



ABN: 52 000 005 550

# Rehabilitation Management Plan

for the

## New Berrima Clay/Shale Quarry



*Compiled by:*

**RWCorkery&co**

August 2022



## ACKNOWLEDGEMENT

*R.W. Corkery & Co. acknowledge and pay our respects to the Traditional Custodians of the lands in NSW and Australia on which our projects are located. We value the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.*





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# New Berrima Clay/Shale Quarry

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Ref No. 744/36

August 2022

## Summary Table

<b>Name of Mine</b>		New Berrima Clay/Shale Quarry		
<b>RMP Commencement Date</b>		2 August 2022		
<b>Mineral Authorities</b>		M(MO)L6	<b>Expiry Date</b>	27 June 2038
<b>Name of Leaseholder</b>		The Austral Brick Company Pty Limited		
<b>Version</b>	<b>Author</b>	<b>Purpose</b>	<b>Approved by</b>	<b>Date of Submission</b>
1	A. Weihart, S. Rosek, S. Hollamby	Initial RMP	S. Hollamby	8 August 2022

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## LIST OF ACRONYMS

AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DPE	Department of Planning and Environment
EPA	Environment Protection Authority
ESCPs	Erosion and Sediment Control Plans
M(MO)L6	Mining (Mineral Owner) Lease 6
PAD	potential archaeological deposit
RC	reverse circulation
RCE	Rehabilitation Cost Estimate
RMP	Rehabilitation Management Plan
RWC	R.W. Corkery & Co. Pty Limited



# 1. INTRODUCTION TO MINING PROJECT

This Rehabilitation Management Plan (RMP) has been prepared in accordance with the following documents and guidelines.

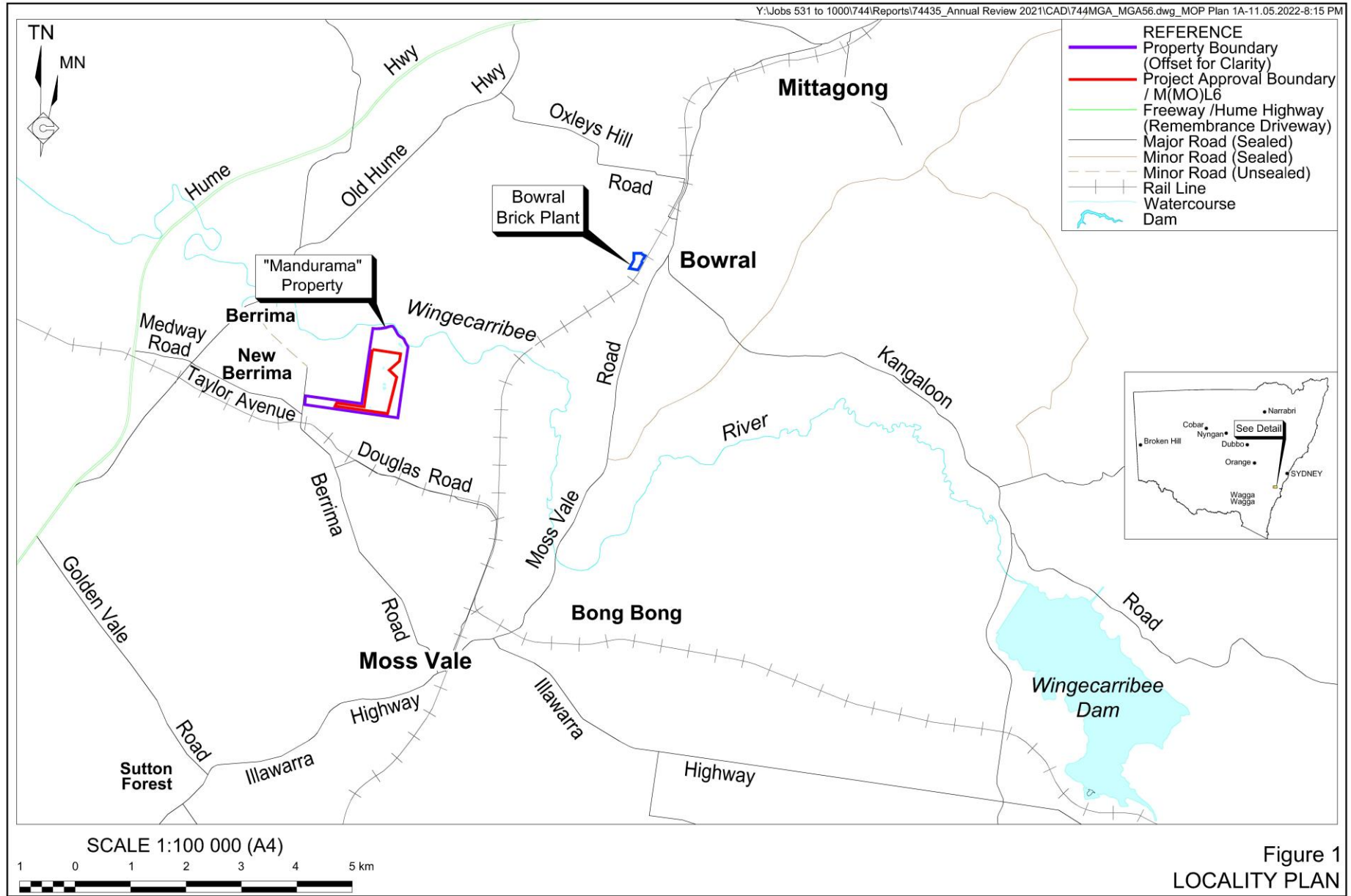
- *Form and Way: Rehabilitation Management Plan for Large Mines (July 2021).*
- *Form and Way: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan for Large Mines (July 2021).*
- *Guideline 1: Rehabilitation Risk Assessment (July 2021)*
- *Guideline 2: Rehabilitation Records (July 2021)*
- *Guideline 3: Rehabilitation Controls (July 2021)*
- *Guideline 5: Rehabilitation Objectives and Rehabilitation Completion Criteria (July 2021)*

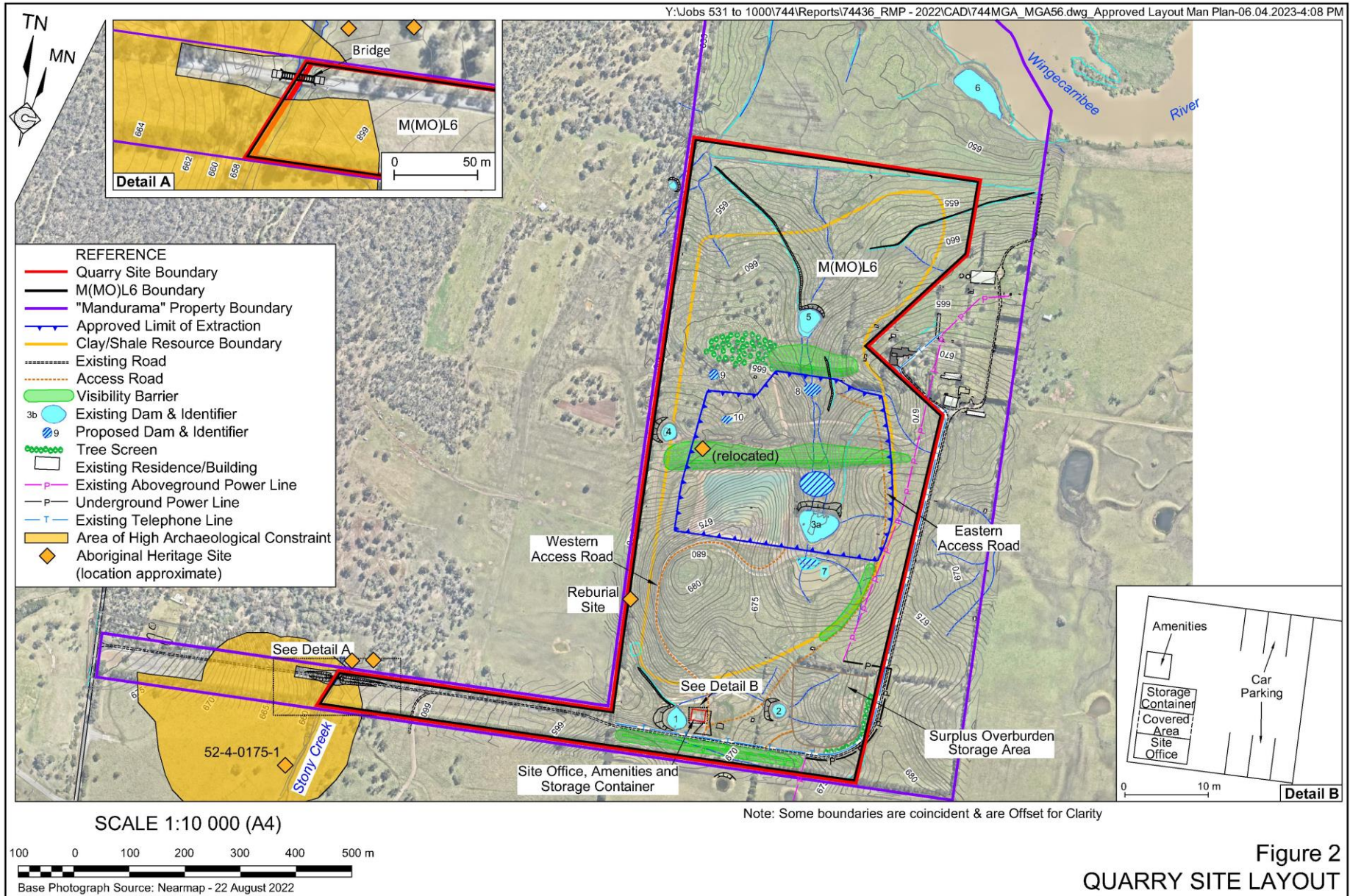
## 1.1 HISTORY OF OPERATIONS

This Rehabilitation Management Plan (RMP) for the New Berrima Quarry (the Quarry) has been compiled by R.W. Corkery & Co. Pty. Limited (RWC) in conjunction with The Austral Brick Company Pty Limited (Austral Bricks). The Quarry is located approximately 1.5km east of New Berrima (see **Figure 1**). It is noted that the Quarry includes the area of Mining (Mineral Owner) Lease 6 (M(MO)L6) together with the section of access road located within the “Mandurama” property between M(MO)L6 and Berrima Road.

