long term monitoring and install new infrastructure as required
6.10	Revegetation species	Inappropriate revegetation species mix for targeted final land use.	3	3	13	• Specialist advice to be sought when preparing revegetation mix. Advice to include consideration of desired final land use, slope/aspect, climatic, soil and other conditions.	2	3	9	• Obtain specialist advice to review the revegetation program and provide advice for revision as necessary; and • Implement remedial planting program.
6.11	Revegetation stresses	Insects and plant disease cause damage to the ecology of revegetation areas.	3	2	8	• Undertake pest inspection as part of routine monitoring.	2	2	5	• Seek specialist advice and implement recommended actions (e.g. pesticide control)
6.12	Revegetation goals	Lack of progress towards achievement of revegetation closure criteria (eg integration of native ecosystems with agricultural ecosystems as desired; poor development of target species and species diversity; limited structural development).	3	4	18	• Utilise annual rehabilitation surveys to assess progress towards completion criteria; and • Where revegetation progress is deemed inadequate or new risks are emerging, investigate the failing to understand likely causes and develop remedial actions to address deficiencies.	2	3	9	• Seek specialist advice. Ensure that learnings are factored into future rehabilitation planning, processes and monitoring.
6.13	Geotechnical risks	Geotechnical instability of rehabilitated landforms, eg slumping or cracking compromises ability to achieve the desired final landform	3	3	13	• Assess stability of landforms as part of routine rehabilitation monitoring • Record details of any structural defects such as depth and extent of cracking; and • Review efficacy of drainage infrastructure to ensure rehabilitated landforms are properly drained.	2	3	9	• Undertake geotechnical investigation and seek specialist advice for repair of major deformation; and • Repair landforms where deformation is observed to be persistent or worsening, and initiate revegetation.
6.14	Erosion and sedimentation	Erosion and loss of topsoil and subsoil compromises revegetation success and achievement of final land use goals	3	3	13	• Assess erosion and sedimentation status as part of routine rehabilitation monitoring. Factors to record include erosion extent, type (sheet, rill, gully) and severity • Review causes of erosion and implement targeted remedial measures that address the root cause • Review drainage and initiate new drainage works as required to control water flow around or across rehabilitated landscapes	2	3	9	• Seek specialist advice to address major erosion issues such as failing waterways, dam spillways or batter drop structures; and • Feed back learnings from erosion repairs into future landform and drainage design.

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
						• Review bank and waterway grades if scouring is occurring. Consider remedial options such as reducing grades or physically armouring waterway channels • Promptly repair and reshape eroded areas to prevent acceleration and progression of the erosion problem • Replace eroded topsoil, re-scarify and revegetate eroded areas; and • Consider application of spray on soil stabiliser, hydromulch etc for quick effective cover solution, particularly in high erosion hazard areas (e.g. waterways, steep slopes and batters).				
6.15	Dam and drainage failure	Failure of drainage and water management/storage structures, causing significant loss of sediment, damage to infrastructure and landforms.	3	4	18	• Inspect water storages regularly for any signs of compromised integrity, such as tunnelling or tension cracking of dam embankments.	2	3	9	• Seek specialist advice where integrity of major waterways or storage structures is compromised and implement remedial measures promptly.
7. Ecosystem and Land Use Development										
7.1	Destructive weather events	Weather and climatic influences (e.g. drought; intense rainfall events; bushfire etc.) causes damage to landform, soils or ecology of rehabilitation areas.	4	3	17	• Incorporate drought tolerant species in the Revegetation plan • Develop the landform design to assist climate resilience (e.g. encouraging moisture infiltration) • Develop growth media to maximise moisture retention (e.g. by utilising clayey materials in subsoil development) • Consider incorporation of micro-relief and microhabitat development in landscape design; and • Consider fire breaks and asset protection zones in bushfire prone areas.	3	3	13	• Obtain specialist advice and prepare remediation plan to address significant damage to ecology or landforms bought about due to climatic extremes; and • Implement remedial repairs.
7.2	Vandalism and unauthorised access	Vandalism causes damage to the landform, soils or ecology of revegetation areas.	3	3	13	• Maintain security measures and include routine site security monitoring.	2	3	9	• Review security measures and implement additional controls as necessary; and • Repair any damage.
7.3	Vandalism and unauthorised access	Inadvertent or unauthorised access by mining equipment and vehicles causes damage to the landform, soils or	3	3	13	• Maintain security measures and include routine site security monitoring.	2	3	9	• Review security measures and implement additional controls as necessary; and • Repair any damage.

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
		ecology of revegetation areas.								
7.4	Water quality	Post-closure water quality is unsuited to the final land use or causes ongoing pollution (e.g.acid-drainage, high salinity, high suspended solids etc.).	3	3	13	• Monitor water quality to address any risks identified during mining or landform development; and • Implement additional controls as necessary, such as sediment traps or other source controls.	2	3	9	• Seek specialist advice and implement remedial measures that may include new water treatment measures or removal of contaminant source.
7.5	Revegetation stresses	Insects and plant disease cause damage to the ecology of revegetation areas.	3	2	8	• Monitor vegetation success and plant health to allow quick identification of pest issues.	2	2	5	• Seek specialist advice and implement pest eradication program.
7.6	Revegetation stresses	Overgrazing of pasture rehabilitation areas by livestock and wildlife damages revegetation areas, reducing vegetation establishment, reducing stability and causing erosion.	3	3	13	• Prevent grazing as far as possible until completion criteria achieved in lands destined for grazing. Exclude stock permanently from native ecosystem areas • Control feral animals to prevent overgrazing; and • Employ fencing or alternative to prevent stock and feral animal access.	2	3	9	• Implement feral animal controls in consultation with relevant authorities • Review efficacy of fencing and implement repairs or install new fencing as required; and • Undertake revegetation repairs.
7.7	Rehabilitation resources	Lack of resources for rehabilitation maintenance leading to failure to achieve rehabilitation and closure criteria.	3	3	13	• Maintain an adequate bond for long term maintenance and regularly review the bond as part of the annual rehabilitation report and forward program submission process; and • Ensure ecosystem development is sufficiently progressed towards final goals before closure criteria are signed off, to minimise need for post-closure maintenance.	2	3	9	• Escalate major rehabilitation and closure risks to senior management and seek additional funding if necessary for targeted maintenance and remedial programs.
7.8	Rehabilitation damage	Re-disturbance of established rehabilitation areas results in failure to achieve rehabilitation and closure criteria.	3	3	13	• Prevent unauthorised access; and • Routinely monitor rehabilitation areas to identify and repair any unwanted disturbance.	2	3	9	• Review efficacy of fencing, security measures and staff training, to ensure rehabilitation goals are widely understood and observed; and • Implement repairs or install new fencing as required.
7.9	Fauna mortality	Fauna entrapment and mortality in dams, final void etc. due to unsafe landforms.	3	3	13	• Develop a water management plan in conjunction with a decommissioning procedure that details measures like safety and access prevention	2	3	9	• In the event of fauna mortality or unsafe conditions, review efficacy of fencing and other security measures and implement remedial actions.

Risk ID	Risk Issue	Description of Risk and Trigger	Risk Rating (pre-Control)			Preventative Controls	Residual Risk			Response actions to be considered if the risk eventuates
						• Provide fencing around the perimeter of the mine pit and any dangerous water storages to prevent fauna access; and • Design the final landform and water bodies to enable self-rescue of fauna (eg shallow gradient ramps for access).				
7.10	Public and stock safety	Unauthorised access past security fence due to poor design or damage of exclusion measures, results in safety risks to people and fauna such as fall from height hazards, unstable slopes and deep water	3	3	13	• Rehabilitation plan will provide for fencing to be installed around the perimeter of the mine pit to prevent uncontrolled access to this area • Install locked entry gate at site access • Install signage warning of dangers and to deter unauthorised entry; and • Address public and stock safety as part of final landform design and include necessary safety elements such as bench bunds above unsafe edges and fencing.	2	3	9	• In the event of fauna mortality or unsafe conditions, review efficacy of fencing and other security measures and implement remedial actions.

4. Rehabilitation objectives and rehabilitation completion criteria

4.1 Rehabilitation objectives and completion criteria

Table 11 presents a copy of the proposed, yet to be approved rehabilitation objectives. Preliminary rehabilitation completion criteria have also been included in the table below; however, the rehabilitation completion criteria will be revised and submitted for approval to the NSW Resources Regulator portal three years before the mining operations cease.

Table 11: Proposed rehabilitation objectives and rehabilitation completion criteria

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator	Proposed Rehabilitation Completion Criteria	Justification/Validation Methods
Infrastructure	Infrastructure area Overburden emplacement area Active mining area	Removal of redundant infrastructure: All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.	Removal of infrastructure and services, including the following: • Buildings, processing infrastructure and industrial equipment • Fuel and chemical tanks and drums in accordance with departmental guidelines. • Mining roads. • Water pumps and pipelines. • Ground water piezometers sealed • Hazardous and contaminated materials • Offices/ laboratory, stores and workshops; and • Crushing and lime processing plant.	All built infrastructure including utilities removed. Hazards isolated and secured.	• Statement provided, utility service disconnection record/notification. • Decommissioning reports; and • Before and after photos.
		Retained infrastructure: All infrastructure that is to remain at the conclusion of mining is in a condition that does not present undue risk to safety or the environment. This includes some working hardstand areas and existing access roads.	• Hardstands and tracks retained in a fit for service condition that is safe and stable; and • Engineering and structural stability reports.	Retained infrastructure is safe, stable and non-polluting. Hazards isolated and secured.	Engineering report/statement and photos.
		Landform and drainage systems: Landforms associated with retained infrastructure are stable with adequate drainage	Drainage is adequate Landforms are safe and stable	Drains are performing under a range of climatic scenarios and are free of appreciable erosion Landforms are safe and stable	Before and after photos, rehabilitation monitoring reports, as-constructed surveys, erosion surveys, independent geotechnical reports (where required) and or erosion modelling reports (where required) that indicate long-term stability of rehabilitated landform.
		Land contamination: Land, water and soils are free from contamination, compatible with the final land use and pose no threat of environmental harm	• Wastes and visible indicators of contamination are removed; and • Soils (and where required water) tested and confirmed free of contamination and fit for final land use in accordance with applicable guidelines including the National Environment Protection (Assessment of Site Contamination) Measure (1999).	No visible signs of contamination. Waste materials removed Contamination assessments confirm site is fit for final land use and does not present an ongoing contamination risk	Land contamination assessment Validation reports

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator	Proposed Rehabilitation Completion Criteria	Justification/Validation Methods
Agricultural Grazing	Infrastructure area Overburden Emplacement	Removal of redundant infrastructure: All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.	Removal of infrastructure and services, including the following: • Buildings, processing infrastructure and industrial equipment • Fuel and chemical tanks and drums in accordance with departmental guidelines. • Mining roads. • Water pumps and pipelines. • Ground water piezometers sealed • Hazardous and contaminated materials; and • Offices/ laboratory, stores and workshops.	All utility infrastructure removed. Hazards isolated and secured.	• Statement provided, utility service disconnection record/notification. • Decommissioning reports; and • Before and after photos.
		Land contamination: Land, water and soils are free from contamination, compatible with the final land use and pose no threat of environmental harm	• Wastes and visible indicators of contamination are cleaned up; and • Soils (and where required water) tested and confirmed free of contamination and fit for final land use in accordance with applicable guidelines including the National Environment Protection (Assessment of Site Contamination) Measure (1999).	No visible signs of contamination. Waste materials removed Contamination assessments confirm site is fit for final land use and does not present an ongoing contamination risk	Land contamination assessment Validation reports
		Landform establishment: Landform constructed to be safe, stable, non-polluting and support the final land use	Indicators of landform suitability include: • Slope grade • Landform shape • Indicators of dispersive soil • Soil surface condition • Indicators of erosion; and • Drainage condition	• Slopes regraded to≤ 18^0 • Landform blends with surrounding landscape • Exchangeable Sodium Percentage (ESP) ≤6% for topsoil materials • Absence of gullies >300mm wide or deep or gullies stable; and • Absence of tunnel erosion intake or outlets points.	Before and after photos, rehabilitation monitoring reports, as-constructed surveys, erosion surveys, soil test reports, independent geotechnical reports (where required) and or erosion modelling reports (where required) that indicate long-term stability of rehabilitated landform.
		Growth media: Suitable growth media established (topsoil and subsoil) to support desired agricultural activities	Topsoil / subsoil of suitable quality is re-spread to the recommended depth	• Topsoil and subsoil placed to minimum depths as recommended by rehabilitation specialist. • Ameliorant applied in accordance with soil testing results • Soil condition prepared to encourage moisture infiltration and retention	Rehabilitation monitoring reports
		Resource recovery: recovery and replacement of landform resources to support ecological outcomes	Presence of woody debris and rocks: Woody debris and rocks replaced in the final landform as identified in Closure and Rehabilitation Management Plan	Rates as identified in Closure and Rehabilitation Management Plan achieved	Rehabilitation monitoring reports