Due to market demand and the planned completion of clay/shale extraction at the Austral Bricks owned and operated Bowral Quarry adjacent to the Bowral Brick Plant, Austral Bricks embarked on an exploration program throughout the Southern Highlands in 2005. The aim of this exploration program was to identify a suitable resource replacement for the Ashfield Shale that has been extracted within the Bowral Quarry since it first commenced operation in 1922. The Quarry Site, located within the 100.2ha “Mandurama” property, was selected on the basis that the land had limited remnant native vegetation coverage, having previously been disturbed by grazing, and had minimal environmental constraints for the proposed quarrying operation.

An application for Project Approval and supporting documentation was subsequently submitted in 2010 with Project Approval (PA) 08\_0212 granted under delegation from the (then) Minister for Planning and Infrastructure on 6 July 2012. Approval was granted until 31 December 2045. Since the original grant of Project Approval PA 08\_0212, two modifications have also been approved. These modifications related to the adjustment of the extraction boundary, replacement of the bridge over Stony Creek, altered alignment of the western access road, altered location of the site office, and conversion of a section of overhead powerline to underground power. The current approved Quarry layout is shown in **Figure 2**.





PA 08\_0212 was physically commenced in 2016. On-site establishment activities commenced November 2020 and were completed by the end of 2022. Site establishment activities have included site access intersection upgrade works, construction of the water management system, establishment of site access roads, construction of the visibility barriers, planting of the northern vegetation screen, progressive stabilisation / rehabilitation of completed works, sealing the western access road, relocation of powerlines and planting of trees on the visibility barriers and southern vegetation screen. The remaining off-site establishment activities, namely the upgrade to the intersection of Taylor Avenue and New Berrima Road, are expected to be completed during 2023.

## 1.2 CURRENT DEVELOPMENT CONSENTS, LEASES AND LICENCES

**Table 1** provides information on the current consents, authorisations and licences under which the Quarry is to operate.

**Table 1**  
**Consents, Authorisations and Licences**

Approval/Lease/ Licence	Issue Date	Expiry Date	Details / Comments
<b>Development Consent</b>			
PA 08_0212	6/07/2012	31/12/2045	Issued under the <i>Environmental Planning and Assessment Act 1979</i> , by the (then) Minister for Planning and Infrastructure and last modified 6 July 2017.
<b>Mining Authorisations</b>			
M(MO)L6	27/06/2017	27/06/2038	Granted under the <i>Mining Act 1992</i> , under delegation from the Secretary of the NSW Department of Planning and Environment (DPE). Incorporates an area of 54.85ha within the “Mandurama” property and the access road up to Stony Creek (see <b>Figure 2</b> ). Permits the recovery of clay/shale, kaolin and structural clay.
<b>Other Approvals &amp; Licences</b>			
Environment Protection Licence 20377	1/08/2016	Renewed annually on 1 August	Issued by the NSW Environment Protection Authority (EPA). Current licence version dated 29 January 2021.

A Section 138 Road permit, DA 17/1477, was previously issued by Wingecarribee Shire Council (Council) on 30 August 2018 for an upgrade to the intersection of the Quarry access road and Berrima Road to accommodate B-Double vehicles. The works and requirements of this permit have been managed with and reported directly to Council with no conditions relevant to the ongoing operation of the Quarry.

It is noted that Water Supply Works and Water Use Approval 10CA102968 and associated Water Access Licence 25683 issued on 1 July 2011 for access and use of water from the Wingecarribee River, are solely for irrigation purposes within the “Mandurama” property. No water under these approvals is accessed or utilised for Quarry purposes.

### 1.3 LAND OWNERSHIP AND LAND USE

**Table 2** presents the land ownership for land within and adjacent to the Quarry Site. In summary, land within the Quarry consists of land owned by the Austral Bricks. Land adjacent to the Quarry consists of land owned by Austral Bricks, PAX Australia Pty Ltd, Cowley Hills Pty Ltd, Pingama Pty Ltd, Flocolo 1 Pty Ltd and privately owned land.

**Table 2**  
**Land Ownership**

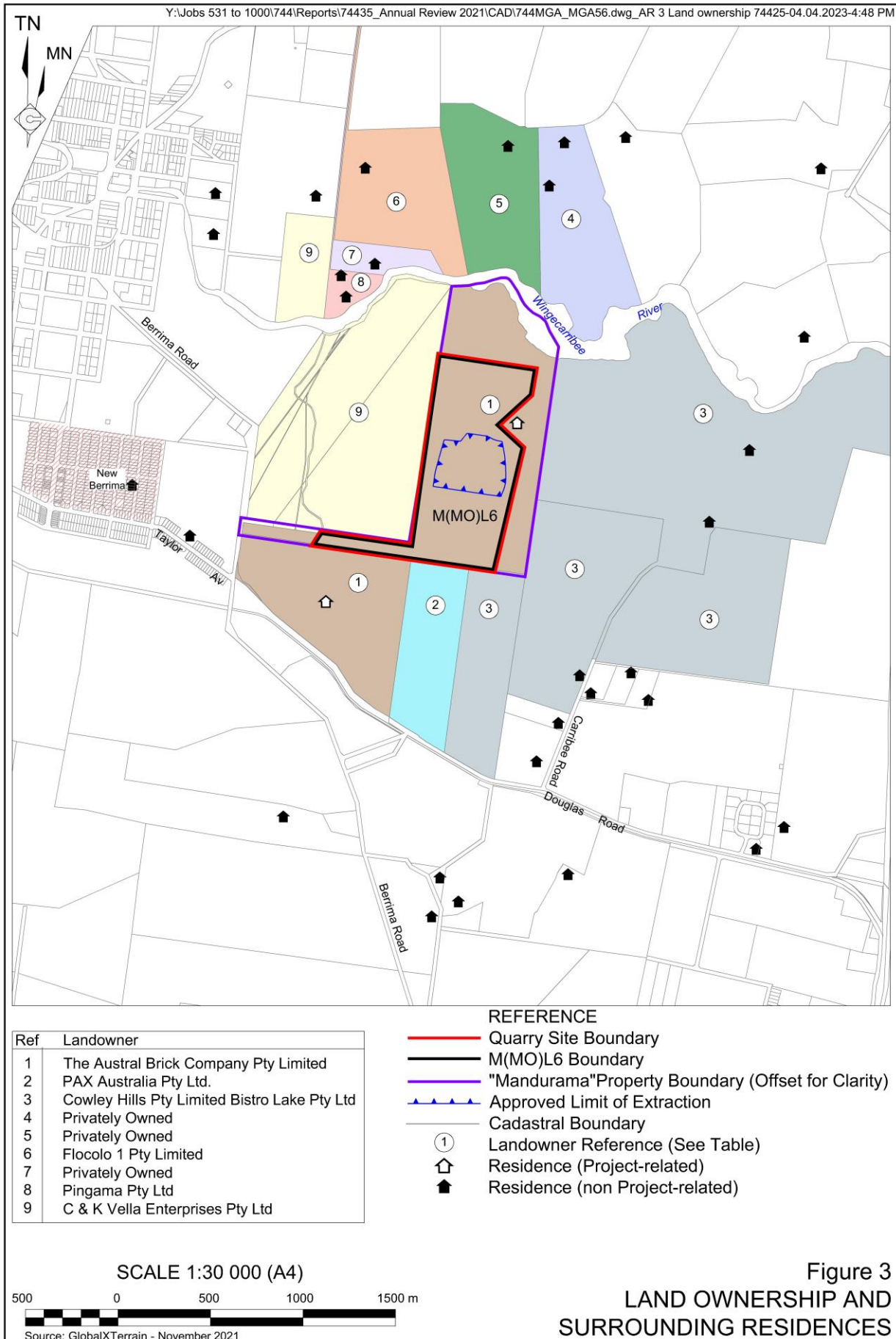
Lot	Deposited Plan	Tenure	Owner	Leases
<b>Quarry Site</b>				
1	414246	Freehold	The Austral Brick Company Pty Ltd	M(MO)L6
<b>Land Adjacent to the Quarry Site</b>				
21	1271421	Freehold	The Austral Brick Company Pty Ltd	N/A
1	1270609	Freehold	PAX Australia Pty Ltd	N/A
2	1270609	Freehold	Cowley Hills Pty Limited	N/A
1	623038	Freehold	Cowley Hills Pty Limited	N/A
3	229807	Freehold	Cowley Hills Pty Limited	N/A
455	257032	Crown Land	State of NSW	N/A
456	257032	Crown Land	State of NSW	N/A
6	628458	Freehold	Pingama Pty Ltd	N/A
5	628458	Freehold	Privately Owned	N/A
4	1009528	Freehold	Flocolo 1 Pty Limited	N/A
7	1053835	Freehold	Privately Owned	N/A
8	1053835	Freehold	Privately Owned	N/A
Crown reserve associated with Wingecarribee River				

Land within the Quarry Site was previously used for grazing purposes. Austral Bricks will continue to graze cattle on areas not required for extraction operations. This will involve placement of some fencing and gates in areas not yet determined.