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator	Proposed Rehabilitation Completion Criteria	Justification/Validation Methods
		Functionality of soils and vegetation: Soil, landform and vegetation systems are functional and tending towards analogue sites	Rapid rehabilitation survey indicates soil, landform and vegetation systems tending towards analogue sites including for the following indicators: • Vegetation cover (eg type, health, abundance, structure) • Weeds (presence, type, severity) • Surface water and drainage (diversion, stability, lining integrity, discharge stability) • Soil physical and chemical characteristics are suitable for the final land use. • Erosion risks (soil exposure %, presence, type and severity of erosion eg sheet, rill and gully); and • Land and Soil Capability or Agricultural Land Classification criteria.	Indicative completion criteria are: • Priority weed numbers absent to very low (<5% cover) • Vegetation cover to >70% and trending towards achieving >90% without the need for active intervention; and • Soils are stable, fertile and supporting the desired vegetation mix.	• Hydromulch contractor report • Rehabilitation monitoring report • Soil survey report; and • Photos before and after.
		Grassland and pasture establishment: Grassland and pasture are on trajectory to forming a self-sustaining ecosystem	Approved grassland and pasture species mix is sown at the specified sowing rate as recommended by agronomist or rehabilitation specialist.	Rehabilitation monitoring reports to confirm that >80% of the total projected foliage cover is achieved.	Seed mix specification Rehabilitation monitoring report • Photos.
			Pasture species established at desired mix and density:	Indicative completion criteria are: • Pasture quantity (herbage mass/ plant height) 700-2900kg DM/ha • Pasture quality meets criteria specified by an agronomist; and • Species composition meets composition specified by an agronomist.	• Rehabilitation monitoring reports; and • Agronomist report.
		Vertebrate pests are controlled and excluded from rehabilitation areas.	Faunal exclusion fencing and/or tree guards are installed (where required) to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	Presence and damage is recorded and controlled.	Rehabilitation monitoring report
		Management measures are implemented to minimise bushfire risks in rehabilitation areas	Bushfire mitigation measures based on advice from the NSW Rural Fire Service have been implemented as necessary including managing fuel loads, maintaining fire-breaks and fire-fighting access documented in a Bushfire Management Plan.	Bushfire controls implemented.	Bushfire management plan Acknowledgement of RFS
Native Ecosystem (Woodland & Pine Forest)	Infrastructure area Active mining area	Removal of redundant infrastructure: All infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.	Removal of infrastructure and services, including the following: • Fuel and chemical tanks and drums in accordance with departmental guidelines • Mining roads • Water pumps and pipelines; and • Ground water piezometers sealed • Hazardous and contaminated materials.	All utility infrastructure removed.	• Statement provided, utility service disconnection record/notification. • Decommissioning reports; and • Before and after photos.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator	Proposed Rehabilitation Completion Criteria	Justification/Validation Methods
		Land contamination: Land, water and soils are free from contamination, compatible with the final land use and pose no threat of environmental harm	• Wastes and visible indicators of contamination are cleaned up; and • Soils (and where required water) tested and confirmed free of contamination and fit for final land use in accordance with applicable guidelines including the National Environment Protection (Assessment of Site Contamination) Measure (1999).	No visible signs of contamination. Waste materials removed Contamination assessments confirm site is fit for final land use and does not present an ongoing contamination risk	Final testing and validation report
		Landform establishment: Landform constructed to be safe, stable, non-polluting and support the final land use	Indicators of landform suitability include: • Slope grade • Landform shape • Indicators of dispersive soil • Soil surface condition • Indicators of erosion; and • Drainage condition	• Slopes regraded to≤ 18° • Landform blends with surrounding landscape • Exchangeable Sodium Percentage (ESP) ≤6% for topsoil materials • Absence of gullies >300mm wide or deep or gullies stable; and • Absence of tunnel erosion intake or outlets points.	Before and after photos, rehabilitation monitoring reports, as-constructed surveys, erosion surveys, soil test reports, independent geotechnical reports (where required) and or erosion modelling reports (where required) that indicate long-term stability of rehabilitated landform.
		Growth media: Suitable growth media established (topsoil and subsoil) to support desired agricultural activities	Topsoil / subsoil of suitable quality is re-spread to the recommended depth	Topsoil and subsoil placed to recommended minimum depths of 0.5m (subsoil) and 0.05m (topsoil) or as recommended by rehabilitation specialist	Rehabilitation monitoring reports
		Resource recovery: recovery and replacement of landform resources to support ecological outcomes	Presence of woody debris and rocks: Woody debris and rocks replaced in the final landform as identified in Closure and Rehabilitation Management Plan	Rates as identified in Closure and Rehabilitation Management Plan are achieved	Rehabilitation monitoring reports
		Functionality of soils and vegetation: Soil, landform and vegetation systems are functional and tending towards analogue sites	Rapid rehabilitation survey indicates soil, landform and vegetation systems tending towards analogue sites including for the following indicators:.. • Vegetation cover (eg type, health, abundance, structure) • Weeds (presence, type, severity) • Surface water and drainage (diversion, stability, lining integrity, discharge stability) • Soil physical and chemical characteristics are suitable for the final land use; and • Erosion risks (soil exposure %, presence, type and severity of erosion eg sheet, rill and gully).	Indicators of soil and vegetation functionality include: • Priority weed numbers absent to very low (<5% cover) • Vegetation cover to >70% and trending towards achieving >90 without the need for active intervention; and • Soils are stable, fertile and supporting the desired vegetation mix.	• Hydromulch contractor report • Rehabilitation monitoring report • Soil survey report; and • Photos before and after.
		Woodland tree plantings are established on areas disturbed by mining operations	Approved vegetation community species mix is sown at the specified sowing rate.	Rehabilitation monitoring reports to confirm that >70% of the total projected foliage cover is achieved.	• Seed mix specification • Rehabilitation monitoring report; and • Photos.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator	Proposed Rehabilitation Completion Criteria	Justification/Validation Methods
			Vegetation self-sustaining	Monitoring confirms: Evidence of recruitment and successive generations of the planted species. No further active weed control required (beyond that considered necessary at analogue sites or in the region generally)	• Rehabilitation monitoring report.
		Establishment of native ecosystem	Approved vegetation community species mix is sown at the specified sowing rate.	Rehabilitation monitoring reports to confirm that >80% of the total projected foliage cover is achieved. Revegetation monitoring confirms that >80% of the species sown become established through supplementary planting if required	Seed mix specification Rehabilitation monitoring report Photos
		Vegetation communities are on a trajectory to forming a self-sustaining ecosystem	Native species diversity is consistent with relevant vegetation community identified by a specialist.	Revegetation monitoring confirms that the desired vegetation community is established with respect to floristic species diversity, abundance and cover	Rehabilitation monitoring report
			Vegetation self-sustaining	Monitoring confirms: Evidence of recruitment and successive generations of the planted species; No further active weed control required (beyond that considered necessary at analogue sites or in the region generally)	Rehabilitation monitoring report
		Bushfire: Management measures will be implemented to minimise bushfire risks in rehabilitation areas	Bushfire mitigation measures based on advice from the NSW Rural Fire Service have been implemented as necessary including managing fuel loads, maintaining fire-breaks and fire-fighting access documented in a Bushfire Management Plan	Bushfire controls implemented.	Bushfire management plan Acknowledgement of RFS
		Vertebrate pests are controlled and excluded from rehabilitation areas	Faunal exclusion fencing and/or tree guards are installed (where required) to exclude vertebrate pest species from rehabilitation areas / juvenile vegetation.	Presence and damage is recorded and controlled.	Rehabilitation monitoring report
			Vertebrate pest density: Vertebrate pest species presence and densities are monitored, and control programs implemented when required.		Rehabilitation monitoring report
Water Management Areas	Water Management Area (Dams)	Sediment dams: Dams are desilted and operational equipment removed where retained as clean water dams in the final landform.	Sediments accumulated in mine water and sediment dams will be removed from the dam floor and emplaced in the final void. All ancillary equipment including pumps and pipelines will be removed and services terminated	Dams desilted and ancillary equipment removed, supported by records	Inspection report.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator	Proposed Rehabilitation Completion Criteria	Justification/Validation Methods
		Surface water management structures are designed in accordance with industry standards and guidelines	Indicators include: • Drains are stable and with adequate capacity to manage design flows • Retained dams have suitably sized spillways • Run-on water diverted around voids to a stable drainage line; and • Any areas of concentrated flow to be lined as necessary to ensure non-erosive flow velocities.	Water management structures are in a stable condition and performing as intended	As constructed reports
		Dam water quality: Water quality in retained dams is appropriate for final land use (stock watering and/ or agricultural use)	Water quality indicators include: • No evidence of ongoing water quality impacts from mining • Water quality fit for stock and domestic use	Water quality analysed and proven fit for stock and domestic use. Typical acceptance criteria include: • EC <1500µs/cm • pH 6.5 -8.5 • TSS 50 mg/L; and • Oil and grease 10mg/L • No algal blooms	Water quality results
		Water licensing: Structures that take or hold water are licensed if required subject to relevant legislation (eg Water Management Act 2000) and water sharing rules	• Investigation of basic water rights and obligations under applicable water legislation; and • Advice from Government Agency.	Water license and applicable volumetric entitlement held where required	Water license investigation
Final void	Active Mining Area (Open pit void)	Final void safe, stable and non-polluting	• Final void landform designed and constructed in accordance with geotechnical advice • Exclusion fence and bunding in place around void high walls and unsafe landforms.	Geotechnical report Exclusion fence and bunding installed	Geotechnical and closure reports
		Rehabilitation of mine void undertaken in accordance with the approved final landform	• Batter and bench stability • Benches revegetated in accordance with the Rehabilitation and Closure Plan.	Batters reshaped as necessary to achieve design criteria Batters descaled of loose rock Geotechnical report confirms the final void is safe and stable	Geotechnical and closure reports
		Water retained in final void is appropriate for final land use (stock watering and/ or agricultural use)	Water quality indicators include: • No evidence of ongoing water quality impacts from mining • Water quality fit for stock and domestic use	Water quality analysed and proven fit for stock and domestic use. Typical acceptance criteria include: • EC <1500µs/cm • pH 6.5 -8.5 • TSS 50 mg/L; and • Oil and grease 10mg/L • No algal blooms	Water quality laboratory results.

4.2 Stakeholder consultation

The Environmental Impact Assessment (EIS) (David Mitchell – Melcan, 1995) prepared for the DA 95-77 stated that the final landform for the mine would be a combination of low-intensity grazing and/or nature conservation land use, except the open cut mine void. A consultation process was undertaken during the preparation of the EIS. A summary of the consultation is provided in Table 12.

Table 12: Summary of stakeholder consultation during EIS

Stakeholder	Level of engagement	Aim of engagement	Matters raised regarding rehabilitation
Representatives of Attunga Residents Action Group (Inc)	Inform/involve	To discuss issues of interest to the group	Request for a rehabilitation plan and timetable, which was addressed in the EIS.
Surrounding neighbours	Inform/involve	To assist various residents' concerns	Request to address the visibility of the existing site and the visibility of new operations. The rehabilitation objectives in the EIS aim that the final landform blends with the surrounding land fabric that is not visually intrusive to the residents within the area or travellers on Manilla or Garthowen Roads.
Tamworth Environmental Centre	Inform/involve	To provide comments on the Flora and Fauna report	Request for mine rehabilitation to be addressed in the EIS.

5. Final landform and rehabilitation plan

5.1 Final landform and rehabilitation plan – electronic copy

Figures 2 to 4 are the electronic copies of the final landform and rehabilitation plan submitted to the mine rehabilitation portal.