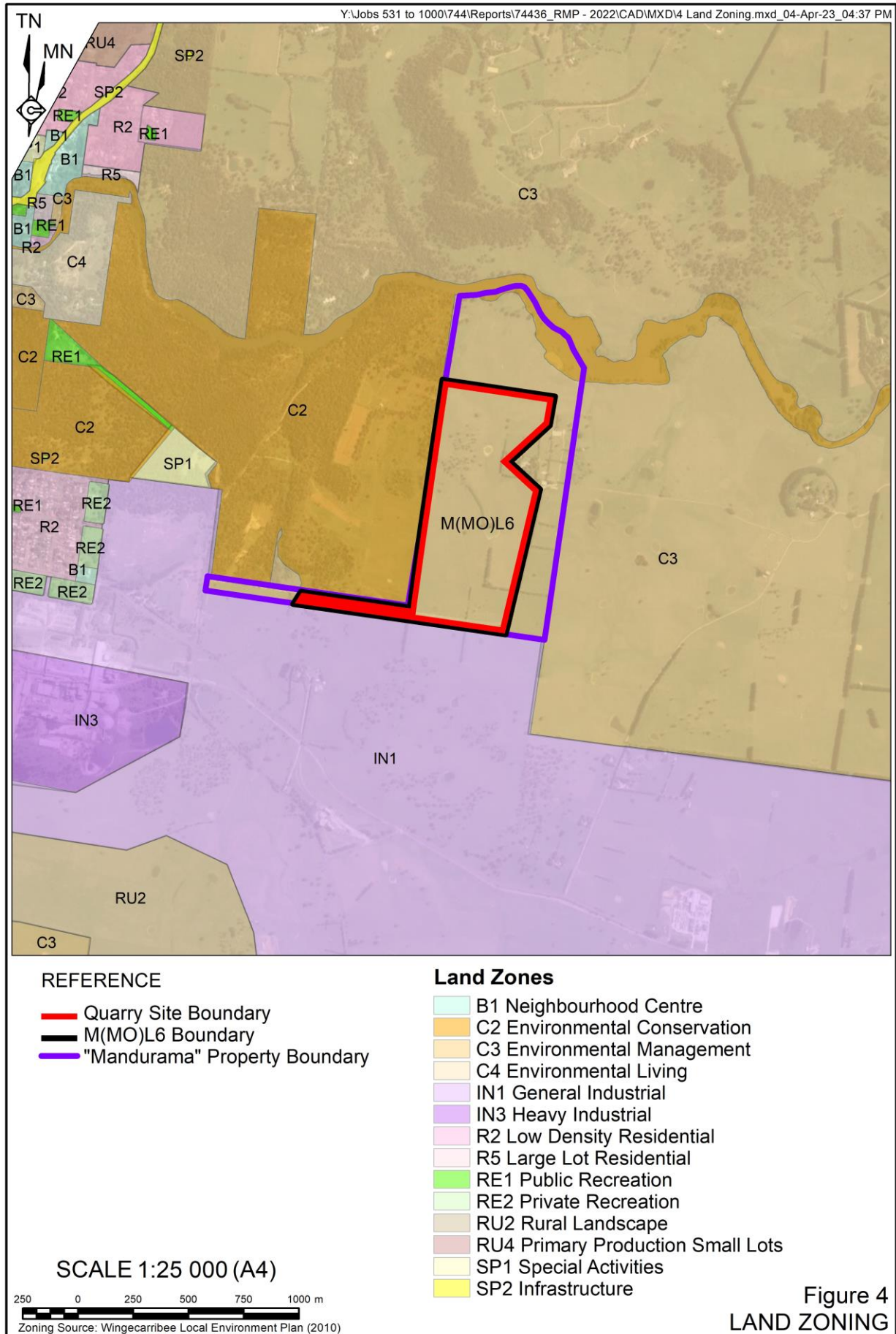
The eastern section of the Crown land reserve immediately to the west of the Quarry Site is used for agricultural purposes whilst the timbered western section includes a pistol/archery range. Properties on the northern side of Wingecarribee River are predominantly lifestyle blocks providing rural/residential housing with some varying degrees of agricultural use. Properties further west adjacent to the river are heavily timbered rural/residential, primarily serving a nature conservation purpose whilst properties to the south and east are primarily used for grazing. Further to the northwest is the town of Berrima, to the west the town of New Berrima and to the southwest, Boral Berrima Cement Works.

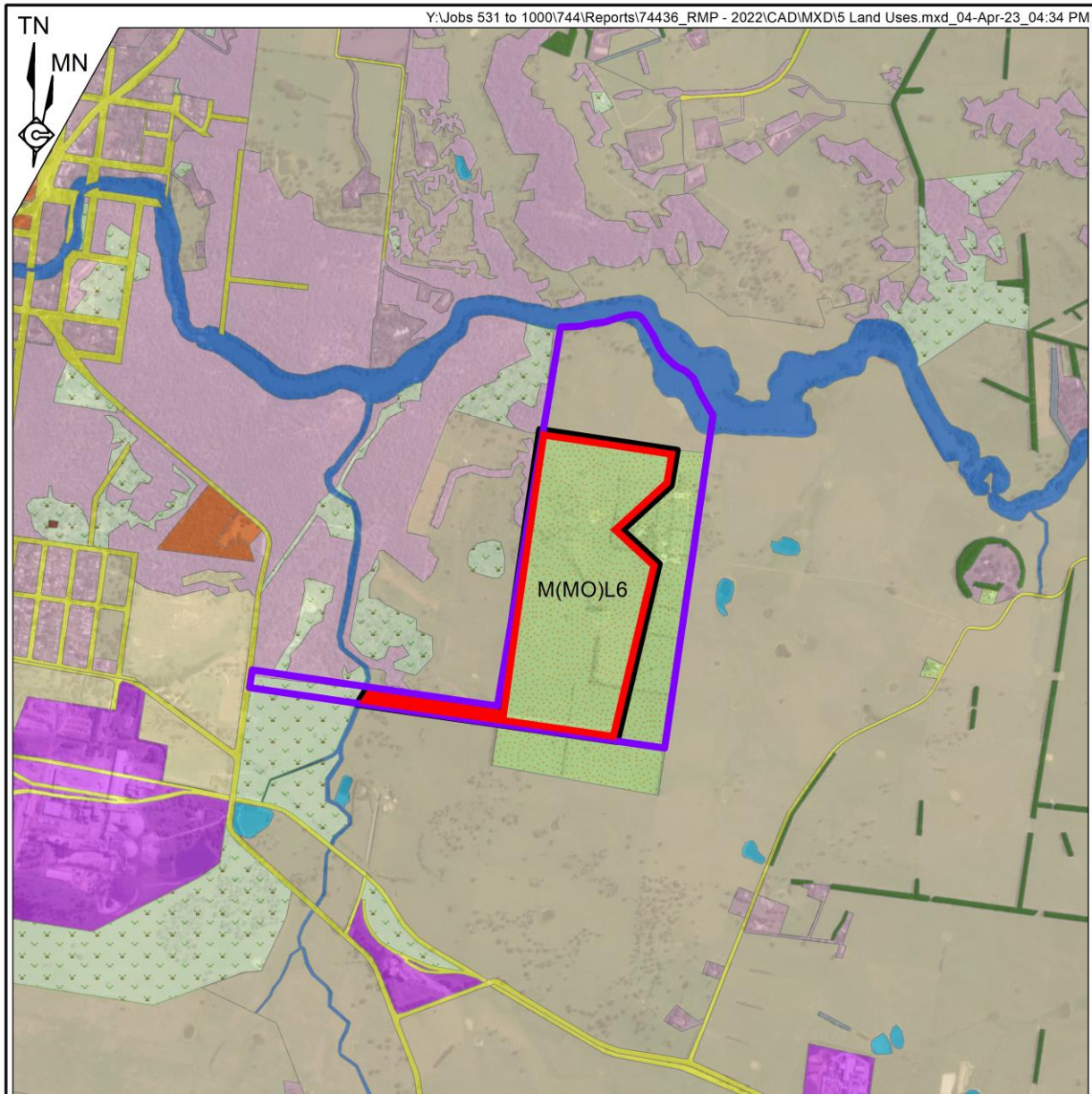
#### 1.3.1 Land Ownership and Land Use Figure

**Figure 3** presents the land ownership details within and immediately surrounding the Quarry Site. **Figure 4** presents land zoning in the vicinity of the Quarry Site and **Figure 5** presents land uses in the vicinity of the Quarry Site.



**Figure 3**  
**LAND OWNERSHIP AND**  
**SURROUNDING RESIDENCES**





**REFERENCE**

- Quarry Site Boundary
- M(MO)L6 Boundary
- "Mandurama" Property Boundary

**Land Uses**

- 1.2.0 Managed resource protection
- 1.3.0 Other minimal use
- 2.1.0 Grazing native vegetation
- 3.1.0 Plantation forests
- 3.2.0 Grazing modified pastures
- 3.4.0 Perennial horticulture
- 3.6.0 Land in transition
- 5.2.0 Intensive animal production
- 5.3.0 Manufacturing and industrial
- 5.4.0 Residential and farm infrastructure
- 5.5.0 Services
- 5.6.0 Utilities
- 5.7.0 Transport and communication
- 6.2.0 Reservoir/dam
- 6.3.0 River
- 6.4.0 Channel/aqueduct

SCALE 1:25 000 (A4)



Source: NSW Land Use & Management (2017)

Figure 5  
**LAND USES**



## 2. FINAL LAND USE

### 2.1 REGULATORY REQUIREMENTS FOR REHABILITATION

Regulatory requirements specifically affecting progress towards the post mining land use are detailed in **Table 3**.

### 2.2 FINAL LAND USE OPTIONS ASSESSMENT

The final land use following rehabilitation of the Quarry has historically been defined in the approved Mining Operations Plan (MOP) for the Quarry and is identified in Section 2.3. In accordance with *Form and Way: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan for Large Mines* (Resources Regulator, 2021), no further land use options assessment is required.

### 2.3 FINAL LAND USE STATEMENT

Final land uses within the Quarry Site will include the following.

- Infrastructure Area – includes the retained sections of site access roads for long-term access to the Quarry.
- Water Management Area – includes the clean water diversion structures.
- Water Storage Area - includes the final Quarry sump, sediment retention dams retained as clean water dams.
- Agricultural Area (Grazing) - Includes all areas returned to pasture, including the extraction area, Overburden Emplacement Area, rehabilitated roads etc.
- Native Ecosystem Area (Woodland Visual Screening) – Includes all other areas disturbed by Quarry activities and which will be returned to native woodland, including the southwestern section of Bench 1 and the Vegetation Screening Area.

Final land use and rehabilitation plans for the Quarry Site are presented in Section 5. It is noted that the proposed final land uses would not interfere with the use of existing reserves within the Quarry Site.

### 2.4 FINAL LAND USE AND MINING DOMAINS

#### 2.4.1 Final Land Use Domains

**Table 4** defines the final land use domains for the Quarry and **Figure 6** displays the final land use domains for the Quarry.

**Table 3**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6	4	<p><b>Must prevent or minimise harm to the environment</b></p> <p>The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease.</p> <p>In this clause –</p> <p><b>harm</b> to the environment has the same meaning as in the <i>Protection of the Environment Operations Act 1997</i>.</p>	Quarry Site	During operations and rehabilitation works.	
	5	<p><b>Rehabilitation to occur as soon as reasonably practicable after disturbance</b></p> <p>The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by mining activities under the mining lease as soon as reasonably practicable after the disturbance occurs.</p>		During operations and rehabilitation works.	
	6	<p><b>Rehabilitation must achieve final land use</b></p> <p>The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area.</p> <p>The holder of a mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1).</p> <p>The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1)</p> <p><b>Note</b> – clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause.</p> <p>In this clause –</p> <p><b>final land use</b> for the mining area means the final landform and final land uses to be achieved for the mining area –</p> <p>as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and</p> <p>for a large mine – as spatially depicted in the final landform and rehabilitation plan, and</p> <p>if the final land use for the mining area is required by a condition of development consent for activities under the mining lease – as stated in the condition.</p> <p><b>planning approval</b> means –</p> <p>a development consent within the meaning of the <i>Environmental Planning and Assessment Act 1979</i>, or</p> <p>an approval under that Act, Division 5.1.</p>		During rehabilitation.	

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6 (Cont'd)	7	<p><b>Rehabilitation risk assessment</b></p> <p>The holder of a mining lease must conduct a risk assessment (a <i>rehabilitation risk assessment</i>) that –</p> <ul style="list-style-type: none"> <li>identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease –</li> <li>the rehabilitation objectives,</li> <li>the rehabilitation completion criteria,</li> </ul> <p>for large mines – the final land use as spatially depicted in the final landform and rehabilitation plan, and</p> <ul style="list-style-type: none"> <li>identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks.</li> </ul> <p>The holder of the mining lease must implement the measures identified.</p> <p>The holder of a mining lease must conduct a rehabilitation risk assessment –</p> <ul style="list-style-type: none"> <li>for a large mine – before preparing a rehabilitation management plan, and</li> <li>for a small mine – before preparing the rehabilitation outcome documents for the mine, and</li> <li>whenever a hazard is identified under clause 6(3) – as soon as reasonably practicable after it is identified, and</li> <li>whenever given a written direction to do so by the Secretary.</li> </ul>			
	8	<p><b>Application of Division</b></p> <p>This Division does not apply to a mining lease unless—</p> <ul style="list-style-type: none"> <li>the security deposit required under the mining lease is greater than the minimum deposit prescribed under the Act, section 261BF in relation to that type of mining lease, or</li> <li>the Secretary gives a written direction to the holder of the mining lease that this Division, or a provision of this Division, applies to the mining lease.</li> </ul>			
	9	<p><b>General requirements for documents</b></p> <p>A document required to be prepared under this Division must—</p> <ul style="list-style-type: none"> <li>be in a form approved by the Secretary, and <b>Note—</b> The approved forms are available on the Department's website.</li> <li>include any matter required to be included by the form, and</li> <li>if required to be given to the Secretary—be given in a way approved by the Secretary.</li> </ul>			

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6 (Cont'd)	10	<p><b>Rehabilitation management plans for large mines</b></p> <p>The holder of a mining lease relating to a large mine must prepare a plan (a rehabilitation management plan) for the mining lease that includes the following—</p> <ul style="list-style-type: none"> <li>a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area,</li> <li>a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation,</li> <li>a summary of rehabilitation risk assessments conducted by the holder,</li> <li>the risk control measures identified in the rehabilitation risk assessments,</li> <li>the rehabilitation outcome documents for the mining lease,</li> <li>a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored.</li> </ul> <p>If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document.</p> <p>A rehabilitation management plan is not required to be given to the Secretary for approval.</p> <p>The holder of the mining lease—</p> <ul style="list-style-type: none"> <li>must implement the matters set out in the rehabilitation management plan, and</li> <li>if the forward program specifies timeframes for the implementation of the matters—must implement the matters within those timeframes.</li> </ul>			
	11	<p><b>Amendment of rehabilitation management plans</b></p> <p>The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows—</p> <ul style="list-style-type: none"> <li>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,</li> <li>as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made,</li> <li>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,</li> <li>whenever given a written direction to do so by the Secretary—in accordance with the direction.</li> </ul>			

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6 (Cont'd)	12	<p><b>Rehabilitation outcome documents</b></p> <p>The holder of a mining lease must prepare the following documents (<i>the rehabilitation outcome documents</i>) for the mining lease and give them to the Secretary for approval—</p> <p>the <i>rehabilitation objectives statement</i>, which sets out the rehabilitation objectives required to achieve the final land use for the mining area,</p> <p>the <i>rehabilitation completion criteria statement</i>, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives,</p> <p>for a large mine, the <i>final landform and rehabilitation plan</i>, showing a spatial depiction of the final land use.</p> <p>If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.</p>			
	13	<p><b>Forward program and annual rehabilitation report</b></p> <p>The holder of a mining lease must prepare a program (a <i>forward program</i>) for the mining lease that includes the following—</p> <p>a schedule of mining activities for the mining area for the next 3 years,</p> <p>a summary of the spatial progression of rehabilitation through its various phases for the next 3 years,</p> <p>a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs.</p> <p>The holder of a mining lease must prepare a report (an <i>annual rehabilitation report</i>) for the mining lease that includes—</p> <p>a description of the rehabilitation undertaken over the annual reporting period,</p> <p>a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period,</p> <p>a report demonstrating progress made towards the achievement of the following—</p> <p>the objectives set out in the rehabilitation objectives statement,</p> <p>the criteria set out in the rehabilitation completion criteria statement,</p> <p>for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan.</p> <p>If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document.</p>			

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6 (Cont'd)	13 (Cont'd)	<p>The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary.</p> <p>In this clause— <b>annual reporting period</b> means each period of 12 months commencing on— the date on which the mining lease is granted, or if the Secretary approves another date in relation to the mining lease— the other date</p>			
	14	<p><b>Amendment of rehabilitation outcome documents and forward program</b></p> <p>This clause applies to—</p> <ul style="list-style-type: none"> <li>a rehabilitation outcome document if it has been approved by the Secretary, and</li> <li>a forward program if it has been given to the Secretary.</li> </ul> <p>The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless—</p> <ul style="list-style-type: none"> <li>the Secretary gives the holder a written direction to do so, or</li> <li>the Secretary, on written application by the holder, gives a written approval of the amendment.</li> </ul> <p>The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval.</p> <p>Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.</p>			
	15	<p><b>Times at which documents must be prepared and given</b></p> <p>The holder of a mining lease must do the following before the end of the initial period—</p> <ul style="list-style-type: none"> <li>prepare a rehabilitation management plan, and</li> <li>prepare rehabilitation outcome documents and give them, other than the rehabilitation completion criteria statement, to the Secretary for approval, and</li> <li>prepare a forward program and give it to the Secretary.</li> </ul> <p>The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before—</p> <ul style="list-style-type: none"> <li>60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or</li> <li>a later date approved by the Secretary.</li> </ul>			

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6 (Cont'd)	15 (Cont'd)	<p>A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary.</p> <p>The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before—</p> <p>60 days after a development consent is modified following an application referred to in clause 20(1)(b), or</p> <p>a later date approved by the Secretary.</p> <p>A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3).</p> <p>The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause.</p> <p>The holder of the mining lease must comply with the direction.</p> <p>In this clause— initial period means the period commencing when the mining lease is granted and ending—</p> <p>30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or</p> <p>if this Division applies to the mining lease because of an increase in the required security deposit—</p> <p>when the surface of the mining area is disturbed by activities under the mining lease, or</p> <p>at a later date approved by the Secretary.</p>			
	16	<p><b>Certain documents to be publicly available</b></p> <p>This clause applies to the following documents—</p> <p>a rehabilitation management plan,</p> <p>a forward program,</p> <p>an annual rehabilitation report.</p>			

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
M(MO)L6 (Cont'd)	16 (Cont'd)	<p>The holder of a mining lease must make a document to which this clause applies publicly available by—</p> <p>publishing it on its website in a prominent position, or</p> <p>if the holder does not have a website— providing a copy of it to a person—</p> <p>on the written request of a person, and</p> <p>without charge, and</p> <p>within 14 days after the request is received.</p> <p>If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published—</p> <p>for a rehabilitation management plan—within 14 days after it is prepared or amended, or</p> <p>for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended,</p> <p>Personal information within the meaning of the <i>Privacy and Personal Information Protection Act 1998</i> is not required to be included in a document made available to a person under this clause.</p>			
	17	<p><b>Records demonstrating compliance</b></p> <p>The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part.</p> <p><b>Note—</b> The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.</p>			
	18	<p><b>Report on non-compliance</b></p> <p>The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with—</p> <p>a condition of the mining lease, or</p> <p><b>Note—</b> The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition.</p> <p>a requirement of the Act or this Regulation relating to activities under the mining lease.</p> <p>The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance.</p>			



**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section											
M(MO)L6 (Cont'd)	18 (Cont'd)	The holder of the mining lease must ensure the report— identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and describes the causes or likely causes of the non-compliance, and describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.														
Project Approval PA08_0212	2(6)	<i>Note: Under this approval, Austral Bricks is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary or MEG.</i>	Quarry Site	During operations and rehabilitation works.												
	3(18)	The Surface Water Management Plan will include detailed plans, including design objectives and performance criteria; for reinstatement of drainage lines on the rehabilitated areas of the site, and control of water pollution from rehabilitated areas of the site.														
	3(33)	Austral Bricks must comply with the rehabilitation objectives outlined in Table 6 to the satisfaction of MEG.  <i>Table 6 - Rehabilitation Objectives</i>	Quarry Site	During operations and rehabilitation works.												
		<table border="1"> <thead> <tr> <th>Feature</th> <th>Objective</th> </tr> </thead> <tbody> <tr> <td>Site (as a whole)</td> <td>Safe, stable &amp; non-polluting</td> </tr> <tr> <td>Surface Infrastructure</td> <td>To be decommissioned and removed, unless the DRG agrees otherwise</td> </tr> <tr> <td>Quarry Walls</td> <td>Final slopes of 1:3 (vertical : horizontal), except the southwestern wall of Bench 1 Vegetated with native endemic flora species to be consistent with surrounding landscape and to minimise visual impacts</td> </tr> <tr> <td>Quarry Pit Floor</td> <td>Suitable for grazing or other agricultural activities</td> </tr> <tr> <td>Other Land affected by the project</td> <td>Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: <ul style="list-style-type: none"> <li>local native species: and</li> <li>a landform consistent with the surrounding environment</li> </ul> </td> </tr> </tbody> </table>	Feature	Objective	Site (as a whole)	Safe, stable & non-polluting	Surface Infrastructure	To be decommissioned and removed, unless the DRG agrees otherwise	Quarry Walls	Final slopes of 1:3 (vertical : horizontal), except the southwestern wall of Bench 1 Vegetated with native endemic flora species to be consistent with surrounding landscape and to minimise visual impacts	Quarry Pit Floor	Suitable for grazing or other agricultural activities	Other Land affected by the project	Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: <ul style="list-style-type: none"> <li>local native species: and</li> <li>a landform consistent with the surrounding environment</li> </ul>		
Feature	Objective															
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Quarry Pit Floor	Suitable for grazing or other agricultural activities															
Other Land affected by the project	Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: <ul style="list-style-type: none"> <li>local native species: and</li> <li>a landform consistent with the surrounding environment</li> </ul>															
	3(34)	Austral Bricks must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies must be employed when areas prone to dust generation cannot yet be permanently rehabilitated.	Quarry Site	During operations and rehabilitation works.												