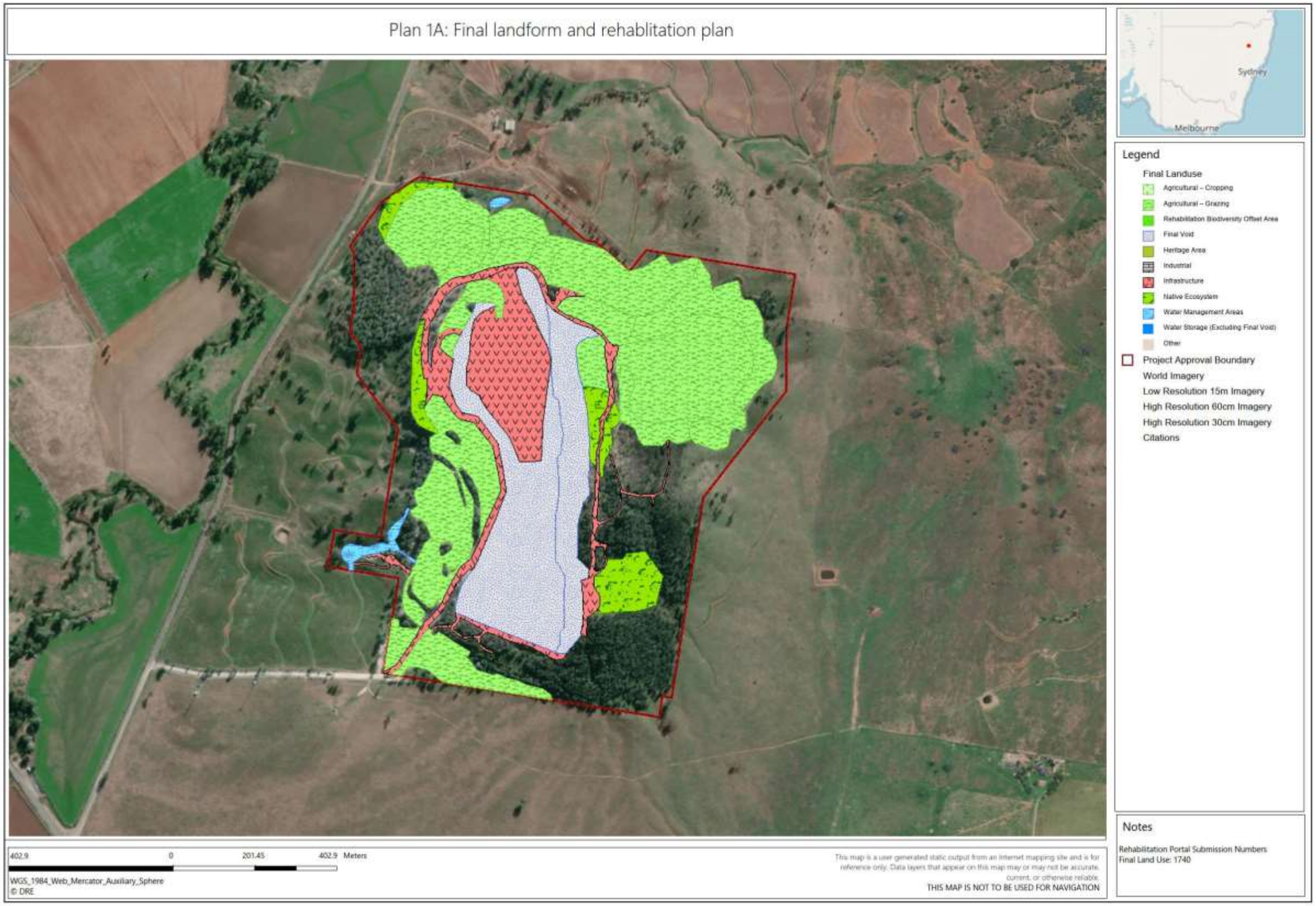

Figure 2: Final landform and rehabilitation plan - Final land use

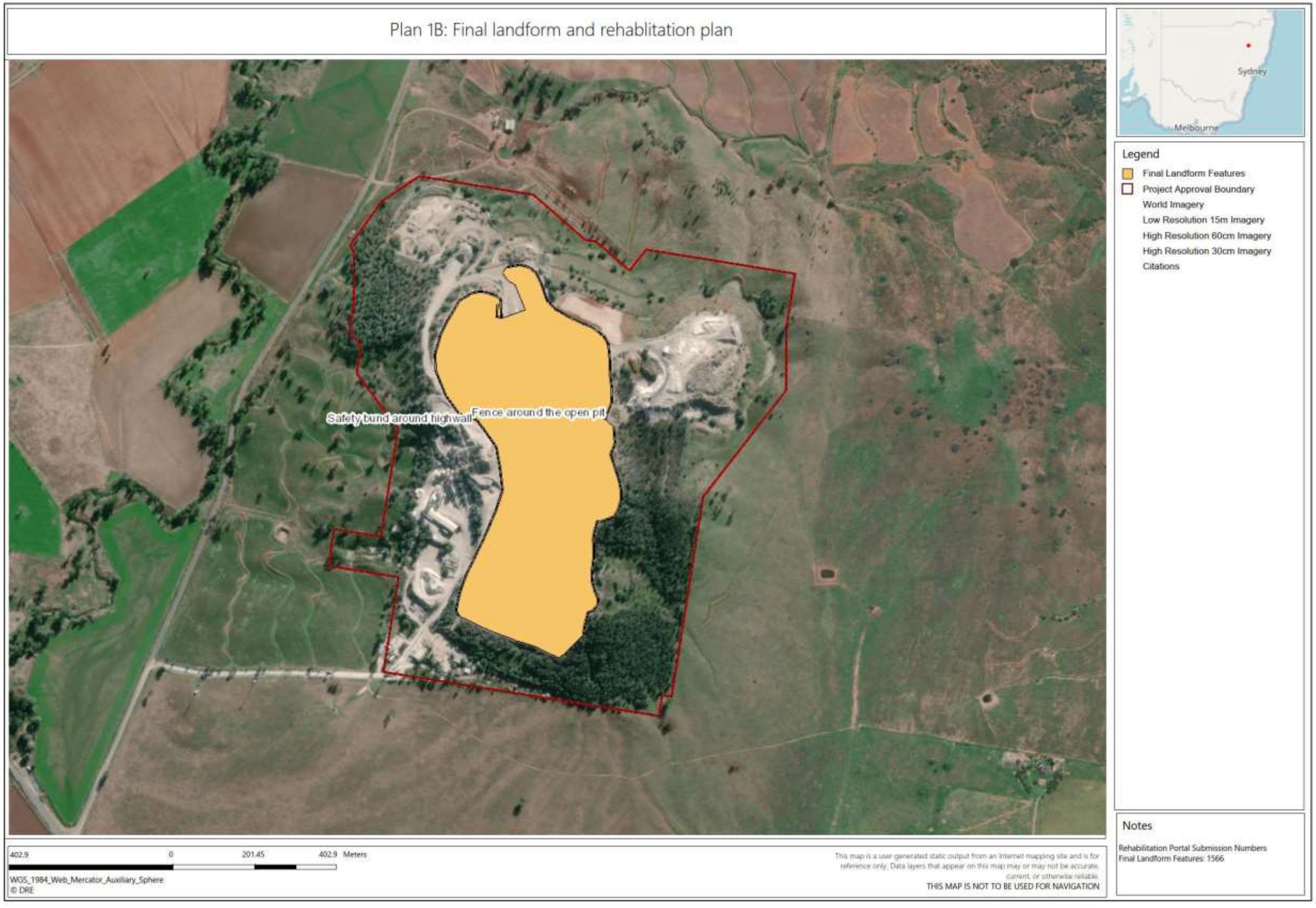

Figure 3 Final landform and rehabilitation plan - Final landform features

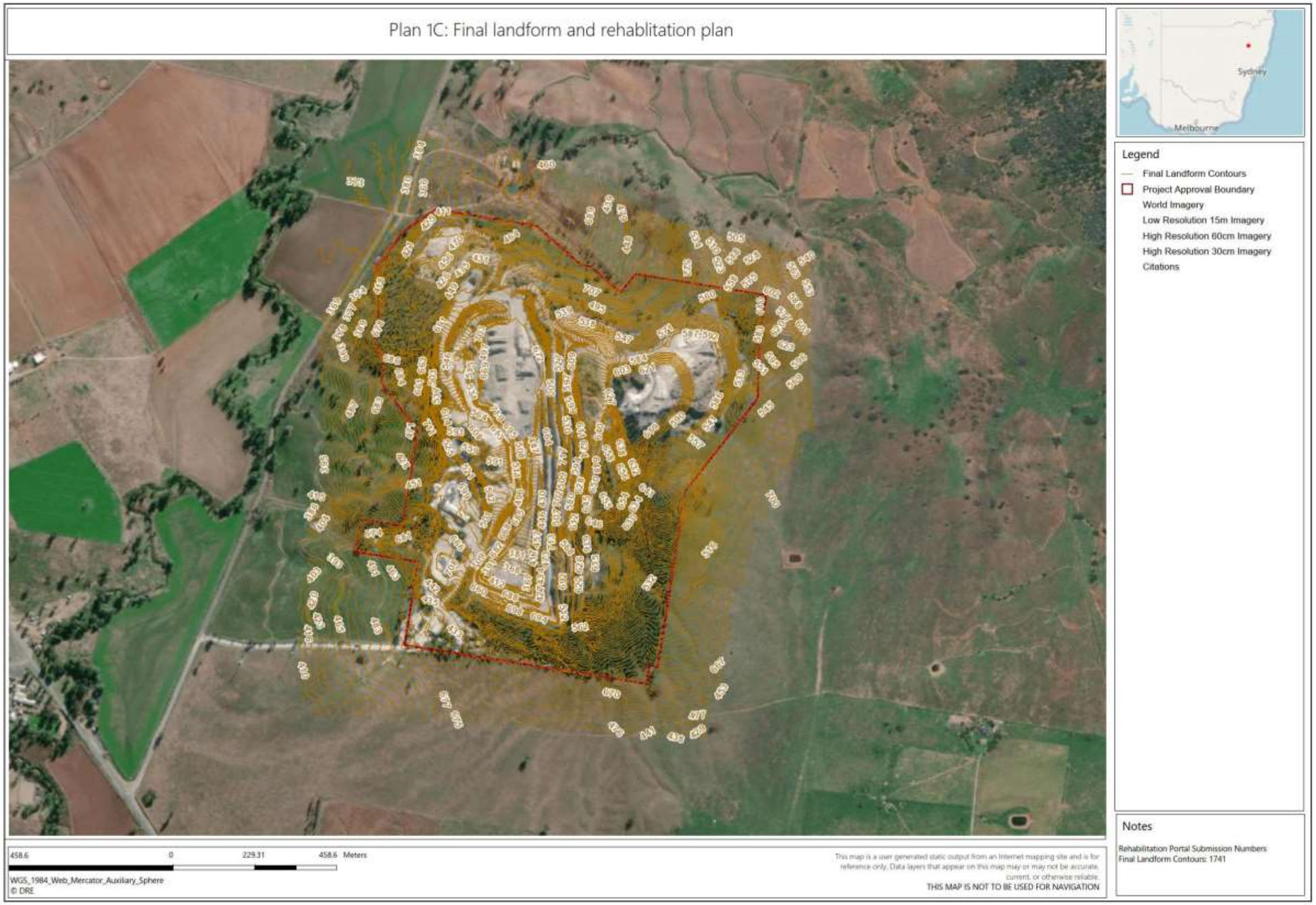

Figure 4: Final landform and rehabilitation plan – Final landform contours

6. Rehabilitation implementation

6.1 Life of mine rehabilitation schedule

Table 13 presents the proposed rehabilitation schedule from 2022 to 2038 at yearly, two-yearly and five-yearly intervals.

Table 13: Rehabilitation mine schedule

Disturbance ID	Area Description	Final Land Use Domain	Area (m^2)	Rehab Phase – as of February 2022	Rehab Start Date	Rehab Status 2022	Rehab Status 2023	Rehab Status 2024	Rehab Status 2026	Rehab Status 2031	Rehab Status 2036	Year 2038 (status)
Infrastructure Domain												
IA1	Offices and Work Shops	Agriculture - Grazing	19,554	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA2	Stockpiles - crushed rock	Agriculture - Grazing	12,389	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA3 Lower bench	Stockpiles - crushed rock	Agriculture - Grazing	24,688	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA3 East	Stockpiles - crushed rock	Agriculture - Grazing	2,102	Active Mining	2023	Landform Establishment	Landform Establishment	Growth Media Development	Ecosystem and Land Use Establishment	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
IA3 Top bench	Stockpiles - crushed rock	Agriculture - Grazing	6,805	Active Mining	2024			Landform Establishment	Ecosystem and Land Use Establishment	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
IA4	Stockpiles - scalps	Agriculture - Grazing	6,255	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA5	Stockpiles - topsoil	Agriculture - Grazing	2,250	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA6	Stockpiles - topsoil	Agriculture - Grazing	3,829	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA7	Road - bitumen	Infrastructure	3,474	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA8	Road - gravel	Infrastructure	3,692	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA9	Road - gravel	Infrastructure	1,298	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion

Disturbance ID	Area Description	Final Land Use Domain	Area (m^2)	Rehab Phase – as of February 2022	Rehab Start Date	Rehab Status 2022	Rehab Status 2023	Rehab Status 2024	Rehab Status 2026	Rehab Status 2031	Rehab Status 2036	Year 2038 (status)
IA10	Road - gravel	Infrastructure	31,380	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA11	Stockpiles - crushed rock	Agriculture - Grazing	2,756	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA12	Stockpiles - crushed rock	Agriculture - Grazing	1,261	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
IA14	New Ramp	Agriculture - Grazing	3,963	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
Overburden Emplacement Domain												
R1	Overburden Emplacement Area	Native Ecosystem	14,279	Ecosystem and Land Use Development	1994	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R2	Overburden Emplacement Area	Agriculture - Grazing	29,807	Ecosystem and Land Use Development	2012	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R3	Screening Bund - Overburden	Native Ecosystem	4,173	Ecosystem and Land Use Development	1997	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R4	Overburden Emplacement Area	Native Ecosystem	5,643	Ecosystem and Land Use Development	2000	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R5	Overburden Emplacement Area	Agriculture - Grazing	6,398	Ecosystem and Land Use Development	2004	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R6	Overburden Emplacement Area	Agriculture - Grazing	17,991	Ecosystem and Land Use Development	2007	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R7	Overburden Emplacement Area	Agriculture - Grazing	7,444	Ecosystem and Land Use Development	2010	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R8	Overburden Emplacement Area	Native Ecosystem	7,564	Ecosystem and Land Use Establishment	2016	Ecosystem and Land Use Establishment	Ecosystem and Land Use Establishment	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R9	Overburden Emplacement Area	Agriculture - Grazing	8,958	Ecosystem and Land Use Establishment	2020	Ecosystem and Land Use Establishment	Ecosystem and Land Use Establishment	Ecosystem and Land Use Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
R10	Overburden Emplacement Area	Agriculture - Grazing	2,657	Growth Media Development	2022	Growth Media Development	Growth Media Development	Ecosystem and Land Use Establishment	Ecosystem and Land Use Establishment	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion

Disturbance ID	Area Description	Final Land Use Domain	Area (m^2)	Rehab Phase – as of February 2022	Rehab Start Date	Rehab Status 2022	Rehab Status 2023	Rehab Status 2024	Rehab Status 2026	Rehab Status 2031	Rehab Status 2036	Year 2038 (status)
OEA1	NE Overburden top	Agriculture - Grazing	48,477	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
OEA2	In pit Overburden Area	Infrastructure	44,009	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
OEA3	R10 extension	Agriculture - Grazing	4,073	Active Mining	2022	Landform Establishment	Growth Media Development	Ecosystem and Land Use Establishment	Ecosystem and Land Use Establishment	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
OEA4	NE Overburden south batters	Agriculture - Grazing	10,457	Active Mining	2033						Rehabilitation Completion	Rehabilitation Completion
Open Pit Domain												
AMA1	Jackson open pit - West	Final Void	81,643	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
AMA2	Jackson open pit - East	Final Void	38,282	Active Mining	2033						Ecosystem and Land Use Development	Rehabilitation Completion
AMA2 - 433 berm	East berm -433 level	Final Void		Active Mining	2023	Landform Establishment	Landform Establishment	Growth Media Development	Ecosystem and Land Use Establishment	Rehabilitation Completion	Rehabilitation Completion	Rehabilitation Completion
AMA2 - 422 berm	East berm -422 level	Final Void		Active Mining	2024			Landform Establishment	Growth Media Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion
AMA2 - 411 berm	East berm -411 level	Final Void		Active Mining	2025				Growth Media Development	Ecosystem and Land Use Development	Rehabilitation Completion	Rehabilitation Completion
Beneficiation Facility Domain												
BE1	Crushing plant area		17,601	Active Mining	2033							Rehabilitation Completion
BE2	Burnt lime plant area		16,148	Active Mining	2033							Rehabilitation Completion

6.1.1 Rehabilitation from 1994 to 2020

Rehabilitation activities commenced in 1994. A summary of the key rehabilitation activities undertaken from 1994 to 2021 is as follows:

- In 1994, rehabilitation activities were undertaken in the south-eastern corner of the lease (referred to as area “R1”)
- From 1996 to 1998, further rehabilitation was completed in the northern and north-western areas of the lease (areas R2 and R3). This included extensive stabilisation of the northern overburden dump batters and the north-western stockpile area
- In 2000, an area of the western slope, disturbed in earlier mining campaigns, was rehabilitated to increase the visual amenity of the operation (area R4)
- In 2004, rehabilitation work was completed on the northern overburden dump, over a part of the north-facing batters (area R5)
- In 2007, rehabilitation of a large part of the north-facing batters of the overburden dump occurred (area R6)
- In 2010, rehabilitation of the large, east-facing batters of the overburden dump occurred (area R7)
- In 2019, a rehabilitation trial was commenced on the upper eastern visible bench area (area R8). This included pushing overburden and topsoil (in separate strips) against the bench face, ameliorating overburden and hydro mulching the area
- In 2020, additional rehabilitation of the north-facing batters of the northern overburden dump was undertaken (area R9). The area was ripped, topsoil applied, track walked (up and downslope) to give roughness, and then hydro mulched; and
- A rehabilitation trial was undertaken throughout 2020-2021 for the upper eastern bench area, to compare the use of topsoil as an establishment medium against ameliorated overburden.

Figure 5 shows a visual representation of the above rehabilitation summary. Table 14 provides additional details of the rehabilitation status of the ALM site completed by the end of 2020.