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

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Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
Project Approval PA08_0212 (Cont'd)	3(35)	Austral Bricks must prepare and implement a Landscape Management Plan for the project to the satisfaction of the Secretary.	Quarry Site	Updated every five years	
<b>Commonwealth Legislation</b>					
<i>Environmental Protection and Biodiversity Conservation Act 1999</i>	s15B-15C	Discusses the requirement for approval for activities that may affect matters of national environmental significance including National Heritage places.	Mine Site	During decommission and rehabilitation works.	
<b>NSW Legislation</b>					
<i>Protection of Environmental Operations Act 1997</i>	s42-58	Discusses the provision of Environment Protection Licences.	Quarry Site	During operations and rehabilitation works.	
	s89-113	Discusses the application of Clean-up Notices.		During operations.	
	Chapter 5	Discusses environmental offences including water, air, noise and land pollution.		During operations and rehabilitation works.	
<i>Heritage Act 1977</i>	Part 3 (s27-30)	Discusses interim orders for items of State or local significance.		During decommission and rehabilitation works.	6.2.1.13
	Part 3A (s31-38)	Discusses listing of items, places or buildings on the state heritage register.		During construction, operations and rehabilitation works.	
	Part 4	Discusses the effect of interim heritage orders and listings on the State Heritage Register			
	Part 6	Discusses other measures for the conservation of environmental heritage.			
	Division 8	Discusses controlling and restricting harm to buildings, works, relics and places not subject to interim heritage orders or State Heritage Registered listings.			
<i>Mining Act 1992</i>	Division 3	Under these sections the Minister can direct a company to rehabilitate their land, or, should the company not comply with this direction, rehabilitate the land at the Ministers expense and recover the cost from the company.		During rehabilitation works.	Noted

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
<b>NSW Legislation (Cont'd)</b>					
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>	2.23	The rehabilitation of the land affected by the development must be considered including: <ul style="list-style-type: none"> <li>the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;</li> <li>the appropriate management of waste generated by the development;</li> <li>remediation of any soil contaminated as a result of the development; and</li> <li>the steps to be taken to ensure that the state of the land does not jeopardize public safety.</li> </ul>			This Plan 6.2.1.5 6.2.1.11 6.2.2.1
<b>Long Term Rehabilitation Objectives</b>					
Statement of Commitments	4.1	Ensure early and progressive revegetation of visibility barriers and rehabilitation of completed extraction areas.	Quarry Site	During operations and rehabilitation works.	6.2.2.11, 6.2.2.2
	7.2	Commence progressive rehabilitation of completed faces and all other completed disturbed areas as soon as possible after completion of extraction. Rehabilitation of the southern extraction area wall would be very advanced (13-18 years) and protect against views of extraction faces during Stages 5 to 7.	Quarry Site		6.1
	8.2	Commence progressive rehabilitation of all disturbed areas as soon as possible after the completion of excavation in that area.	Quarry Site		6.1
	9.2	Wherever practicable, place stripped topsoil directly onto the constructed visibility barriers or areas prepared and awaiting rehabilitation.	Quarry Site		
<i>Environmental Assessment (RWC, 2010)</i>	2.12.5	i) Sediment and erosion controls would be re-instated as required around all areas of disturbance.	Quarry Site	During operations and rehabilitation works.	6.2.1.10
		ii) The final extraction faces would have an average overall grade of 2:1 (V: H) at the end of the extraction period. Terminal benches would be backfilled with subsoil to a height of approximately 2m to 3m against the extraction face. The relief of the placed subsoil would be made irregular to retard and catch runoff. Topsoil would be spread and the areas vegetated. A quick growing cover crop would be seeded to provide rapid stabilisation. Trees and shrubs endemic to the area would also be planted by seed and/or tube stock. It is noted that rehabilitation of Stage 1 extraction faces should be quite advanced as excavation proceeds to Stages 3 and 4.			6.2.3.2, 6.2.3.4
		iii) The operational haul road into the extraction area would be regraded to suit any changed grades of the basin walls and used as an access track into the basin.			6.2.2.3

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
<b>Long Term Rehabilitation Objectives (Cont'd)</b>					
<i>Environmental Assessment (RWC, 2010) (Cont'd)</i>	2.12.5 (Cont'd)	iv) The floor of the excavation area would be deep ripped following the progressive completion of excavation. Stockpiled overburden and materials from the amenity bunds would be used to re-surface the floor of the excavation area.			6.2.3.4
		v) Topsoil would be applied over the deposited overburden/subsoil.			6.2.3.3
		vi) The surface of the placed topsoil would be left even but 'roughened' to assist with infiltration of water and seed retention.			6.2.3.2
		vii) Pasture species would be seeded over all arable areas and fertilisers applied as recommended. The pasture species would be selected by the Proponent's farm manager reflecting the stock being carried on the property at that time.			6.2.5, 6.2.6
		viii) Stock would be prevented from entering rehabilitated areas until pasture is well established.			6.2.5, 6.2.6
		ix) The area to be rehabilitated would be fenced and signs erected to restrict access to the area.			6.2.2.1
		x) Rehabilitation would be monitored regularly as described in Section 2.11.7.			8
	2.12.7	<p>During regular inspections, the following would be monitored.</p> <ul style="list-style-type: none"> <li>Evidence of any erosion or sedimentation from areas with establishing vegetation cover.</li> <li>Success of pasture establishment, where present.</li> <li>Incidence of pasture attack by pests.</li> <li>Natural regeneration of native species on amenity bunds and benches within the extraction area.</li> <li>Adequacy of drainage controls.</li> <li>General stability of the rehabilitation areas.</li> </ul>	Quarry Site	During operations and rehabilitation works.	8

**Table 3 (Cont'd)**  
**Regulatory Requirements for Rehabilitation**

Consent	Cond No. or Section Ref.	Rehabilitation Requirement	Area	Timing	RMP Section
<b>Long Term Rehabilitation Objectives (Cont'd)</b>					
<i>Environmental Assessment</i> (RWC, 2010) (Cont'd)	2.12.7	<p>Throughout the life of the Project, the following rehabilitation maintenance activities would be undertaken:</p> <ul style="list-style-type: none"> <li>• Where monitoring indicates that rehabilitation success appears limited, the following maintenance activities would be initiated. <ul style="list-style-type: none"> <li>– Re-seeding, re-topsoiling and/or the application of specialised treatments such as composted mulch and fertiliser to areas with poor vegetation establishment.</li> <li>– Protection against grazing by native animals.</li> <li>– Repair or reconstruction of drainage controls should existing controls be found to be inadequate.</li> </ul> </li> <li>• Where monitoring identifies excessive erosion and sedimentation, remedial works such as importation of additional fill, subsoil or topsoil material, or re-designing of water management structures would be undertaken.</li> <li>• Where monitoring identifies actual or potential weed infestations, the Proponent would undertake appropriate weed control or eradication programs.</li> </ul>	Quarry Site	During operations and rehabilitation works.	8

**Table 4**  
**Final Land Use Domains**

Final Land Use Domain	Domain ID <sup>1</sup>	Domain Description
Infrastructure Area	I	Includes the retained sections of site access roads for long-term access to the Quarry.
Water Management Area	F	Includes the retained clean water diversion structures.
Water Storage Area (Excluding Final Void)	G	Includes the retained clean water Dams 1, 2, 4 and 8.
Agricultural Area (Grazing)	B	Includes all areas returned to pasture, including the extraction area, Overburden Emplacement Area, rehabilitated roads etc.
Native Ecosystem Area (Visual Screening Woodland)	A	Includes all other areas disturbed by Quarry activities and which will be returned to native woodland, including the southwestern section of Bench 1 and visual screening.
Note 1: See <b>Figure 6</b>		

## 2.4.2 Mining Domains

**Table 5** defines the mining domains for the Quarry and **Figure 7** displays the mining domains for the Quarry.

**Table 5**  
**Mining Domains**

Mining Domain	Domain ID <sup>1</sup>	Domain Description
Infrastructure Area	1	Includes the site access and internal roads, Stony Creek bridge, site office and amenities block (transportable), storage container and covered area, and the northern, central and southern visibility barriers.
Water Management Area	3	Includes up to 11 dams (throughout the Quarry life), clean and dirty water diversion drains, mobile pumping and flocculation system and associated piping.
Overburden Emplacement Area	4	Includes the Overburden Emplacement Area which will contain overburden and soil stockpiles and potentially raw material stockpiles.
Active Mining Area (Open Cut Void)	5	Includes the active extraction area.
Vegetation Screening Area	8a	Includes the north-western and south-eastern woodland vegetation screens.
Note 1: See <b>Figure 7</b>		

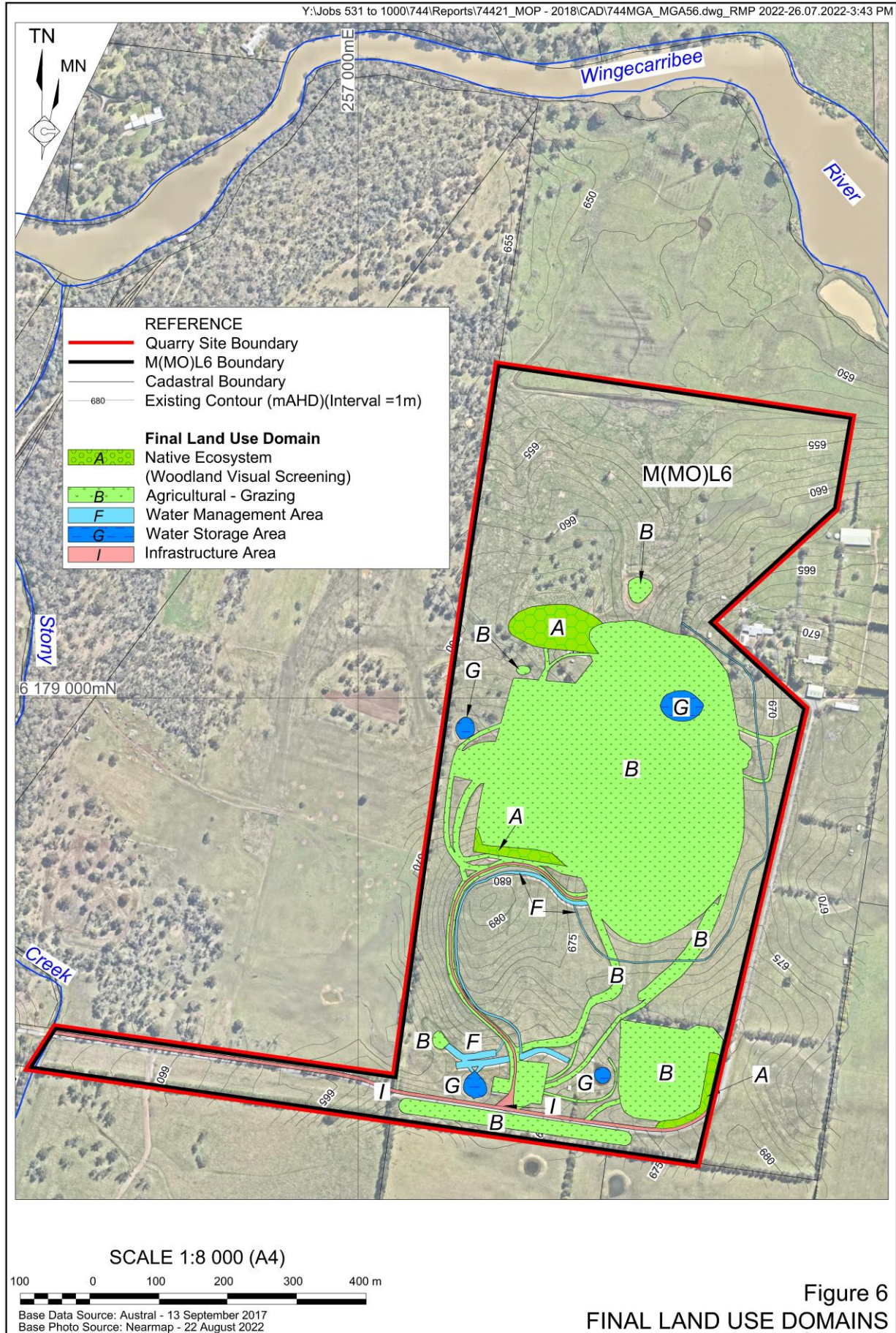


Figure 6  
FINAL LAND USE DOMAINS

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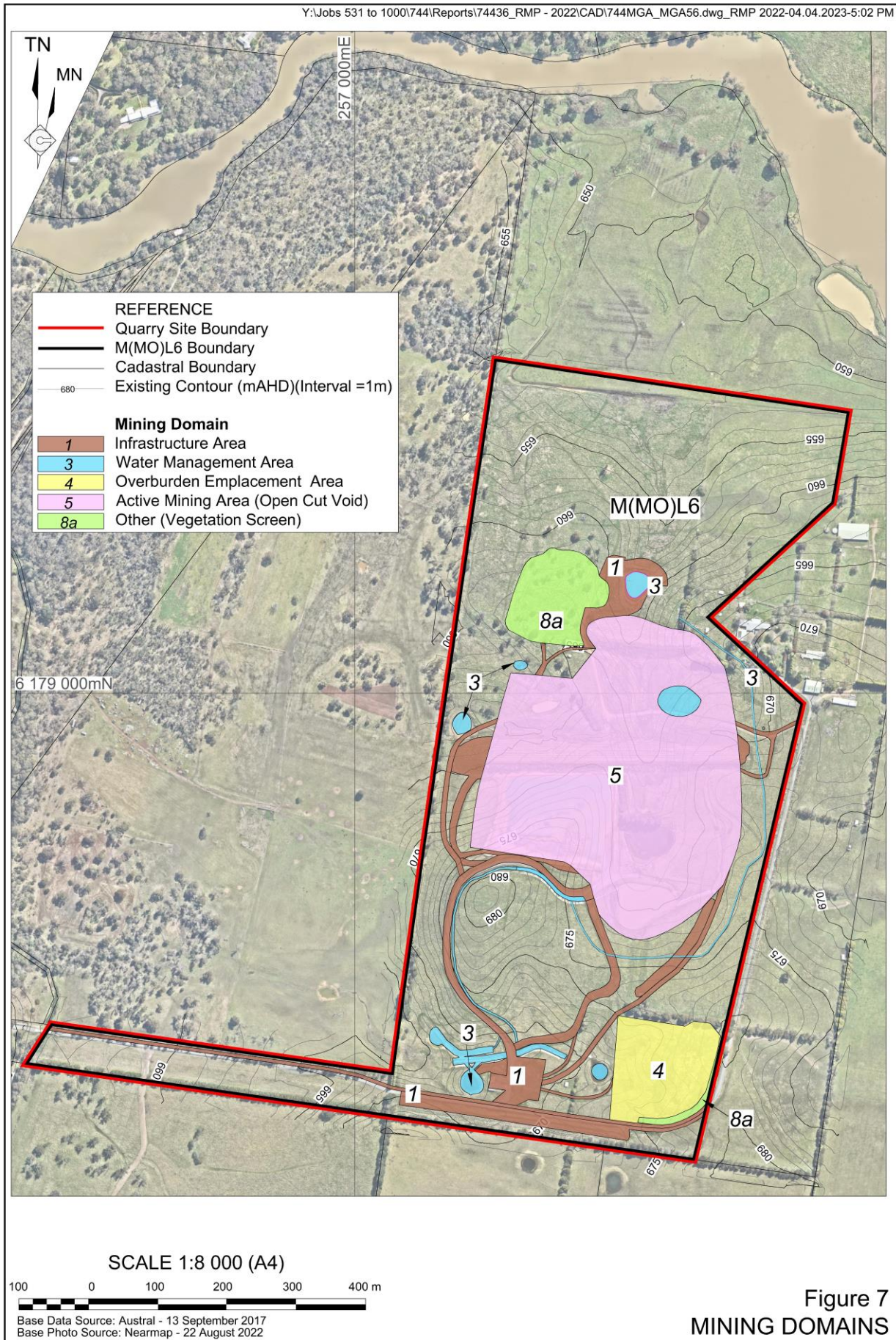


Figure 7  
 MINING DOMAINS



### 3. REHABILITATION RISK ASSESSMENT

The following risk assessment was undertaken generally in accordance with *Australian Standards HB 203:2006, AS/NZS 4360:2004 and AS/NZS ISO 31000:2018 Risk Management – Principles & Guidelines*.

Risks to achieving the rehabilitation objectives and rehabilitation completion criteria outlined in Section 4, as well as the final landform outlined in Section 5, were identified and assessed jointly by Austral Bricks and R.W. Corkery & Co. Pty Limited during the preparation of this Plan. Site-specific threats to rehabilitation were assessed based on both the results of previous rehabilitation trials (see Section 9) as well as observations of site-specific conditions and threats to rehabilitation in collaboration with Austral Bricks. This risk assessment was completed with consideration of existing controls as well as those risk controls outlined in this Plan.

For each identified risk to rehabilitation, potential adverse outcomes were identified and allocated a risk rating based on the potential consequences and likelihood of occurrence. **Tables 6, 7 and 8** present the consequence, likelihood and risk rating used during this analysis. Where risks were determined to be unacceptable, namely those risks classified as “Moderate” or above, a Trigger Action Response Plan has been developed and is presented in Section 10.

**Table 9** presents the results of the risk analysis assuming the implementation of standard mitigation measures and those outlined within this RMP.

**Table 6**  
**Qualitative Consequence Rating**

Level	Descriptor	Description
1	Negligible	No detrimental impact on the environment is measurable or envisaged.
2	Minor	An event which could have temporary and minor effects on the environment, such as a non-reportable environment incident.
3	Moderate	An event which would create substantial temporary or minor permanent damage to the environment, such as a reportable incident not likely to result in prosecution.
4	Major	An event which could have a substantial and permanent consequence to the environment such as an environmental incident which would result in prosecution, adverse local publicity and community complaints.
5	Severe	A major event which could cause severe damage to the environment with actual or potential loss of credibility with key stakeholders, environmental liability, regulatory intervention, national publicity/complaints, or could close the operation prematurely.
Note: Rating modified after AS/NZS ISO31000:2009 Risk Management – Principles & Guidelines		

**Table 7**  
**Qualitative Likelihood Rating**

Level	Descriptor	Description
A	Certain	Is an ongoing occurrence or will occur under all conditions.
B	Almost Certain	Is expected to occur in most circumstances.
C	Likely	Will probably occur in most circumstances.
D	Possible	Will probably occur under favourable circumstances.
E	Unlikely	May occur, but only under favourable circumstances.
F	Rare	Not expected to occur, unless subject to exceptional circumstances.
G	Very Rare	Theoretically possible but not expected to occur.

Source: Rating modified after HB 89:2012 – Figure B7

**Table 8**  
**Qualitative Risk Rating**

Likelihood	Consequences				
	1 Negligible	2 Minor	3 Moderate	4 Major	5 Severe
A Certain	M	H	H	VH	VH
B Almost Certain	M	M	H	VH	VH
C Likely	M	M	H	H	VH
D Possible	L	M	M	H	H
E Unlikely	L	L	M	M	H
F Rare	L	L	L	M	M
G Very Rare	L	L	L	L	M

Risk Rating: L = Low, M = Moderate, H = High and VH = Very High

Source: Modified after HB 89:2012 – Figure B8

Table 9  
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking					Where Addressed in RMP
			Domain A: Native Ecosystem	Domain B: Agricultural – Grazing	Domain F: Water Management Areas	Domain G: Water Storage (Excluding final void)	Domain I: Infrastructure	
General	Insufficient skills and experience of rehabilitation personnel.	Extensive experience of management team Development and implementation of <i>Integrated Management Plan</i> documentation, including inductions, toolbox talks and Contractor Permit to Work, safety contacts and workplace inspections. Engagement of specialist consultant(s) to address specific issues if and when required.	L (F3)	L(F3)	L (F3)	L (F3)	L(F2)	7, 10
	Lack of clearly defined responsibilities.	Responsibilities as defined in the <i>Rehabilitation Management Plan</i> and Safety, Health and Environment Management System. Implementation of <i>Integrated Management Plan</i> documentation, including inductions, toolbox talks and Contractor Permit to Work.	L(G3)	L(G3)	L(G3)	L(G3)	L(G3)	7
	Insufficient funding for or prioritisation of rehabilitation activities.	Rehabilitation cost estimate and maintenance of security bond.	L(F3)	L(F3)	L(F3)	L(F3)	L(F3)	7, 10
Active Mining Phase of Rehabilitation	Inappropriate biological resource (e.g. subsoil, topsoil, vegetative material, seedbank, rocks, habitat resources) through clearing, salvage, and handling practices.	Stockpiling of growth medium in locations not subject to run-on water or vehicle access. Spraying of weeds on an as needed basis. <i>Signposting of growth medium stockpile (when present).</i>	NA	L(E2)	NA	NA	NA	6.2.1.1, 6.2.1.11, 9.2
	Limited pre-existing biological resources for use (e.g. topsoil, woody debris).	Strip all available soil resources and either immediately place on shaped landform or stockpile in accordance with Rehabilitation Management Plan. <i>Maintain a growth medium register.</i> <i>Record growth medium stockpile locations on map (when present).</i>	NA	L(F3)	NA	NA	NA	6.2.1.1, 6.2.1.11, 9.2
	Adverse meteorological conditions during salvage of biological resources.	Review of meteorological forecast prior to soil stripping and avoidance of stripping activities during high rainfall. Review site conditions prior to commencement of vegetation clearing and soil stripping.	NA	L(F3)	NA	NA	NA	6.2.1.1, 6.2.5, 8.2
	Adverse geochemical/chemical composition of materials such as overburden, processing wastes, topsoils and subsoils.	Allowance for application of gypsum and fertiliser in rehabilitation cost estimate. <i>Ensure that all areas of overburden / clay are rehabilitated with adequate depth of soil to avoid exposure of potentially dispersive materials.</i> <i>Testing of growth medium following spreading but prior to application of seed to confirm rates of gypsum, fertiliser and/or other soil ameliorants required.</i>	L(F3)	L(F3)	L(F3)	NA	NA	6.2.1.1, 6.2.1.6, 9.2.
	Handling and containment of geochemical and geotechnically unsuitable process residue and reject materials.	No geochemically or geotechnically unsuitable process residues or reject materials generated or present.	NA	NA	NA	NA	NA	-
	Adverse surface and/or groundwater quality and quantity.	Erosion and sediment control structures. Storage of all hydrocarbons and chemicals in accordance with AS1940:2017 – The storage and handling of flammable and combustible liquids. Management of discharge water quality, including use of flocculants / coagulants as required.	NA	NA	NA	L(F3)	NA	6.2.1.5, 6.2.2.5, 6.2.3.1, 10