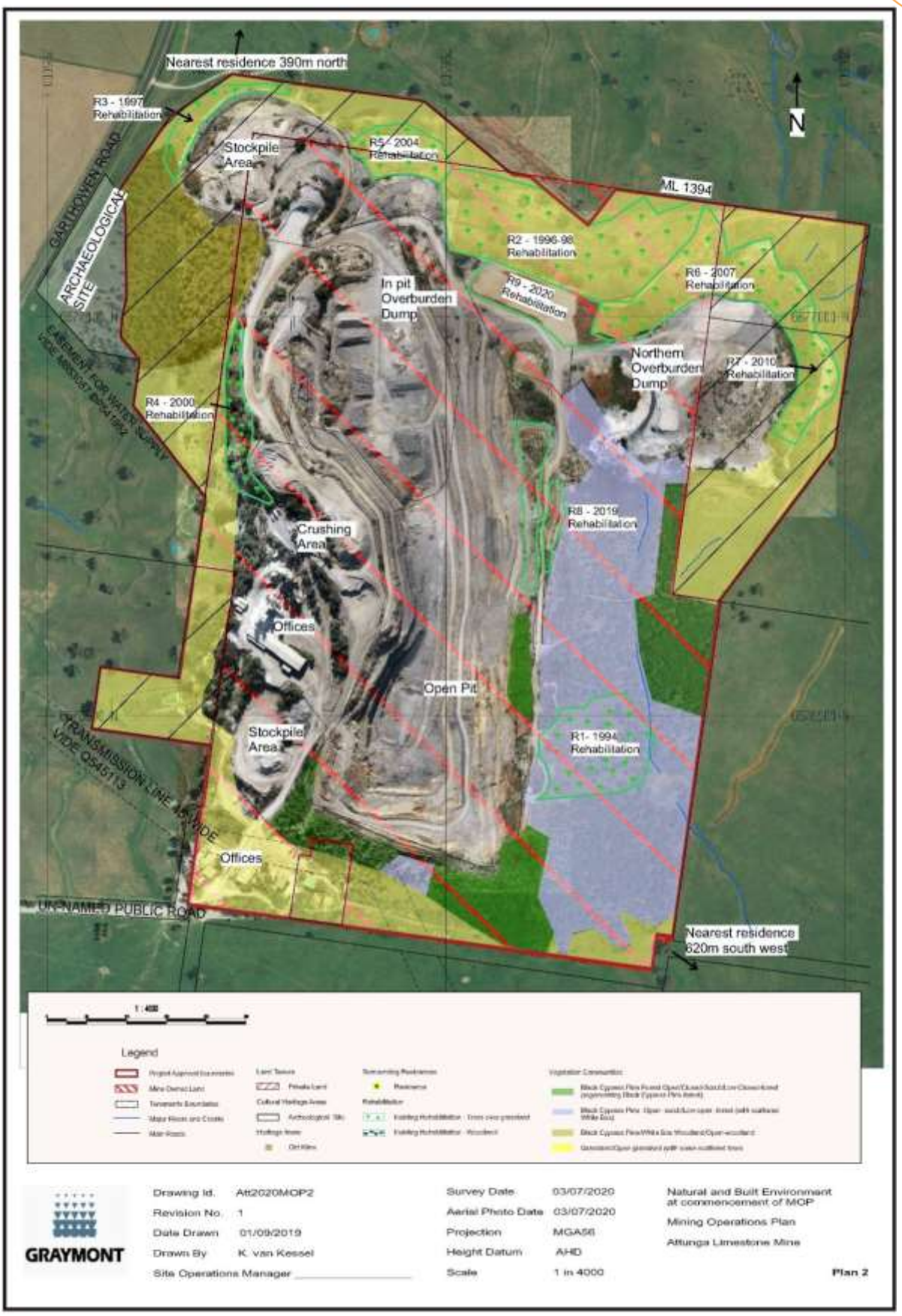

Figure 5: Status of rehabilitation by November 2020

Table 14: Rehabilitation status and completed activities

Rehab Area	Year Activity Completed			Final Land Use Domain	Closure Status			Overall Status and Improvement Opportunities
	Stable Landform	First Vegetation Planted	Additional Vegetation Planted		Stability	Biodiversity		
					Erosion Gullies	***Vegetation Cover***	***Native tree Species Composition***	
R1	1994	1994		Native Ecosystem	Stable surface, minimal evidence of erosion.	Good grass coverage. Good tree coverage and growth.	Predominately White Cedar uniformly spaced.	Nearing completion.
R2	1996	1998	2012	Grazing	Stable surface, minimal evidence of erosion.	Good grass coverage with some larger trees – dominated by large Pepper Trees.	Some establishment of Black Cypress, Kurrajong, and a variety of other Eucalypt species in scattered areas.	In progress. Both number and variety of native species plantings could be improved. Consider removing Pepper trees once natives are established.
R3	1997	1997		Grazing	Stable surface, minimal evidence of erosion.	Good grass coverage.	NIL	In progress. Number and variety of native species planting could be improved.
R4	2000	2000		Native Ecosystem	Severe erosion gullies in the southern section. Minimal erosion in the northern section.	Negligible vegetation coverage in the southern section. Moderate vegetation coverage in the northern section. Large Pepper trees distributed throughout the entire area.	Minimal native tree species.	Early establishment. Divert upslope surface water away from rehabilitation area. Batter back slope to a more stable landform and plant with appropriate grasses, shrubs and trees.

Rehab Area	Year Activity Completed			Final Land Use Domain	Closure Status			Overall Status and Improvement Opportunities
	Stable Landform	First Vegetation Planted	Additional Vegetation Planted		Stability	Biodiversity		
					Erosion Gullies	*Vegetation Cover*	*Native tree Species Composition*	
R5	2004	2004		Grazing	Stable surface, negligible evidence of erosion.	Good grass coverage.	Minimal native tree species.	In progress. Number and variety of native species plantings could be improved.
R6	2007	2007	2011	Grazing	Stable surface, negligible evidence of erosion.	Good grass coverage. Good tree coverage in limited areas.	Several localised areas of good variety and composition.	Nearing completion. Targeted weed removal and supplementary planting as required to improve native species mix. Groundcover good with minimal erosion
R7	2010	2010	2011	Grazing	Stable surface, negligible evidence of erosion.	Good grass coverage. Very good tree coverage throughout entire area.	Variety and composition is very good.	Nearing completion. Targeted weed removal and supplementary planting as required to improve native species mix. Groundcover good with minimal erosion
R8	2016	2021		Grazing	Stable surface, negligible evidence of erosion.	Drought affected. Sparse grass coverage, some self-seeded plants.		Poor vegetation cover. Re-planting in 2020-21 season. Targeted weed removal. Groundcover required to prevent erosion.

Rehab Area	Year Activity Completed			Final Land Use Domain	Closure Status			Overall Status and Improvement Opportunities
	Stable Landform	First Vegetation Planted	Additional Vegetation Planted		Stability	Biodiversity		
					Erosion Gullies	*Vegetation Cover*	*Native tree Species Composition*	
R9	2020	2020		Grazing	Stable surface, negligible evidence of erosion.	Seeded in August 2020		Groundcover developing and some tree seedlings established. Hydromulch providing effective initial erosion protection. No visible erosion

6.1.2 Rehabilitation year 2022

Figure 6 presents the rehabilitation phases for the year 2022. The summary of the key rehabilitation activities for 2022 is as follows:

- Overburden emplacement area from R1 to R9 will continue to be in the Ecosystem and Land Use Development rehabilitation phase
- Overburden emplacement area R10 will begin the Growth Media Development phase
- Overburden emplacement area OEA3, which is an extension of R10 is currently in the Decommissioning phase and will begin Landform Establishment phase, later this year
- A part of the Infrastructure disturbance area identified as IA3 will begin the Landform Establishment rehabilitation phase; and
- A final void section identified as AMA2 - 433 berm will begin the Landform Establishment phase.

Figure 6: Rehabilitation schedule year 2022

6.1.3 Rehabilitation year 2023

Figure 7 presents the rehabilitation phases for the year 2023. The summary of the proposed rehabilitation phases and activities for 2023 is as follows:

- A part of the infrastructure area identified as IA3 East will commence the Growth Medium Development phase while another section will begin with the Landform Establishment phase
- Overburden emplacement area from R1 to R9 will continue to be in the Ecosystem and Land Use Development rehabilitation phase
- Overburden emplacement area R10 will continue to be in the Growth Media Development phase
- Overburden emplacement area OEA3, which is an extension of R10, will continue to be in the Landform Establishment phase; and
- A section of the final void identified as AMA2 - 433 berm will continue to develop the Landform Establishment phase.

Figure 7: Rehabilitation schedule year 2023

6.1.4 Rehabilitation year 2024

Figure 8 presents the rehabilitation phases for the year 2024. The summary of the proposed rehabilitation phases and activities for 2024 is as follows:

- During 2023 and 2024, stockpile/infrastructure area identified as IA3 East will begin the Landform Establishment and then will continue with the Growth Media Development phase
- The stockpile/infrastructure area identified as IA3 Top bench will comment the Landform Establishment phase in 2024
- Overburden emplacement area from R1 to R9 will continue to be in the Ecosystem and Land Use Development rehabilitation phase
- By the end of 2024, the Overburden emplacement area R10 will be in the Ecosystem and Land Use Establishment phase
- Overburden emplacement area OEA3 will also transition to the Ecosystem and Land Use Establishment phase in 2024
- In 2024, the final void identified as AMA2 – 433 berm will begin the Growth Media Development phase; and
- The final void identified as AMA2 – 422 berm will begin the Landform Establishment phase in 2024.

Figure 8: Rehabilitation schedule year 2024

6.1.5 Rehabilitation year 2026

Figure 9 presents the rehabilitation phases to be completed by the end of the year 2026. The summary of the proposed rehabilitation phases and activities is as follows:

- Stockpile/infrastructure area identified as IA3 East and IA3 Top bench will be in the Ecosystem and Land Use Establishment phase
- Overburden emplacement area from R1 to R10 and OEA3 will continue to be in the Ecosystem and Land Use Development rehabilitation phase
- The final void area identified as AMA2 – 433 berm will be the in Ecosystem and Land Use Establishment phase; and
- The final void area identified as AMA2 – 422 berm and AMA2 – 411 East berm -411 level will be in the Growth Media Development phase.

Figure 9: Rehabilitation schedule year 2026

6.1.6 Rehabilitation year 2031

Figure 10 presents the rehabilitation schedule to be completed by the end of the year 2031. The summary of the proposed rehabilitation phases and activities is as follows:

- Stockpile/infrastructure area identified as IA3 East and IA3 Top bench will be completely rehabilitated
- Overburden emplacement area from R1 to R10 and OEA3 will be completely rehabilitated
- The final void area identified as AMA2 – 433 berm will be completely rehabilitated; and
- The final void area identified as AMA2 – 422 berm and AMA2 – 411 East berm-411 level will be in the Ecosystem and Land Use Development phase.

Figure 10: Rehabilitation schedule year 2031

6.1.7 Rehabilitation year 2036

Figure 11 presents the rehabilitation schedule to be completed by the end of the year 2036. A summary of the proposed rehabilitation phases and activities is as follows:

- Stockpile/infrastructure area identified as IA3 East and IA3 Top bench will be completely rehabilitated
- Infrastructure areas identified as IA4 to IA14 will be in the Ecosystem and Land Use Development phase
- Beneficiation facility areas identified as BE1 and BE2 will be in the Ecosystem and Land Use Development phase
- Decommissioning and removal of infrastructure within the infrastructure areas and beneficiation facility is currently planned to commence in 2033 and is anticipated to take up to 5 years to complete
- Overburden emplacement area from R1 to R10 will be completely rehabilitated
- Overburden emplacement areas identified as OEA1 and OEA2 will be in the Ecosystem and Land Use Development phase
- Overburden emplacement areas identified as OEA3 and OEA4 will be completely rehabilitated
- The final void area identified as AMA1 Jackson open pit West and AMA2 Jackson open pit – East will be in the Ecosystem and Land Use Development phase; and
- The final void area identified as AMA2 – 433 berm, AMA2 – 422 berm and AMA2 – 41 will be completely rehabilitated.

Figure 11: Rehabilitation schedule year 2036

6.1.8 Rehabilitation end of lease year 2038

Figure 12 presents the rehabilitation schedule to be completed by the end of the year 2038. All disturbed areas are expected to be completed rehabilitated by the end of the mining lease.

Figure 12: Rehabilitation schedule year 2038

6.2 Phases of rehabilitation and general methodologies

6.2.1 Active mining

The active mining phase for the Attunga site constitutes the rehabilitation and or maintenance activities undertaken during active mining operations (production), including soils and material management, materials handling, environmental monitoring and planning for rehabilitation. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes, such as selective handling of waste rock and overburden material. The mining domains that are under active mining operations are the following:

- Infrastructure area – including office and workshops building, stockpile crushed rock, stockpile scalps, stockpile topsoil, roads (bitumen and gravel) and ramps
- Overburden emplacement area – including areas identified as OEA OEA2 OEA3 OEA4 which are the northeast overburden top and south batters and in pit overburden area
- Open pit void – including the Jackson open pit and the east berm 433, 422 and 411 levels
- Beneficiation facility – including the crushing plant and burnt lime area and an office building; and
- Water Management area – including two dams and a drainage channel.

General methodology

The rehabilitation methodology in this phase is driven by activities and controls focused on soils and materials management, material handling, environmental monitoring and planning for rehabilitation.

Soil and materials management

Develop and maintain a materials and soils balance and database to include the following information:

- Volume of inert capping material, topsoil and subsoil stockpiled.
- Location, age and quality of stockpiles.
- Chronology of treatments including weed control and application of cover crop undertaken on the stockpile.
- Volume of material, topsoil and subsoil required for application to current and future disturbance areas.
- An estimate of the volume of suitable alternative material required to be imported onto site to supplement potential material, topsoil and subsoil deficits (if required); and
- Record data on the location of the stockpiled material including date stripped, source area, indicative volume, pre-strip plant community type.

Environmental Monitoring

Maintain and document an environmental monitoring program that includes the following environmental matters.

- Surface and groundwater
- Flora and fauna
- Pasture monitoring and or agricultural capacity
- Soil and erosion; and
- Weed assessment and control.

Planning for rehabilitation

When planning for rehabilitation the key focus areas will include:

- Landform establishment
- Topsoil and growth media development
- Revegetation
- Weed management; and
- Record Keeping.

Site Conditions

The below matters summarise the site conditions and the risks and opportunities for rehabilitation associated with the active mining phase across the mining domains.

Soils and materials

Land and soil capability (LSC) is an assessment of the likely land degradation hazards associated with implementing a broad agricultural land use on an area of land. It relies on general land, climate and soil information.

The Environmental Assessment for the Attunga site used the Land Capability classification system, which is no longer used. The Attunga site comprised a number of land capability classes; Steep slopes greater than 18° or 32.5% as Class VII and remaining land as between capability Classes III and VI.

Under the LSC assessment scheme, the land surrounding the Attunga site is Class 3 which is defined as high capability land which is land that has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. Some of the more gently sloping areas of the ALM towards Manilla and Garthowen Road are also Class 3.

The steeper sloped areas of the Attunga site are Classes 6 and 7. Classes 6 is defined as land capable for a limited set of land uses such as grazing, forestry and nature conservation while Class 7 is defined as very low capability land which is land generally incapable of agricultural land use restricting land use to selective forestry and nature conservation.

Flora

Vegetation on the Attunga site has been described as being dominated by Black Cypress Pine (Callitris endlicheri) while other limestone outcrop areas in the surrounding area have significant components of Eucalyptus species or are dominated by Grass Trees (Xanthorrhoea sp.).

Other species identified surrounding the site which would be expected to occur on the ALM site, or occur in far greater numbers on the site include:

- Rough-barked Apple (Angophora floribunda)
- Kurrajong (Brachychiton populneum)
- Myall (Acacia pendula)
- Native Olive (Notelaea microcarpa)
- Narrow-leaved Hop Bush (Dodonaea attenuata)
- Rusty Fig (Ficus rubiginosa)
- Western Rosewood (Alectryon oleifolium)
- White Cedar (Melia azederach var australasica)
- Grass Tree (Xanthorrhoea australis); and
- Maytenus cunninghami.

A study by Greenloaning Biostudies in 1995 identified the following vegetation communities as occurring on the site:

- Black Cypress Pine Open/Closed-scrub/ Low Closed-forest (regenerating Black Cypress Pine forest)
- Black Cypress Pine Open-scrub/ Low open-forest (with scattered White Box)
- Black Cypress Pine/ White Box Woodland/ Open-woodland; and
- Grassland/ Open-grassland (with some scattered trees).

All noxious weeds within the Attunga site will be controlled in accordance with the requirements of the Biosecurity Act 2015. The site also has a Weed Management Plan. The ongoing application of the Weed Management Plan will reduce the potential for weed spread and allow continuous monitoring and control. This program ensures both a proactive and reactive approach to weed management.

Predation of seedlings and tube stock by rabbits and kangaroos will be minimised by the use of tree guards. The Local Land Services - NSW will be consulted to implement an appropriate pest animal control plan if pest animals increase during monitoring or if significant numbers are causing widespread damage to rehabilitation.

Fauna

One threatened fauna species (Turquoise Parrot, Neophema pulchella) has been recorded to occur within the site locality. Potential breeding habitat is present on-site. No further vegetation clearing is proposed at Attunga hence the potential for further impact on fauna habitat is limited. A range of common fauna including kangaroos and birds are known to utilise habitat at the site.

Rock/overburden emplacement

There are three waste streams on site:

- Waste Rock – Material mined that is not of suitable quality to be processed in the calcination process and is in excess of crushed road base requirements
- Process Waste – Material that is rejected in the calcination or hydration process – basically un-calcined feed material, i.e. limestone; and
- Baghouse Dust – Material that is collected in the dust collector that exhausts the kilns – a combination of limestone and waste component of oil combustion.

Waste Management

The majority waste rock from the operation comes from three sources:

- Weathered or clay contaminated limestone from all three layers (Upper, Middle, and Lower)
- Black shale and cherty limestones; and
- Green Andesite dykes - a durable volcanic rock.

The largest proportion of waste is limestone, which is environmentally beneficial (used to improve soil). The other waste types are relatively benign, including the process waste and are encapsulated in the waste limestone. Water quality monitoring data, from the sediment traps below the overburden dump, show no adverse effects.

Where possible, the waste rock will be used to backfill the Northern end of the open pit. This material will be used to reform the northern end of the open pit to a landform similar to the original surface. This will help block the view into the open pit from the north. Excess waste rock and process waste will be placed on the North-Eastern Overburden Dump.

Geology and geochemistry

The limestone on ML1394 belongs to the younger Moore Creek formation. The rocks on the ALM occur within a synclinal or basin structure that is elongated in a north-south direction with its base tilted gently to the south.

The sequence of rocks from top to bottom at the Attunga site is:

- Upper Limestone: Massive, high-grade light grey limestone
- Upper Pyritic Shale: Brown shale which varies in thickness from 1 to 6 meters into friable clay soil
- Middle Limestone: up to 28 meters thick red to light grey limestone. Unsuitable as kiln feed
- Lower shale: Black shaly limestone up to 4 meters thick
- Lower Limestone: Up to approximately 28 meters thick although thins to 15 meters thick in the south and along the eastern side of the deposit. It outcrops near the margins of the basin, so it is typically seen in the outcrop on the sides of the hill. The surface is typically deeply dissected by solution channels and small caves; and
- Shaly Limestone and Cherty Limestone (Bottom Black): Shales and cherts of variable thickness form the basement of the limestone sequence. Shale layers have no economic value and are removed to waste rock dumps.

Material prone to spontaneous combustion

No issues relating to spontaneous combustion have been identified at the Attunga site.

Material prone to generating acid mine drainage

No issues relating to generating acid mine drainage have been identified at the Attunga site.

Ore beneficiation waste management (reject and tailings disposal)

No tailings or residues are produced at the Attunga mine. As a by-product, the kiln produces unburnt limestone (core) and baghouse dust, and the hydration plants produce Nibs. By-products are placed on the waste emplacement where they naturally revert to limestone. Mineral processing is carried out in three main sections with each section producing a number of final products.

Erosion and sediment control

The majority of runoff from the active mining area reports to the open pit sump. This area captures dirty water and allows sediment to settle out. The areas outside the main open pit area all drain via sediment catchment dams as described in the Water Management Plan.

Water monitoring of discharges from the sediment dams will be undertaken in accordance with the Environment Protection Licence. Currently, the licence requires the monitoring of four parameters, against concentration limits as detailed below:

- pH: 6.5-8.5
- conductivity: less than 1500 uS/cm
- total suspended solids: less than 50 mg/L; and
- oil and grease: 10 mg/L.

Clean water that drains from undisturbed areas in the southern area of the site is diverted along an armoured contour drain, to discharge along the southern boundary of the site. Exposed areas that are identified to not require further disturbance will be stabilised with vegetation. Routine inspections of the site will be carried out to identify areas of erosion and appropriate rectification.

Ongoing management of biological resources for use in rehabilitation

There are no further vegetation clearing resources. No resources available for rehabilitation in the future.

Mine subsidence

No issues relating to mine subsidence have been identified at the Attunga site.

Management of potential cultural and heritage issues

Aboriginal Heritage

No activities are planned that will affect the previously identified sites. Routine monitoring will be undertaken to ensure fencing around previously identified sites is maintained. In the event that an Aboriginal object is found, works in the vicinity of the object will cease immediately, and the relevant authorities notified.

Natural Heritage

No activities are planned that will affect the previously identified sites.

Exploration activities

The geology of the Mining Lease is generally well understood, and there is no scope for any significant further reserves to be discovered. Further drilling may be required to better define existing reserves. This will be discussed with the Resource Regulator – Regional NSW, as required, with all necessary approvals granted, prior to work commencing.

6.2.2 Decommissioning

The decommissioning phase for the Attunga site will include activities associated with removing mining infrastructure and the removal and/or remediation of contaminants and hazardous materials if required. This rehabilitation phase may also include studies and assessments related to decommissioning and demolition of infrastructure or works carried out to make safe or ‘fit for purpose’ built infrastructure to be retained for future use(s) following lease relinquishment.

A detailed decommissioning procedure will be developed in a future update of this RMP closer to the end of mine life. This will guide activities at the end of the mine operations and detail the resources needed to undertake those activities. The decommissioning procedure will include the process for undertaking decommissioning and closure activities, complying with all legal obligations, and communicating to minimise the risk of safety and environmental incidents. In addition, the decommissioning procedure will outline how all the infrastructure remaining at the end of the mining lease is to be managed and financed into the future and provide opportunity for the community and other stakeholders to provide input.

Generally, the decommissioning procedure will address the following:

- Before demolition, all infrastructure should be evaluated in terms of the presence of hazardous substances and land contamination, and appropriate management strategies developed to protect employees, the public and minimise potential environmental harm. This includes the identification of the various waste streams and development of management strategies in accordance with the appropriate waste legislation
- Before demolition activities, undertake or review existing assessments to determine potential heritage approvals and or management measures that may be required; these may include heritage management plans, retention/restoration of buildings, archival recording and dilapidation studies
- Electricity services to any infrastructure scheduled for demolition will be removed before the start of building demolition works
- Telecommunications, water supply and other services will also be disconnected and removed where practical
- Where services are buried (e.g. pipelines, cables) and their retrieval may lead to further disturbance, the infrastructure may be left in situ (subject to any necessary approvals or agreements) if they don't pose constraints to the final land use. In this situation, the location of the services will be surveyed and marked on the site plan and a suitable caveat developed to provide that they are readily identifiable for future land holders
- All buildings, fixed plant and other infrastructure that are not required as part of the final land use will be demolished and removed. Demolition will be carried out in accordance with the AS 2601—2001, *The demolition of structures*. Approval for demolition will be reviewed closer to the demolition date as the this activity may be exempt under Clause 2.13 (c) of the State Environmental Planning Policy (Resources and Energy) 2021, which states that '*the demolition of a building or structure that is carried out in accordance with Australian Standard AS 2601—2001, The demolition of structures, but only if the building or structure is not, or is not part of, a heritage item, or in a heritage conservation area, identified by an environmental planning instrument,'*; and
- Remaining structures will be surveyed and recorded on a plan, with a suitable caveat developed to provide that they are readily identifiable for future land holders (as appropriate).

Site security

Site security management will include physical and operational measures to promote work health and safety and prevent access by members of the public to site. Physical and operational site security will include:

- Access control – consider minimising the number of access points, installing suitable security gating so that gates cannot be simply unhinged, after hours security, warning signage and out-of-hours security contact information
- Fencing and barries – the final void will be isolated using a physical barrier around mine void constructed to limit access by people and stock to unsafe areas. A locked gate will be installed as part of the barrier around mine void to permit stock access and allow for irrigation of water from the mine void, as required
- Locks – the site will include lockable storage such as steel tool vaults and containment so that all equipment, tools, metals and materials can be secured out of sight overnight and when not in use
- Provision and monitoring of risk management, assessment and health and safety protocols; and
- Entry and exit monitoring.

Infrastructure to be removed or demolished

The following items will be removed and or demolished during the decommissioning phase.

- Office buildings and workshops
- Electricity, water, septic system and telecommunications infrastructure
- Fuel and oil storage facilities and generator
- Crushing plant, kilns and associated processing plant
- Concrete pads and footings; and
- Decommission dirty water dams (Drain and removed sediments to make dam clean water or drain and minor earthworks to fill in dam).

Buildings, structures and fixed plant to be retained

Some roads will be retained for property access, bushfire fighting and rehabilitation monitoring purposes. The structural integrity and possible risk of the proposed retained roads will be verified and addressed by a qualify engineer upon mining closure.

Management of carbonaceous/contaminated material

A number of areas of potential hydrocarbon contamination exist within the Beneficiation Facility domain and the Open Pit void domain at the Attunga site. These areas are associated with the processing plant, maintenance workshops, and refuelling for:

- Diesel and Hydraulic/lubricating oils and waste oils.

Current management practices include bunded storage, regular inspections and spill response procedures, including spill kits available and training on their use. Past inspections have indicated that hydrocarbon contamination is not a significant issue. Ongoing inspections will continue to monitor contamination.

A contaminated site assessment in accordance with requirements of the Contaminated Land Management Act 1997 and Protection of the Environment Operations Act 1997 will be undertaken during the decommissioning phase, and Remedial Action Plans that outline remediation works for any hydrocarbon impacted areas will be developed and implemented, as required.

No new areas of contamination have been identified on-site.

Hazardous materials management

A register of hazardous substances used on site is maintained. The register is updated when new materials are brought into use on site. The site also has access to on line hazardous substance databases which can provide detail information on chemicals including SDS's as required. Following the cessation of the mining operation, the following material must be removed from site as required.

- **Fuel Containment:** Both diesel and waste oil fuels are stored in above-ground tanks built to relevant standards. The quantity of diesel stored on site is less than 40Kl
- **Explosives:** Explosives are generally not stored on site. The site does have suitably designed magazines for temporary storage. A site security plan has been developed and implemented
- **Oil & Grease:** Oils and grease are stored adjacent to the main fuel tank within the bunded containment area. Used oils are stored in a tank located in the same bunded area. Used oil is collected by a licensed contractor for disposal; and
- **Gas Bottle Storage:** Gas bottles are stored in a segregated compound of block construction**.**

Underground infrastructure

The Decommissioning procedure will also address the following:

- Removal of remote equipment (e.g. powerlines to remote shafts, ventilation infrastructure, PED lines, services boreholes, pipeline); and
- The need to undertake a hydrological assessment and develop a groundwater management strategy and monitoring (if required). This may require the development of water treatment strategies and subsequent approvals from relevant agencies.

6.2.3 Landform establishment

The landform establishment phase of rehabilitation consists of the processes and activities required to construct the approved final landform as per the Chapter 5 of this document.

Water management infrastructure

There are three existing Water Management Areas within the Attunga site. There will not be construction of any new water management infrastructure, but maintenance of the existing ones, including:

- Removal of excess sediment from the surface dams for future use by the subsequent land owner
- The installation of appropriate sediment and erosion control measures (if required); and
- Water within the final void will be appropriately licensed in perpetuity under the Water Management Act 2000).

Final landform construction: general requirements

During the final landform construction, the following matters will be considered and addressed as relevant:

- Emplacement Areas: Overburden and waste rock emplacement areas are designed to enable progressive rehabilitation of all batter faces and benches prior to bulk waste rock emplacement, thereby minimising the extent of exposed surfaces liable to erode and minimising the magnitude of visual impacts. Emplacement areas will have a drainage system. A monitoring program will be in place to determine the drainage system's effectiveness, including a trigger action response plan (TARP) to address issues
- Final void: The final void on site has been approved to remain as part of the final landform as stated in the EIS prepared for the DA 95-77. Therefore, the design and construction will be following the minimum requirements of the development consent, associated environmental assessments/environmental impact statements, and in consideration of the following:
    - A geotechnical assessment should be undertaken to determine the likely long-term stability risks associated with the proposed final landform, including any remaining high walls or low walls. Based on the outcome of this assessment, suitable measures are to be implemented to minimise potential risks and support the final land use
    - Updated surface and groundwater assessments should be undertaken concerning the likely final water level in the void and post-mining water take, including groundwater inflows into the void and surface water capture
    - The final stabilisation and revegetation strategy associated with the final void should be designed and implemented based on the outcomes of the above assessments; and
    - The final void must address any relevant approval requirements of regulatory authorities and demonstrate the satisfaction of licensing requirements under the relevant legislation including the Water Management Act 2000.

Final landform construction: reject emplacement areas and tailing dams

There are no tailings dams on site. Final landform construction of the reject emplacement, including overburden and waste rock emplacement would involve:

- Run-of-mine waste rock lies at an angle of repose of 35° (70%). This will be re-profiled such that external batter are formed at a grade of 1:3 (V:H), or less. The batters would be separated by 5 m wide benches at 10 m vertical intervals. Emphasis would be placed upon creating a final surface that has an uneven appearance with large rocks scattered across the final cover. This final appearance would reflect the familiar natural outcrop in areas not yet mined. Benches would be constructed with a 5 per cent backslope and a longitudinal slope of 0.5 per cent for drainage purposes
- The batter slopes of waste emplacement areas will be constructed using existing methods which have been assessed by Rocktest Consulting (2012) as performing acceptably
- Moonscaping would be undertaken in those areas of the waste rock emplacements suited for this treatment, such as short steep batters; and
- Batters will be covered with at least 0.5m (where available) of subsoil like material to aid moisture and nutrient retention. Final capping with topsoil would then proceed as described in section 6.2.4.

Final landform construction: final voids, high walls and low walls

Although the open cut mine would remain as a final void on cessation of mining, specific rehabilitation procedures would be applied both during and on completion of the mining operation to achieve the rehabilitation objectives. Emphasis would be placed on the earliest possible establishment of a vegetation cover on the elevated areas, which are visually exposed to residents within the local area. The construction of the final landform would include:

- The final void upper eastern benches – The benches will be deep ripped where possible and covered with a base 0.5m of well-graded broken rock. This layer will be covered with a 200mm layer of -40mm rock. The bench will then be top soiled and seeded with a grass and tree/shrub mixture. Some supplemental planting may be required after the grasses are established.
- Rehabilitation of benches on the eastern highwall below 419 m AHD and all but the uppermost bench around the remainder of the open cut mine would be limited to blasting the berms to achieve a rubble of broken rock or ripping to achieve similar.
- The floor of the mine would be covered with a thin veneer of waste rock to create a surface amenable to water infiltration and the subsequent establishment of native vegetation through the natural dispersal of seed material from the surrounding areas
- The haul road into the mine would be closed off with large boulders to prevent vehicle entry to the mine area. the barrier would, however, enable stock or faunal access to any water collecting within the mine sump; and
- The void will be progressively backfilled with waste rock (from the crushing and screening plant) dumped into the northern side; however, will only ever be partially filled. The final void will collect water and be used for stock watering.

Construction of creek/river diversion works

The final landform for the Attunga site does not include construction of any creek or river diversion works.

6.2.4 Growth medium development

This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community to ensure achievement of the approved rehabilitation objectives and rehabilitation completion criteria and final landform. During this phase the following activities will be undertaken:

Soil stripping and handling

There is topsoil stored on-site for rehabilitation purposes. Most topsoil stockpiles have been stored for greater than 10 years and are partially vegetated providing an adequate cover to minimise erosion.

No new topsoil resources are available and there are no plans for future stripping of more topsoil, as the mine currently has no plans to develop additional areas.

Prior to re-spreading of stockpiled topsoil onto reshaped batters and benches, a visual assessment of weed infestation will be undertaken to determine if individual stockpiles require scalping or burial due to their unsuitability as a result of weed infestation. Topsoil and subsoil stockpiles will be treated annually and additionally as required to control weeds, in accordance with the Weed Management Plan. The site HSEQ advisor is responsible for implementation of the Weed Management Plan.