Table 9 (Cont'd)  
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking					Where Addressed in RMP
			Domain A: Native Ecosystem	Domain B: Agricultural – Grazing	Domain F: Water Management Areas	Domain G: Water Storage (Excluding final void)	Domain I: Infrastructure	
Decommissioning Phase of Rehabilitation	Impacts on heritage items.	Implement management measures in accordance with approved Aboriginal Cultural Heritage Management Plan. Note: Aboriginal heritage reburial site located well beyond final land use domains.	L(G4)	L(G4)	L(G4)	L (G4)	L(G4)	6.2.1.13, 9.2
	Hazards associated with retained infrastructure.	Inspection of roads, sediment basins and diversion banks following periods of intense rainfall to ensure trafficability / stability.	NA	NA	L(F3)	L(F3)	L(F3)	6.2.2.3, 6.2.6.2, 9.2
	Contamination resulting from associated activities (e.g. storage and use of hydrocarbons/chemicals, drilling fluid, spillage of dirty water, brine, sewage).	Storage of all hydrocarbons and chemicals in accordance with AS1940:2017 – The storage and handling of flammable and combustible liquids <i>Visual contamination inspection and report prior to relinquishment.</i>	L(G4)	L(G4)	L(G4)	L (G4)	L(G4)	6.2.2.4, 6.2.2.5
	Material and waste products from the demolition process retained on the final landform.	Removal of all equipment and any associated spares / wastes in accordance with established protocols.	NA	L(F2)	NA	L(F2)	NA	6.2.2.2
	Groundwater accumulation in former underground workings (e.g. potential for fill and spill or impacts on regional groundwater users).	No underground workings present.	NA	NA	NA	NA	NA	-
	Exposure or access to underground workings.	No underground workings present.	NA	NA	NA	NA	NA	-
	Habitation of structures and/or underground workings by native fauna (e.g. bats).	No underground workings present.	NA	NA	NA	NA	NA	-
Landform Establishment Phase of Rehabilitation	Unstable landform due to erosion and/or mass movement issues associated with inappropriate design and/or quality assurance during landform construction.	Establishment of safe and stable final extraction faces up to 1:3 V:H (670m AHD batter up to 1:1.5 V:H). <i>Visual inspection and report of slope stability prior to relinquishment.</i>	NA	L(F3)	L(F3)	L(F3)	L(F3)	6.2.3.2, 6.2.3.4
	Exposure or release of geochemical and/or geotechnically adverse material associated with containment design and construction, including capping/cover system.	No capping or containment systems present or required.	NA	NA	NA	NA	NA	-
	Lack of availability of suitable materials for encapsulation or capping of adverse materials.	No capping or containment systems present or required.	NA	NA	NA	NA	NA	-
	Borehole or gas well seals failure.	No boreholes or gas wells present.	NA	NA	NA	NA	NA	-
	Final landform unsuitable for final land use (e.g. large rocks present affecting cultivation, unsuitable surface cover and landform settlement).	<i>Shaping and ripping of final batters and extraction floor to provide suitable grades and surface substrate for application of growth medium.</i> <i>Visual inspection prior to application of growth medium.</i>	NA	L(F3)	NA	NA	NA	6.2.3.4, 6.2.4, 8
	Retained final landform is not free-draining / results unintended ponding of water.	<i>Shaping of batters and extraction floor to provide suitable grades directing surface water flows to the retained water storages and/or suitably stabilised outlets.</i>	NA	L(F2)	L(F2)	NA	NA	6.2.3.1
	Uncontrolled public access to highwalls	No highwalls will be retained.	NA	NA	NA	NA	NA	-

Table 9 (Cont'd)  
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking					Where Addressed in RMP
			Domain A: Native Ecosystem	Domain B: Agricultural – Grazing	Domain F: Water Management Areas	Domain G: Water Storage (Excluding final void)	Domain I: Infrastructure	
Growth Medium Development Phase of Rehabilitation	Inappropriate physical and structural properties of growth medium.	<p><i>Shaping and ripping of batters and extraction floor to provide suitable grades and surface substrate for application of growth medium.</i></p> <p><i>Light ripping of growth medium across contours to key in to substrate, reduce surface runoff velocities, and retain seed (when spread).</i></p> <p>Allowance for application of gypsum in rehabilitation cost estimate.</p> <p><i>Testing of growth medium following spreading but prior to application of seed to confirm rates of gypsum and/or other soil ameliorants required.</i></p> <p><i>Restriction of vehicular access following spreading of soil material.</i></p>	NA	L(F3)	L(F3)	NA	NA	6.2.1.1, 6.2.1.6, 6.2.1.11, 6.2.4, 8, 9.2
	Subsoil and topsoil deficit for rehabilitation activities.	<p>Strip all available soil / growth medium resources and either immediately place on shaped landform or stockpile in accordance with Rehabilitation Management Plan.</p> <p><i>Ensure soil material spread at the correct calculated depths across rehabilitation areas to avoid areas of over-placement under under-placement.</i></p> <p><i>If required, suitable source of additional soil material to be identified, including the need for importation of growth medium or soil conditioners to increase volume of on-site growth medium.</i></p>	NA	L(G4)	L(G4)	NA	NA	
	Substrate inadequate to support revegetation or agricultural land capability (e.g. lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties, exposed hostile geochemical materials, and any other factors impeding the effective rooting depth).	<p>Allowance for application of gypsum and fertiliser in rehabilitation cost estimate.</p> <p><i>Testing of growth medium following spreading but prior to application of seed to confirm rates of gypsum, fertiliser and/or other soil ameliorants required.</i></p>	NA	L(F3)	L(F3)	NA	NA	
Ecosystem and Land Use Establishment Phase of Rehabilitation	Lack of availability and quality of target seed resources, including genetic integrity.	<i>Source and purchase of appropriate pasture seed mix for ground stabilisation and pasture establishment suitably in advance of planned rehabilitation activities.</i>	NA	L(F3)	L(F3)	NA	NA	6.2.5, 8
	Poor seed viability or seed dormancy.	<i>Source and purchase of appropriate pasture seed mix for ground stabilisation and pasture establishment suitably in advance of planned rehabilitation activities.</i>	NA	L(F3)	L(F3)	NA	NA	8
	Seed predation.	<i>Use of appropriate sowing and seeding techniques.</i> <i>Selection of seed mix appropriate to the season / current weather conditions so that germination occurs as soon as practicable following sowing.</i>	NA	L(F3)	L(F3)	NA	NA	8
	Damage to seed through revegetation process.	<i>Use of appropriate sowing and seeding techniques.</i>	NA	L(F3)	L(F3)	NA	NA	8, 9
	Poor quality tubestock.	<i>Purchase of suitable tube stock grown from locally collected seed and from reputable supplier.</i>	L(F3)	NA	NA	NA	NA	8, 9
	Weed infestation associated with both introduction and control (or lack thereof).	Implement weed inspection and control program. Implement equipment delivery protocol to ensure equipment does not import weeds.	L(F2)	L(F2)	L(F2)	NA	NA	6.2.1.11, 6.2.5, 8
	Adopting inappropriate or inadequate rehabilitation techniques, including equipment fleet.	Extensive experience of management team. <i>Engagement of experienced contractors.</i> <i>Rehabilitation personnel induction and training.</i>	L(F3)	L(F3)	L(F3)	L(F3)	L(F3)	9, 10
	Inappropriate revegetation species mix for targeted final land use.	<i>Consult with suitably experienced expert to confirm suitable seed mix that maintains suitable groundcover whilst providing suitable pasture for grazing (Domains B and F).</i> <i>Ensure tube stock species planted are consistent with Rehabilitation Management Plan.</i> <i>Source seed mix / tube stock from reputable supplier.</i>	L(F3)	L(F3)	L(F3)	NA	NA	6.2.5, 8, 9
	Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	Review long-term weather forecast prior to purchase of seed mix / tube stock. <i>Consult with suitably experienced expert to confirm suitability of seed mix / tube stock species for seasonal conditions.</i> If required, utilisation of stored water for irrigation of revegetation areas to achieve effective root establishment.	M(E3)	M(E3)	M(E3)	NA	NA	6.2.5
Lack of infrastructure to support intended final land use (e.g., bunding or fences).	No specific infrastructure required to support final land use.	NA	NA	NA	NA	NA	-	