Soil and overburden characterisation will also be undertaken to assess the suitability of the material as a growing media. Soil testing will address chemical factors including pH, electrical conductivity and general fertility. Physical factors such as texture and degree of stoniness will be assessed in consideration of material suitability as a growing media. Some rock and gravel in the soil profile are desirable to facilitate water penetration deeper into the soil profile and minimise evaporative losses. This is particularly important when rehabilitating for a nature conservation post mine land use.

The estimated topsoil quantity available in stockpiles is 17,950 m^3. The topsoil quantity required assuming an average 100mm topsoil thickness applied across all rehabilitation areas, is 38,840 m^3. This leaves an estimated topsoil deficit of 20,890 m^3.

To address the topsoil deficit and ensure that sufficient topsoil is available for rehabilitation of all rehabilitation areas it is expected that additional topsoil resource will need to be either imported or manufactured by improving topsoil like materials on site. It is intended to manufacture a topsoil like material onsite to satisfy some of the topsoil deficit. A procedure will be developed that outlines appropriate techniques including for selection of base materials, handling of the material, testing requirements, and desirable physical and chemical attributes for manufactured topsoil.

Surface preparation

Areas to be rehabilitated will be reshaped to achieve the desired landform and checked to ensure that desired batter grades and slope lengths are achieved. Suitable stormwater drainage measures shall be incorporated.

Surfaces will generally be contour ripped to a nominal depth of 300mm to incorporate ameliorants into the overburden and to encourage infiltration of water and improve keying in of topsoil.

Contour scarification of topsoil is undertaken to incorporate soil ameliorants into the plant rooting zone (to a depth of 100mm) and to provide a suitable seedbed for direct seeding. A roughened soil surface also increases rainfall infiltration, reduces run-off and provides a micro-habitat allowing plants to germinate and establish.

Where possible ripping and scarification will be undertaken when the soil is moist to minimise structural decline and immediately prior to sowing. The respread topsoil surface will be scarified prior to, or during seeding.

Where topsoil resources allow, topsoil will be spread to a nominal depth of 100mm to 150mm on all regraded areas flatter than 1(v):3(h) and 50mm thick on areas steeper than 1(v):3(h) on the upper eastern benches.

Amelioration of growing media

Soil testing of topsoil and subsoil has been undertaken and will be used to determine amelioration requirements and rates. Fertiliser requirements will be assessed for type and rates in accordance with the planned vegetation for each area.

Where topsoil is unavailable or of insufficient quality, some of the site subsoils will be ameliorated to form a suitable growing media. A suitable guide to topsoil quality assessment would be undertaken to assess suitable alternatives such as biosolids, organic growth medium or another substitute, if required. However, the risk of introducing hazards to the establishment of the preferred plant community type (e.g. non-native species, elevated nutrient levels through the application of soil ameliorants) should be evaluated.

Erosion control

Erosion control will focus on reducing the concentration of runoff, increasing infiltration and providing soil surface cover. Erosion control works will include:

- Amelioration of dispersive soil to minimise the risk of rill, gully and tunnel erosion and to allow the infiltration of surface water (reduce the amount and velocity of surface water)
- Contour scarification to increase infiltration, reduce flow velocity and to incorporate soil ameliorants
- Ground cover vegetation is established promptly following commencement of rehabilitation works to prevent raindrop and sheet erosion of the overburden emplacements. The seed mixture will include at least three cover crop species that will grow quickly to provide early groundcover, even if that species will not form part of the final, permanent vegetation; and
- Implement erosion and sediment controls in accordance with Managing Urban Stormwater: Soils and Construction Volume 2E, Mines and Quarries (DECC 2008b).

6.2.5 Ecosystem and land use establishment

This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform. For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control.

At the Attunga site revegetation rehabilitation activities will be undertaking for the Agricultural – Grazing and Native Vegetation final land use domains. A combination of procedures and controls are described below.

Revegetation: agricultural-grazing

The seed mix currently used for this vegetation community on-site is a grass seed mix comprising Kikuyu, Clover and Couch species which is sown at a rate of 100kg/ha. Additional native grass species such as Barbed Wire Grass (Cymbopogon refractu), Kangaroo Grass (Themeda australis), Queensland Blue Grass (Dichanthium sericeum), Spear Grass (Austrostipa scabra) will also be used at rates to be determined.

Revegetation works are aimed to be carried out in spring and autumn when conditions are optimal. In the first instance, groundcover vegetation will be established to prevent raindrop and sheet erosion from occurring. Direct seeding with the seed mix containing species representative of the vegetation community will be undertaken and where the applicable seed will be treated to enhance germination rates.

Irrigation of rehabilitation areas may be required to assist plant germination in situ and to assist the supplementary stock planted. Watering (if required) will be undertaken in response to the prevailing weather conditions and monitoring of the plants.

Revegetation: native vegetation

The seed mix will contain species from the broad vegetation communities including Black Cypress Pine Forest, Open Grassy Woodland, Open Forest and White Box- pine – Silver-leaved Ironbark shrubby open forest details of which are provided in Table 15.

Revegetation works are aimed to be carried out in spring and autumn when conditions are optimal. In the first instance, groundcover vegetation will be established to prevent raindrop and sheet erosion from occurring. Direct seeding will be undertaken and where the applicable seed will be treated to enhance germination rates. Planting of tube stock will supplement areas of low success rates from natural regeneration through the seed bank and direct seeding.

Tube stock will be sourced from a local nursery to provide a mature tree density equivalent of the representative vegetation community.

Irrigation of rehabilitation areas may be required to assist plant germination in situ and to assist the supplementary stock planted. Watering (if required) will be undertaken in response to the prevailing weather conditions and monitoring of the plants.

Mulching the topsoil surface with manageable logs, branches, stumps, and other vegetative debris transferred directly from or stockpiled during the clearing for emplacement development and mine extension. Mulching would aid surface runoff control, assist moisture retention and infiltration, provide protection to emerging seedlings, and provide a mulch to the emplacement surface and micro and macrofaunal habitats. Seed bearing branches harvested from selected trees and shrub species would be placed randomly over the rehabilitated surface to increase native seed concentration and a source of nutrients for continued regenerating vegetation. The vegetative debris would not be placed at the rear of each bench so as not to impede longitudinal drainage.

Rehabilitation trials would be carried out on the topsoiled surface by sowing a cover crop for stability before direct seeding with a locally collected see of native trees and shrubs. Trees and shrub seedlings raised from seeds collected in the Attunga area would be planted on the visually exposed surfaces of the emplacement at a density similar to that found in the Black Cypress/White Box open-woodland community on site.

The waste rock emplaced to the west of the mine would be treated similarly to the main waste rock emplacement, but with greater emphasis on the use of tree and shrub seeding to reduce the visual exposure of surfaces and assist the visual screening of project-related activities in the background.

Revegetation species

The revegetation works will aim to establish four broad native vegetation classes which are consistent with the vegetation in the region.

Table 15 provides a list of significant species which can be used for direct seeding in rehabilitation areas. A summary of the indicative species and structures of these four broad vegetation types is provided in Table 16Table 16, which includes source information from Namoi Catchment Management Authority Regional Vegetation Communities.

Table 15: Rehabilitation species list

Species	Common Name	Final land use domain
Callitris endlicheri	Black Cypress Pine	Native Vegetation
Angophora floribunda	Rough-barked Apple	Native Vegetation
Brachychiton populneum	Kurrajong	Native Vegetation
Acacia pendula	Myall	Native Vegetation
Notelaea microcarpa	Native Olive	Native Vegetation
Dodonaea attenuate	Narrow-leaved Hop Bush	Native Vegetation
Ficus rubiginosa	Rusty Fig	Native Vegetation
Alectryon oleifolius	Western Rosewood	Native Vegetation
Melia azedarach var australasica	White Cedar	Native Vegetation
Maytenus cunninghamii	Yellowberry Bush	Native Vegetation
Eucalyptus albens	White Box	Native Vegetation
Eucalyptus melanophloia	Silver leaved Iron Bark	Native Vegetation
Acacia decora	Western Silver Wattle	Native Vegetation
Cymbopogon refractus	Wire Grass	Agricultural Grazing
Themeda australis	Kangaroo Grass	Agricultural Grazing
Dichanthium sericeum	Queensland Blue Grass	Agricultural Grazing
Austrostipa scabra	Spear Grass	Agricultural Grazing

Rehabilitation establishment inspections, monitoring and maintenance

The following activities will be undertaken to ensure that the juvenile vegetation thrives during this rehabilitation phase:

- Inspections will be conducted no later than three months following the completion of each rehabilitation campaign to determine whether performance issues have occurred or are emerging, which may result in a delay revegetation establishment
- Inspections will be conducted to assess soil conditions and erosion, drainage and sediment control structures, runoff water quality, revegetation germination rates, plant health and weed infestation, until vegetation has become well established and the site can be considered stable
- Where possible, use drones or LiDAR to conduct additional inspections and analysis of developing rehabilitation
- Outcomes of inspections will be recorded to implement any required intervention/adaptive management actions as soon as practicable after a monitoring program indicates that rehabilitation performance is unsatisfactory as part of the rehabilitation management and maintenance program; and
- Implement long-term rehabilitation monitoring program and evaluate trajectory of rehabilitation against achieving rehabilitation objectives and rehabilitation completion criteria as per Chapter 8 of this document.

Table 16: Broad vegetation communities

Broad Vegetation Communities					
Structure	Open Forest (White Box-pine – Silver- leaved Ironbark shrubby open forest)	Open Woodland	Open Grassy Woodland	Black Cypress Pine Forest	Grassland/ Pasture
Photo/Image					
Canopy	30% cover of more than 50% of some combination of White Box (Eucalyptus aldens) Black Cypress Pine (Callitris endlicheri), Silver-leaved Ironbark (Eucalyptus melanophloia) and Rough-barked Apple (Angophora floribunda)	30 % cover of more than 50% of some combination of White Cedar (Melia azedarach var australis), White Box (Eucalyptus aldens) Black Cypress Pine (Callitris endlicheri) with other species that occur less frequently including Rough-barked Apple	20% cover of more than 50% of some combination of White Box (Eucalyptus aldens), Black Cypress Pine (Callitris endlicheri) with other species that occur less frequently including Rough-barked Apple (Angophora floribunda) and Kurrajong (Brachychiton populneus)	30-70% cover dominated by Black Cypress Pine (Callitris endlicheri)	Isolated paddock trees of Black Cypress Pine (Callitris endlicheri), Kurrajong (Brachychiton populneus) and a variety of other eucalypt species
Shrub layer	Well-developed shrub layer (25% cover) including Native Olive (Notelaea macrocarpa) and Western silver wattle (Acacia decora)	Generally absent or sparse (5% cover) with Native Olive (Notelaea macrocarpa)	Generally absent or sparse (5% cover) with Native Olive (Notelaea macrocarpa)	Absent	Generally sparse or absent however contains
Ground layer	A range of grasses with >70% cover including Barbed	A range of grasses and leaf litter >70% cover and	A range of grasses including Barbed Wire Grass	A range of grasses and leaf litter >70% cover	A range of grasses with >70% cover including

Broad Vegetation Communities					
	Wire Grass (Cymbopogon refractu), Kangaroo Grass (Themeda australis), Queensland Blue Grass (Dichanthium sericeum), Spear Grass (Austrostipa scabra)	Barbed Wire Grass (Cymbopogon refractu), Kangaroo Grass (Themeda australis), Queensland Blue Grass (Dichanthium sericeum), Spear Grass (Austrostipa scabra)	(Cymbopogon refractu), Kangaroo Grass (Themeda australis), Queensland Blue Grass (Dichanthium sericeum), Spear Grass (Austrostipa scabra) and leaf litter >70%		Kikuyu, Clover and Couch species and natives including Barbed Wire Grass (Cymbopogon refractu), Kangaroo Grass (Themeda australis), Queensland Blue Grass (Dichanthium sericeum), Spear Grass (Austrostipa scabra)
Fallen timber (Coarse woody debri)	Moderate amount	Moderate amount	Moderate amount	A sparse to moderate amount	Generally absent

6.2.6 Ecosystem and land use development

This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan.

The aim of this phase is to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.

Maintenance and contingency

Maintenance/contingency works in the rehabilitation areas will be completed as required to address any issues of concern or unpredicted impact identified during monitoring. These works will include the following:

- Supplementary seeding of vegetated areas
- Weed and pest control
- Application of soil ameliorants; and
- Additional stabilisation

Supplementary seeding and tube stock planting

In the event that grass cover is initially insufficient to stabilise sloped areas due to slow growth rates (65 – 75% coverage), introduced sterile ground covers such as sterile Japanese Millet or Rye Corn may be used to supplement plantings.

- Supplementary seed broadcasting will be undertaken in areas where growth rates are considered insufficient or unsuccessful following monitoring. The seed for broadcasting will be treated where necessary prior to broadcasting to maximise germination rates
- Supplementary tube stock planting will be undertaken in areas where growth rates are considered insufficient or unsuccessful following monitoring; and
- Supplementary seed broadcasting will focus on ensuring desired shrub density and diversity is established in the rehabilitation areas.

Weeds and pest control

All priority weeds within the Attunga site will be controlled in accordance with the requirements of the Biosecurity Act 2015. A Weed Management Plan has been implemented. The continued monitoring of priority weeds will reduce the potential for spread and provide control. This program ensures both a proactive and reactive approach to weed management.

Control strategies will include spot spraying in and around vegetation and boom spraying on the more open grasslands.

Predation of seedlings and tube stock by rabbits and kangaroos will be minimised using tree guards. Local Land Services NSW input will be consulted to implement an appropriate pest animal control plan if significant numbers are causing widespread damage to rehabilitation.

Application of soil ameliorants

Soil testing will be undertaken to determine amelioration requirements and rates. This will ensure the soil is ameliorated to ensure an optimum growing medium and further application of fertiliser will not be required.

Additional stabilisation

Additional stabilisation works will be undertaken as required and may include reshaping, the installation of grade stabilisation structures, and amelioration of dispersive soil, revegetation, fencing and de-silting.

Stabilisation works are inspected as part of the Rapid Rehabilitation inspection program (Refer to Chapter 8).

6.3 Rehabilitation of areas affected by subsidence

The section does not apply as Attunga site is not affected by mine subsidence. Therefore, no issues relating to mine subsidence have been identified at the Attunga site.

7. Rehabilitation quality assurance process

A Rehabilitation Quality Assurance Process (RQAP) will be implemented through the life of the mine and each phase of rehabilitation. The RQAP will ensure that:

- Rehabilitation is being implemented following the nominated methodologies
- Persons responsible for rehabilitation implementation are identified; and
- Identified rehabilitation risks are adequately addressed at each phase of rehabilitation.

The Attunga site will implement the RQAP through every phase of rehabilitation. The RQAP will include inspections, monitoring and documentation to ensure that each phase of decommissioning and rehabilitation has been completed according to the nominated methodologies before proceeding to the next rehabilitation phase. Risks to rehabilitation are addressed in Chapter 3 of this RMP (rehabilitation risk assessment). The risk assessment is a live document that would be updated to address any emerging risks.

As part of the RQAP, a rehabilitation register will be developed and maintained. The register aims to record success factors and lessons learned from previous reviews to assist future rehabilitation planning and improve outcomes. This register will detail the current rehabilitation status and outline the rehabilitation works undertaken. The RQAP will be managed by the site HSEQ advisor.

The key elements of the rehabilitation quality assurance process and how they would be applied at each rehabilitation phase, are summarised in sections 7.1 to 7.9.

7.1 RQAP – active mining

- Updated mine and rehabilitation plans
- Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources
- Scheduled inspections to identify soil and land erosion and adequacy of soil, erosion and drainage controls
- Weed inspections and maintenance; and
- Documentation of all weed management and eradication programs and follow-up inspections.

7.2 RQAP – decommissioning

- Inspections and demolition reports to confirm all infrastructure has been removed
- Inspections and assessments to ensure any contamination has been appropriately remediated and/or removed; and
- Waste tracking documentation to demonstrate that all wastes are disposed legally.

7.3 RQAP – landform establishment

- Survey and preparation of as constructed drawings of final constructed slopes, landforms and water drainage structures; and
- Inspection to record the progression of the intended landform.

7.4 RQAP – growth medium development

- Registers of topsoil and/or soil substitute stockpiles including management records (such as stripping/stockpiling dates, weed control, inoculation with microbes, etc.)
- Records of implementation of erosion and sediment controls in accordance with Managing Urban Stormwater: Soils and Construction Volume 2E, Mines and Quarries (DECC 2008b)
- Soil testing results to confirm appropriate soil geochemical parameters for plant establishment; and
- Records of soil replacement depths and methodologies.

7.5 RQAP – ecosystem and land use establishment

Records of revegetation activities undertaken including:

- Date of revegetation actions;
- Weather conditions
- Seed mix
- Seeding rate (kg/ha) and/or planting rate (tubestock/ha)
- Fertiliser rate (kg/ha)
- Records of the salvage of all rehabilitation resources including suitable capping materials, topsoils/subsoils, seeds, habitat structures for use in rehabilitation
- Regular site inspections of rehabilitated areas to allow early identification of any emerging threats to rehabilitation
- Rehabilitation monitoring in accordance with Chapter 8 of this plan
- Regular inspections to identify potential weed and feral animal infestations; and
- Documentation of all weed management and eradication programs and follow-up inspections.

7.6 RQAP – ecosystem and land use development

- Rehabilitation monitoring in accordance with Chapter 8 to monitor the success of rehabilitation
- Regular site inspections of rehabilitated areas to allow early identification of any emerging threats to rehabilitation
- Regular inspections to identify potential weed infestations; and
- Documentation of all weed management and eradication programs and follow-up inspections.

8. Rehabilitation monitoring program

8.1 Analogue site baseline monitoring

Future rehabilitation monitoring will compare against the identified analogue sites for native vegetation and Agricultural – Grazing, refer to section 8.1.1 and 8.1.2. These analogue sites are representative of the local region landform and land uses. A full biodiversity survey will be undertaken to determine all species including weed species within the analogue sites. The analogue site selection occurred on 7th of June 2022, during the winter season. The weather conditions at the time were as follows:

- Sunny day and afternoon
- 12° C temperature; and
- Light NW winds 19 to 24 km/h.

Figure 13 shows the four analogue sites.

Figure 13: Analogue sites

8.1.1 Analogue sites – native vegetation

Table 17 and Table 18 provide a description of two analogue sites for native vegetation final land use. These sites are in an undisturbed area in the east and south-east of the Attunga Mine lease area.

Table 17: Analogue site 1

Site	Analogue site 1 (AS1) 
Coordinates	30.92842º S, 150.86116º E
Ecosystem Type	Black Cypress Pine Forest.
Canopy / Emergent	Canopy is dominated with Black Cypress Pine (*Callitris endlicheri*) and wattle tress *(Acacia pycnantha)* by approximately 90% and 10%, respectively.
Shrub / Understory Layer	Primarily introduced species such as milkweed, dandelions, verain, horehound and common nightshade. These species are common weed species in the region and should be controlled.
Ground / Herb Layer	90% groundcover dominated by tussock grasses. There is also minor gravel and other herbaceous plants.
Fallen timber (Coarse woody debris)	Very low – Occasional thin (5-10mm diameter) sticks and rare medium (10-50mm diameter) sticks.
Landform	Moderately inclined upper slopes with a gradient of approximately 20%.
Soil Conditions	No visible erosion on site. A soil survey was no undertaken for this analogue site.

Table 18: Analogue site 2

Site	Analogue site 2 (AS2) 
Coordinates	30.92647º S, 150.86193º E
Ecosystem Type	Black Cypress Pine Forest.
Canopy / Emergent	Canopy cover is around 60 to 70%, dominated by Black Cypress (*Callitris endlicheri*), White Box *(Eucalyptus albens),* and Wattle *(Acacia pycnantha)* tress.
Shrub / Understory Layer	Primarily introduced species such as milkweed, dandelions, verain, horehound, captuces, common nightshade, among others. These species are part of the native ecosystem of the region; however, they need to be controlled.
Ground / Herb Layer	95% groundcover dominated by tussock grasses. There is also moss and other type of herbaceous plants. This site has a rockier ground than analogue site 1.
Fallen timber (Coarse woody debris)	Small, medium, and large sticks, with some large logs and fallen branches.
Landform	Moderately inclined to steep upper slopes with a gradient of approximately 25 to 30%.
Soil Conditions	No visible erosion on site. A soil survey was no undertaken for this analogue site.

8.1.2 Analogue sites – agricultural grazing

Table 19 and Table 20 provide a description of two analogue sites for agricultural – grazing final land use. These sites are located outside of the mining lease on adjoining land to the east, and south respectively.

Table 19: Analogue site 3

Site	Analogue site 3 (AS3) 
Coordinates	30.92736º S, 150.86317º E
Ecosystem Type	Grazing woodland
Canopy / Emergent	Canopy cover is around 20% dominated by Black Cypress (*Callitris endlicheri*) which seems to be returning to this site.
Shrub / Understory Layer	A mixed pasture of native and introduced species.
Ground / Herb Layer	100% groundcover dominated by tussock grasses. Rocky cover less than 5%.
Fallen timber (Coarse woody debris)	None visible at the time of inspection.
Landform	Lower slope with a gradient of approximately 10 to 15%
Soil Conditions	No visible erosion on site. A soil survey was no undertaken for this analogue site.

Table 20 shows a selected analogue site for agricultural – grazing final land use. This site is located outside the project boundary at the south-west direction.

Table 20: Analogue site 4

Site	Analogue site 4 (AS4) 
Coordinates	30.92951 S, 150.856040 E
Ecosystem Type	Grazed pasture/Grassland
Canopy / Emergent	Canopy cover is around 5-10% dominated by Eucalyptus trees.
Shrub / Understory Layer	A mixed pasture of native and introduced species.
Ground / Herb Layer	100% groundcover dominated by tussock grasses and foreign species including onion weed. Rocky cover less than 5%.
Fallen timber (Coarse woody debris)	None visible at the time of inspection.
Landform	Mid slope with a gradient of approximately 3%
Soil Conditions	No visible erosion on site. A soil survey was no undertaken for this analogue site.

8.2 Rehabilitation establishment monitoring

8.2.1 Rapid Rehabilitation Survey

Graymont has adopted a formalised Rapid Rehabilitation Survey (RRS) process to monitor rehabilitation performance. The RRS process involves an inspection that will be undertaken routinely within each discrete rehabilitation area. The recommended frequency of survey will vary depending on conditions and stage of completion, but typical frequency is:

- Monthly for the first three months during ecosystem establishment, then; and
- Quarterly through ecosystem establishment and development phases.

Rehabilitation monitoring using the RRS process will continue until the rehabilitation objectives have been met and are substantially trending towards the completion criteria such that active intervention is no longer required and the area is assessed as stable.

The RRS inspection will record key details of rehabilitation progress, including identification of any emerging risks, activation of triggers for mitigation controls, and noting any corrective actions that may be required. Any identified deficiencies or failures shall be noted and follow-up actions identified. Success factors will be noted for future reference and to assist in continuing improvement. Guidance on the key rehabilitation risks, and response actions is provided in the Rehabilitation Risk Assessment (RRA) (Chapter 3) and Trigger Action Response Plan (TARP) (Appendix B)

Details to be recorded during the rapid rehabilitation survey include:

- Area inspected
- Date and time of inspection
- Person undertaking the inspection
- Photographic record
- Surface water drainage. Note factors including:
    - Upslope stormwater diversion/management
    - Sheet flow stability
    - Management of concentrated flows including berms and batter drains
    - Stability and adequacy of discharge control and discharge locations.
- Soil surface cover and erosion risk:
    - Ground cover %
    - Presence and severity of sheet, rill and gully erosion
- Assess vegetation cover, health, abundance, type and structure (qualitative assessment only, not full floristic survey)
- Assess presence of weeds, focus on key weed types; and
- Record specific repair/maintenance actions, with timelines and responsibilities for completion. Include an audit process to follow up and close out corrective actions.

8.2.2 Flora and fauna survey

Graymont will engage a suitably qualified person to undertake a targeted flora and fauna survey of rehabilitation areas to assess progress towards achieving the completion criteria. The aims of the vegetation survey are:

- Provide a detailed floristic record of analogue sites and rehabilitation areas
- Describe fauna habitat features and opportunistic presence of any native or introduced fauna
- Assess vegetation cover, health, diversity, abundance, structure
- Assess revegetation success and succession towards the target vegetation community and dominant species; and
- Recommend mitigation or improvement works where required, such as supplementary planting, weed control, soil amelioration and erosion control.

The frequency of these surveys would be annually initially (ecosystem development stage), but may reduce over time as the rehabilitated landscape becomes more mature (ecosystem sustainability phase).

Vegetation condition plots

Biometric plots with dimensions 20m x 20m will be established within each rehabilitation management units and permanently marked using star pickets or similar. A minimum of one plot to be established per management unit. Data will be collected within each 20 x 20 m permanently marked monitoring plot including:

- A list of all visible vascular plant species (to assess recruitment through comparison with the seeding mix species with the total number of native species recruited based on the sum of plot data within each management area)
- A list of species showing evidence of flowering and seed set (to assess reproductively mature flowering or seeding with the total number of reproductive species based on the sum of plot data within each management area)
- A list of species with seedlings and saplings (to assess regeneration with the total number of native species regenerating based on the sum of plot data within each management area)
- An assessment of the cover – abundance of priority weeds (to assess weed management success based on the average of plots data per management area). Cover and abundance to be measured as:
    - Percentage cover (1-5%, then increments of 5% thereafter); and
    - Approximate abundance (density) of each individual species in intervals of 1-10, 20, 50, 100, 500, 1000, 2000 etc.

Ground condition - transects

Percentage ground cover shall be assessed along a 50m transect attached to each biometric plot, using a point intercept method with cover for all ground cover (vegetation, litter, bare soil, rock, cryptogram, woody debris) recorded at intervals of 0.5 m (100 points). The number of intercepts per ground cover type provides an estimate of % cover. The completion criteria should be assessed on the average of all transects within each management area.

The presence of erosion features shall be based on a site walkover across the grade within each management area and the measurement of the depth of any rills or gullies encountered. This would also provide an opportunity to provide a general appraisal of groundcover across the site.

8.2.3 Record Keeping

Good record keeping will assist Graymont Attunga to track rehabilitation planning and progress and improve success. Graymont Attunga will maintain the following rehabilitation records:

- Rehabilitation Management Plan (RMP) (this document). The RMP will be reviewed and updated as necessary through the course of mine operations and closure planning and in accordance with Clause 11 of Schedule 8A to the Mining Regulation 2016
- Rehabilitation Risk Assessment. Maintained and updated in accordance with the RRA provided in Chapter 3 and Clause 7 of Schedule 8A to the Mining Regulation 2016
- Annual Rehabilitation Report and Forward Program. Provided annually to the Secretary and prepared in accordance with and Clauses 9 and 13 of Schedule 8A to the Mining Regulation 2016
- Register of soil materials for use in rehabilitation. The register will identify material type, locations and quantity
- Rapid Rehabilitation Survey Results, included as part of a Rehabilitation Register
- Rehabilitation Register to record rehabilitation activity and monitoring. This will detail the current rehabilitation status and outline in detail the rehabilitation methodologies undertaken (including landform preparation, drainage goals, growth media development, surface preparation techniques, and revegetation processes, and any follow up corrective actions). The register shall highlight success factors and lessons learned from previous reviews to assist future rehab planning and improve outcomes. The register would include quality assurance records such as as-built drawings. A photographic log would be kept as part of the rehabilitation register; and
- Additional quality assurance documentation as described in Chapter 7 of this RMP.

8.3 Measuring performance against rehabilitation objectives and rehabilitation completion criteria

Routine inspections as described in Chapter 8 will be used to review progress against the rehabilitation objectives and completion criteria for each rehabilitation domain. A closure checklist will be developed for future inspections targeted at assessing progress against the completion criteria.

9. Rehabilitation research, modelling and trials

9.1 Current rehabilitation research, modelling and trials

Blasting of the upper Eastern bench to lower the batter angle was trialled as an ongoing rehabilitation method for treatment of visible benches. Blasting the crests of benches was not considered a success at this time as the mine pit was operational and access for vehicles was cut off in some areas and safety was compromised. It has been determined that once operations cease and the pit is completed, the crests can be blasted.

A rehabilitation trial is in progress for this upper eastern bench area, to compare the use of topsoil as an establishment medium against ameliorated overburden. The area proposed for the trial is a 20m strip running north-south approximately 250m long. The planned approach for the trial is as follows:

- Backfilling against the bench face with overburden
- Ripping of heavily compacted areas
- Apply topdressing in two trial sections as follows:
    - Topsoil along half of the strip
    - Soil testing and amelioration of the overburden along the other half of the strip; and
- Hydro-mulching of the entire strip using a straw based hydro-mulch with both cover crop species and native species as described above.

A subsoil trial is planned in association with a site soil survey, topsoil and subsoil balance and spoil characterisation. Detailed information on the soil will be used to ensure that amelioration and soil depth for rehabilitation are optimised. The success of the rehabilitation trial areas will be assessed against the following criteria:

- Stability – presence and extent of erosion gullies
- Vegetation cover density; and
- Native tree species composition.

9.2 Future rehabilitation research, modelling and trials

- Eastern benches will be deep ripped where possible and covered with a base of 0.5 m of well graded broken rock. The bench will be top soiled and seeded with a grass mixture as specify in the rehabilitation management plan. Small native shrubs will be planted after the grasses are established. Where practicable, splitting the benches in two will give greater vegetation coverage and help blend the eastern ridged into the mountain range behind
- Rehabilitation area R8, previously an overburden emplacement area, has been subject to rehabilitation in recent years however there is not much progress towards native ecosystem final land use. Specifically, there is very little native vegetation establishment, and the area is dominated by the exotic Johnson grass. A trial will involve herbicide use to remove the Johnson grass and resow native grasses and trees
- Rehabilitation area R9 was rehabilitated through the growth medium development phase in 2020 and then hydromulched with a mixed pasture and native seed mix. Despite showing initial promise with good germination of grasses, vegetation cover subsequently declined during the summer of 2020/21. Repairs are required in this area and will include trialling alternative processes for surface preparation and sowing of the desired seed mix; and
- A future trial is proposed to prepare topsoil like materials using site resources and address the known deficit in topsoil relative to rehabilitation requirements. The approach is to use fine overburden materials and blend these with organic mulch or compost. The trial will seek input and advice from a qualified professional, e.g. an agronomist or mine rehabilitation specialist.

10. Intervention and adaptive management

The site aims to balance future learning and improve understanding by implementing Adaptive Resource Management (ARM) strategies. The intent over time is to develop a structured set of processes that can be applied repeatedly to assist the site in making decisions about the uncertainty of rehabilitation outcomes.

This process will be assisted by structured rehabilitation monitoring and record keeping including through the use of a rehabilitation register, rapid rehabilitation surveys, and assessing rehabilitation performance against the rehabilitation objectives and completion criteria outlined in Chapter 4 of this document.

In the event that rehabilitation failure occurs, further investigation to establish a cause and appropriate remediation strategy(s) will be undertaken. Issues to include the following:

- Nutrient availability
- pH, salinity and metal toxicity
- Shallow root depth
- Other soil limitations
- Insect attack
- Lack of N-fixing legumes
- Lack of organisms involved in litter breakdown (e.g. fungal fruiting bodies) and nutrient cycling (e.g. puff balls)
- Excessive grazing
- Predation
- Evidence of drought effects or storm damage
- Poor soil preparation; and
- Weed competition.

A Trigger Action Response Plan (TARP) (refer Appendix B) has been developed to identify a range of triggers for a number of key rehabilitation activities and to provide responses. The trigger values reflect a trend or change which may affect rehabilitation outcomes and the ability to meet completion criteria for successful rehabilitation.

11. Review, revision and implementation

This Rehabilitation Management Plan (RMP) will be reviewed annually during the preparation of the Annual Rehabilitation Report.

Prior to rehabilitation works commencing on the site, this document will be reviewed to ensure that works are consistent with the RMP and within current approvals. Where works are not consistent, a discussion will take place with the Resource Regulator to determine if an amendment or new RMP is required.

The Operations Manager for Graymont (NSW) Pty Ltd Australia's Attunga site is responsible for implementing the RMP.

In addition to the above, the RMP must be amended in accordance with Schedule 8A of the Mining Regulation 2016, as follows:

> ***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, whenever given a written direction to do so by the Secretary—in accordance with the direction.*

Rapid Rehabilitation Survey Form

Appendix A

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Graymont Attunga – Rapid Rehabilitation Survey Form

Rehab Site ID:	**Rehab stage:**
Date/time of inspection:	**Inspection by:**

Description of status	Existing or emerging risks	Remedial actions, timeframe and responsibility
Vegetation cover (eg type, health, abundance, structure):		
Weeds (presence, type, severity):		
Surface water and drainage (diversion, stability, lining integrity, discharge stability):		
Erosion (soil exposure %, presence, type and severity of erosion (eg sheet, rill and gully):		
Additional notes / key issues / progress since last inspection:		
TARP triggered?		

TARP Item	Risk Level	Recommended Mitigation

Photo record:	

Trigger Action Response Plan (TARP)

Appendix B

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Trigger Action Response Plan (TARP)

Response to Undesired Changes to Rehabilitation affecting Outcome Criteria, or Operational Activities that may affect Rehabilitation Outcomes

Rehabilitation or Operational Activity	Green	Amber	Red	Recommended monitoring/measuring method
Changes in legislation or approval conditions requiring a review of rehabilitation criteria or change to land use or ecological community.	New legislation or approval conditions implemented, but no impact on current closure land use or criteria.	New legislation or approval conditions implemented that requires changes to land-use or closure criteria e.g. slope gradients or vegetation community. Required changes are such that they can be implemented without requiring major redesign work.	New legislation or approval conditions implemented that requires major changes to land-use or closure criteria, requiring major changes to rehabilitation design or processes, as well as impacting on closure costs.	
	Trigger Action Response to above Triggers			
	No actions required except to continue to review any legislation changes that may affect rehabilitation methodology. If best practice is implemented in rehabilitation works, then the risk of legislation changes impacting on planned or implemented rehabilitation will be reduced.	Mine Closure and Rehabilitation Plan and closure criteria are to be updated in accordance with updated legislation. Impact on closure costing to be determined. Rehabilitation designs are to be updated as required.	Closure criteria and final land use options are to be reviewed and the rehabilitation processes developed to achieve the required changes, specialist advice may be required. Closure costing and rehabilitation plans and manuals are to be updated.	Triggers for legislation changes will include new approval conditions, updates of mining lease conditions, and Rehabilitation Management Plans.
Slope Gradients	Slope gradient ≤ 2% of design gradient	Slope gradient ≤ 4% of design gradient	Slope gradient ≤ 6% of design gradient	Formal survey is undertaken as part of the waste dump inspection process prior to the placement of subsoil and topsoil.
	Trigger Action Response to above Triggers			
	Do nothing, progress rehabilitation works.	Instigate investigation into the cause of the non-conformance—re-grade slopes and survey.	Instigate investigation into cause of the non-conformance. Determine and implement a methodology to return the slope to design gradients.	
Topsoil in rehab domains	Suitable topsoil quality and depth	Insufficient topsoil depth for establishment species	Insufficient suitable growing media	Topsoil testing from stored stockpiles prior to re-spreading.
	Trigger Action Response to above Triggers			
	Proceed with seeding and/or planting	Apply ameliorated subsoil	Test mine spoil for agronomic and erosion parameters. Amend spoil for rehabilitation purposes. Investigate why topsoil and subsoil resources were insufficient.	
Seed Establishment Rate	>75% of seeds germinate	<75% and > 40% of seeds germinate	<40% of seeds germinate	
	Trigger Action Response to above Triggers			
	Check soil moisture and weather forecast & determine if irrigation may be required. Review seed purity and germination certificates.	Visual investigation for potential causes of low establishment rate, including (soil moisture & temperature, ground conditions). Record any findings. Follow up seeding to improve plant densities is to be considered. Undertake spot topsoil and subsoil samples to determine if soil parameters fall within required ranges.	Detailed investigation into cause of poor seed establishment. Investigations may include: Detailed soil sampling program including soil moisture levels, analysis of meteorological conditions, follow seed germination testing with original seed used, germination trials in seed trays using field growth medium. Use an ecology specialist to investigate potential causes.	Measured as number of grass seedlings that have emerged ±2 weeks after expected germination. Establishment rate is determined by counting the number of seedlings in a few (1-3) square meter plots with comparison to sowing density
Germination testing	>80% of seeds germinate	65% - 80%of seeds germinate	<40% of seeds germinate	
	Trigger Action Response to above Triggers			
	No action to be taken and germination rate is to be used to determine seeding rate.	Cause of poor germination rate is to be investigated. The investigation is to include growth vigor, as vigor may also be affected. Actions to improve germination using various seed preparation methodologies may be required and the germination trials redone. Seeding rate in kg/ha is to be adjusted to compensate for poor germination. An alternate option is to include other seed which has a higher germination rate if available.	Investigation of flow germination rate to be undertaken. Actions to improve germination using various seed preparation methodologies may be required and the germination trials Seeding rate in kg/ha is to be adjusted to compensate for poor germination. Other seed may need to be sourced.	
Weeds and invader species across the mining lease or within the seed mix	No identified weeds	Suspect weed and/or invader species identified	Weeds and/or invader species identified in seed mix. Infestation of weeds in concentrated areas of the Mining Lease.	
	Trigger Action Response to above Triggers			
	No action to be taken.	Monitoring to continue, treatment and management to occur as per the weed management plan. Seed mix to be visually screened and additional testing undertaken to confirm if free of weeds.	Seed mix is not to be used on any mine rehabilitation areas. Monitoring frequency to increase, frequency of treatment and management measures to increase beyond the normal requirements of the weed management plan.	Weeds and invader species will be identified during germination trials. Identification can also be done by visual inspection of the seed mix prior to use. History and sourcing of the seeds acts as a prompt to investigate the seed mix.
Waste outside the design criteria (shape, height, and volume)	Waste Dump is in accordance with design criteria.	Waste Dump area has reached the design capacity.	Dumping has extended beyond the design criteria (shape, height, and volume).	
	Trigger Action Response to above Triggers			
	No action to be taken.	Discuss situation with mine planning and put procedures in place to prevent toe of dump extending beyond the design criteria. Design criteria can be reviewed and amended if the dump rehabilitation design is feasible within the	Dumping should be put on hold until the situation has been reviewed and a workable rehabilitation plan implemented for the change in dumping strategy. If no alternative design plan is feasible then all dumping should be halted. An investigation into the cause of the change of the dumping plan is to be investigated	Identification of design exceeds is through: Visual inspection, from mining and survey reports, comparison of aerial photography with surface elevations to original design criteria.
Rehabilitation Monitoring				
Geotechnical instability	No identified signs of instability or mass movement.	Signs of minor settlement (drop in elevation), appearance of hairline ground cracks.	Signs of significant movement: Appearance of enlarged ground cracks (+2mm wide), visible vertical or horizontal movement	
	Trigger Action Response to above Triggers			
	No action to be taken.	Depth and extent of cracking to be recorded and 3 monthly monitoring undertaken. Survey stations for movement may be required. Minor settlement can be infilled with topsoil and reseeded if required.	Geotechnical investigation of the ground movement is to be undertaken together with an assessment of damage to rehabilitation landform or drainage structure.	Ground movement will be identified as part of infield rehabilitation monitoring (ecological or annual walk around, remote sensing initiative to identify erosion would also assist in the identification of ground movement)
Erosion and loss of topsoil/growth medium	No rill erosion evident	Rills and inter rill erosion present	Gullies and tunnels present	
	Trigger Action Response to above Triggers			
	No action is to be taken other than continued monitoring following rainfall.	Erosion to be treated. Surface hydrology reviewed and landform is to be reviewed, in conjunction with surface vegetation and historic weather. Application of organic cover or soil polymer may be considered.	Full investigation is to be undertaken with a review of all design parameters with particularly emphasis on overland from the top of the dump, drainage design and amelioration of dispersive spoil and soils. Expert advice on remediation to be sought.	Visual assessment for rill, inter rill, gully and tunnel erosion inlet and outlet points.
Vegetation Predation	Minimal amount of vegetation predation by browsers and grazers (kangaroos, rabbits, livestock, insects), no effect on plant growth.	Pest animal species presence and density increased in annual monitoring events.	Significant numbers of pest animals causing widespread damage to rehabilitation	
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Consult with LHPA to recommend and implement appropriate pest animal control campaign. Implement controls to prevent access depending on the species eating the vegetation.	Consult with LHPA to recommend and implement appropriate pest animal control campaign. Engage a suitably qualified specialist to prepare a site management plan and implement recommendations such as augmenting pest animal exclusion fencing and re-vegetation.	Identified as part of annual ecological and walk around monitoring.
Monitoring shows Vegetation communities have unsatisfactory progress towards achieving the set closure criteria, or there is degradation in the vegetation community function.	Vegetation community progression still within expected progression.	Vegetation community progression is not in accordance with expected progression.	Vegetation community progression has started to deteriorate.	
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Progression analysis is to be reviewed with meteorological data and compared with analogue sites. Causes of the poor vegetation progression to be determined and remedial action developed.	Specialist advice is to be sought to determine root cause of deterioration and a remedial action plan developed. Learning's from the process are to be fed back into the rehabilitation plan as part of continuous improvement.	Determined by annual rehabilitation monitoring and analysis of monitoring data.
Destructive environmental event (Fire, drought, flood, insect plague)	Minimal effect/damage to vegetation and landform including drainage structures, vegetation able to fully recover without intervention.	Minor damage to ecological plant structures and or landform and stability structures. Minimal remediation required e.g. reseeding or fertilizer application.	Significant damage to ecological plant structures and or landform and stability structures requiring remediation and redesign.	
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Remediation action plan to be implemented by site personnel.	Detailed assessment to be undertaken by rehabilitation specialist and remedial action plan developed. Preventative measure to be investigated and any recommendations are to be implemented and the rehabilitation manual updated as required.	Identified as part of post event inspection and monitoring by rehabilitation specialist as required.
Batters and Benches	Batters and benches show no signs of erosion and vegetation layer is self-sustaining and improving over time.	Batters and benches show signs of sediment filling, minor erosion, stressed vegetation covering or minor water ponding.	Batters and benches are filled with sediment, signs of water overtopping or substantial erosion (undercutting, tunnel erosion, riling along bank), or bare vegetation patches.	
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Monitoring frequency is to be increased, and observations undertaken during rainfall events that cause runoff. Local repair work is to be undertaken as needed. Diversion banks or contour drains to be removed and sheet flow conditions re-established if 70% soil surface (vegetation) cover exists below diversion bank.	Investigation into the cause of the diversion bank failure is to be initiated, and the design parameters reviewed, with learning fed back into the rehabilitation processes. Investigation initiated by erosion specialist if ground movement (slumping, settlement) is suspected. Grade survey of the diversion bank may be required if drainage is an issue. After initial causes have been identified a remediation plan is to be implemented. Diversion banks to be removed and sheet flow conditions re-established if 70% soil surface cover (vegetation) exists below diversion bank.	Monitoring is primarily undertaken during informal and formal rehabilitation inspections (walk around) and monitoring. Site incident reporting and ad-hoc environmental inspections ay also identify issues.
Slope Drains & Drops structures	Slope drains show no signs of erosion and any geofabrics/membranes or rock lining are in place as constructed with no signs of movement. No signs of water overtopping or undercutting of drain structure.	Slope drains starting to show signs of channel bed erosion, minor undercutting of drain inlets, erosion riling of drain sidewalls, drain outlets show signs of erosion. Topsoil/growth medium shows signs of accelerated erosion and degradation of any vegetation covering.	Severe channel erosion, damage to any geofabric linings or stone lining, overtopping of drain sidewalls, loss of topsoil/growth medium, tunnel erosion under or beside the structure.	Monitoring is primarily undertaken during informal and formal rehabilitation inspections (walk around) and monitoring. Site incident reporting and ad-hoc environmental inspections ay also identify issues.
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Monitoring frequency is to be increased, and observations undertaken during rainfall events causing runoff. Local repair work is to be undertaken as needed. Diversion banks and slope drains to be removed and rehabilitation once 70% vegetative soil surface cover has been achieved and sheet flow conditions can be established.	Investigation into the cause of the failure is to be initiated, and the design parameters reviewed, with learning fed back into the rehabilitation design. Erosion specialist investigation initiated if tunnel erosion is suspected. Grade survey of the diversion bank may be required if drainage is an issue. After initial causes have been identified a remediation plan is to be implemented. Diversion banks and slope drains to be removed and rehabilitation once 70% vegetative soil surface cover has been achieved and sheet flow conditions can be established.	
Dams and water retained in final void.	Water quality monitoring shows water meets requirements for final land use.	Water quality monitoring shows water quality parameters are outside the requirements for final land use.	Water quality monitoring shows that water quality parameters are continually significantly outside the requirements for final land use.	Water quality monitoring
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Continue monitoring to determine if increased vegetation establishment achieves improved water quality. Treat the dam water.	Investigate removal of dam or alternate water uses. Investigate removal of dam and landform changes to manage surface water as sheet flow conditions if possible. Develop removal and earthworks plan and undertake works. Alternatively investigate alternate water use and criteria if water quality cannot be maintained.	

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Rehabilitation Management Plan – Attunga Limestone Mine

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