Table 9 (Cont'd)  
Rehabilitation Risk Assessment

Rehabilitation Phase	Risk	Risk Control	Final Land Use Domain / Risk Ranking					Where Addressed in RMP
			Domain A: Native Ecosystem	Domain B: Agricultural – Grazing	Domain F: Water Management Areas	Domain G: Water Storage (Excluding final void)	Domain I: Infrastructure	
Ecosystem and Land Use Development Phase of Rehabilitation	Hazards associated with retained infrastructure.	Inspection of roads, retained water storages, and diversion banks following periods of intense rainfall to ensure trafficability / stability.	NA	NA	L(F3)	L(F3)	L(F2)	6.2.6.2, 6.2.6.4
	Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	Review long-term weather forecast. <i>If existing seed mix is inappropriate for current weather conditions, consult with suitably experienced expert to confirm alternative species and/or cover crop or mulch for temporary stabilisation.</i>	L(F3)	L(F3)	L(F3)	NA	NA	6.2.6.2
	Substrate inadequate to support revegetation or agricultural land capacity.	<i>If inadequate groundcover / projected foliage cover achieved, consult with suitably experienced expert to confirm appropriateness of species selection, or need for additional soil amelioration requirements (gypsum, fertiliser, organic matter).</i>	L(F3)	L(F3)	L(F3)	NA	NA	6.2.1.1, 6.2.1.11, 6.2.6.3, 9.2
	Post-closure water quality and quantity issues.	<i>Ensure adequate projected foliage cover to limit erosion / silt entrainment.</i> <i>Ensure water management structures remain stable and functional.</i>	L(F3)	L(F3)	L(F3)	L(F3)	NA	6.2.3.1, 6.2.6.2, 9.2
	Damage to rehabilitation (e.g. fauna, domestic stock, vandalism, vehicular interactions, bushfire).	Maintain existing property fencing. <i>Exclude domestic grazing stock until pasture suitably established / tube stock suitably advanced.</i> <i>If required and approved by relevant government agency, undertake control of kangaroo population.</i> <i>Rehabilitation monitoring program.</i>	L(F3)	L(F3)	L(F3)	L(F3)	L(F2)	6.2.2.1, 6.2.5, 6.2.6.1, 9.2
	Re-disturbance of established rehabilitation areas.	<i>Appropriate rehabilitation planning / scheduling.</i>	L(F3)	L(F3)	L(F3)	NA	NA	8, 6.2.2.1
	Insufficient establishment of target species and limited species diversity.	<i>Rehabilitation monitoring program.</i> <i>Supplementary sowing of additional species seed mix (if required to maintain adequate projected foliage cover across all seasons).</i>	L(F3)	L(F3)	L(F3)	NA	NA	6.2.6.2, 6.2.6.3, 8
	Erosion and failure of landform, drainage and water management/storage structures.	<i>Visual inspection program.</i> <i>If required, suitably qualified expert engaged to recommend erosion and sediment control measures.</i>	L(G3)	L(F3)	L(F3)	L(F3)	NA	6.2.6.4
	Lack of infrastructure to support intended final land use (e.g. bunding, fences).	No specific infrastructure required to support final land use.	NA	NA	NA	NA	NA	-
	Lack of resources for rehabilitation maintenance.	Rehabilitation cost estimate and maintenance of security bond. Rehabilitation planning / scheduling.	L(G3)	L(G3)	L(G3)	L(G3)	L(G3)	6.2.6, 10
Other Risks (Non-Phase Specific)	Redirection of creek and river flows.	No watercourses present in extraction areas.	NA	NA	NA	NA	NA	-
	Subsidence cracking.	No underground mining undertaken.	NA	NA	NA	NA	NA	-
	Interconnective cracking with underground workings	No underground mining undertaken / no historic underground workings present.	NA	NA	NA	NA	NA	-

## 4. REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

### 4.1 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

**Table 10** presents the rehabilitation objectives and rehabilitation completion criteria for individual final land use domains at the Quarry Site.

Table 10  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria – New Berrima Quarry

Final Land Use Domain	Mining Domain	Spatial Ref.	Rehabilitation Objective	Indicator	Rehabilitation Completion Criteria	Validation Method	
Native Ecosystem (Vegetation Screen)	Active Mining Area	A5	<b>Decommissioning Phase</b>				Visual contamination assessment and report prepared by qualified person, following decommissioning with follow up validation testing as required.
			Domain safe and free from hazardous materials and contaminants.	Contaminated land identified and remediated.	Contaminated land assessment indicates contamination acceptable for final land use.		
				No hazardous materials remain.	All hazardous materials removed.		
			<b>Landform Establishment Phase</b>				Single occurrence plan(s) prepared by surveyor, including photographs, following completion of final landform establishment (unless further earthworks required).
			Free draining, stable and permanent landform established.	Final landform contours.	Mapping confirms the landform is generally consistent with the approved final landform.		
				Presence of erosion / sedimentation.	No 'active' erosion or sedimentation visible.	Monitoring reports, including photographs, following completion of final landform works.	
			<b>Growth Medium Development Phase</b>				Single occurrence inspection and photographs of ripped areas following completion of ripping.
			Establish soil suitable for establishment of vegetative tree screening.	Presence of surface compaction	Compacted areas are deep ripped cross slope.		
				Appropriate depth of growth medium.	Minimum growth medium depth of 100mm over all areas stripped of soil.	Small 'test pits' (5 per ha) dug by hand and photographed to show final soil depth. Report indicates required thicknesses achieved.	
				Key soil characteristics generally within the range of pre-disturbance soil characteristics.	Topsoil samples record parameters as follows. • pH – 6.0 to 8.0 or within 1 pH unit lower or higher than analogue sites. • Electrical conductivity <100uS/cm (in 1:5 soil:water suspension) or within 20% of analogous sites.	Collection and analysis of topsoil samples (1 bulk sample per ha) and soil analysis report.	
			<b>Ecosystem Establishment Phase</b>				Visual monitoring and photographs to be completed by suitably experienced person.
			Establishment of vegetation including species from the Southern Highlands Shale Woodland Endangered Ecological Community and other complimentary species.	Weeds are not competing or impacting on rehabilitated area.	Revegetation monitoring confirms that, after 2 years, the non-target species (weeds) represent less than 30% of projected foliage cover or equivalent to surrounding woodland areas.		
					Grazing by native and domestic fauna not adversely impacting on ecosystem development.	Domestic grazing animals are excluded from the rehabilitation area (except for controlled grazing to reduce bushfire hazard). Feral animal control programs implemented if required and approved.	
			<b>Ecosystem Development Phase</b>				Preparation of a report by a suitably experienced / trained person confirming compliance with criteria.
			Maintenance of self-sustaining vegetation.	Weeds are not competing or impacting on establishment of screening.	Revegetation monitoring confirms that non-target species (weeds) continue represent less than 30% of projected foliage cover or equivalent to surrounding woodland areas.		
					Grazing by native and domestic fauna not adversely impacting on establishment of screening.	Trees are sufficiently advanced / mature such that grazing does not impact upon continued growth of the tree screen.	
<b>Rehabilitation Completion / Relinquishment Phase</b>				Demonstrated compliance with all performance indicators.			
Demonstrated compliance with all performance indicators.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all performance indicators.					
Native Ecosystem (Vegetation Screen)	Other - Vegetation Screening Area	A8a	<b>Decommissioning, Landform Establishment and Growth Medium Development Phases</b>				
			Phases not applicable to Mining Domain 8a Other – Vegetation Screening Area (vegetation screen planted in non-disturbed areas).				
			<b>Ecosystem Establishment Phase</b>				
Establishment of vegetation including species from the Southern Highlands Shale Woodland Endangered Ecological Community.	Weeds are not competing or impacting on establishment of screening.	Revegetation monitoring confirms that, after 2 years, the non-target species (weeds) represent less than 30% of projected foliage cover or equivalent to surrounding woodland areas.	Establish a minimum of one monitoring point within northern visibility screen. Visual monitoring and photographs to be completed by suitably experienced person.				
	Grazing by native and domestic fauna not adversely impacting on establishment of screening.	Domestic grazing animals are excluded from the visual screening area (except for controlled grazing to reduce bushfire hazard). Feral animal control programs implemented if required.					



Table 10 (Cont'd)  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria – New Berrima Quarry

Final Land Use Domain	Mining Domain	Spatial Ref.	Rehabilitation Objective	Indicator	Rehabilitation Completion Criteria	Validation Method	
Native Ecosystem (Vegetation Screen) (Cont'd)	Other - Vegetation Screening Area (Cont'd)	A8a	<b>Ecosystem Development Phase</b>				Preparation of a report by a suitably experienced / trained person confirming compliance with criteria.
			Maintenance of self-sustaining vegetation.	Weeds are not competing or impacting on establishment of screening.	Revegetation monitoring confirms that non-target species (weeds) continue represent less than 30% of projected foliage cover or equivalent to surrounding woodland areas.		
				Grazing by native and domestic fauna not adversely impacting on establishment of screening.	Trees are sufficiently advanced / mature such that grazing does not impact upon continued growth of the tree screen.		
			<b>Rehabilitation Completion / Relinquishment Phase</b>				
			Demonstrated compliance with all performance indicators.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all performance indicators.	
Agricultural – Grazing	Infrastructure Area, Water Management Area, Overburden Emplacement Area, Active Mining Area (Open Cut Void)	B1, B3, B4, B5	<b>Decommissioning Phase</b>				Single occurrence relinquishment inspection and report, including photographs, following decommissioning (unless follow up actions identified).
			All infrastructure and services not suitable for a lawful final land use will be removed.	Services not required for final land use disconnected.	Relevant services disconnected.		
				Infrastructure not required for final land use removed from site.	All infrastructure removed.		
			Domain safe and free from hazardous materials and contaminants.	Contaminated land identified and remediated.	Contaminated land assessment indicates contamination acceptable for final land use.	Visual contamination assessment and report prepared by qualified person, following decommissioning with follow up validation testing if required.	
				No hazardous materials remain.	All hazardous materials removed.		
			All stockpiles removed.	No remaining stockpiles.	All stockpiles (overburden or product) removed / incorporated into final landform.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning (unless follow up actions identified).	
			<b>Landform Establishment Phase</b>				
			Stable, permanent and non-polluting landform established.	Final landform contours.	Mapping confirms the landform is generally consistent with the approved final landform.	Single occurrence plan(s) prepared by surveyor, including photographs, following completion of final landform establishment (unless further earthworks required).	
				Presence of erosion / sedimentation.	No 'active' erosion or sedimentation visible.		
			<b>Growth Medium Development Phase</b>				
			Establish soil suitable for establishment of improved pasture.	Presence of surface compaction	Compacted areas are deep ripped cross slope.	Single occurrence inspection and photographs of ripped areas following completion of ripping.	
				Appropriate depth of growth medium.	Minimum growth medium depth of 100mm over all areas stripped of soil.		
			<b>Ecosystem Establishment Phase</b>				
			Establishment of a suitable improved pasture for continued grazing activities.	The rehabilitated area does not constitute an erosion hazard.	Total projected foliage cover is greater than 70% cover or equivalent to analogue sites not disturbed by Quarry activities.	Establish a minimum of one monitoring point per 5ha of rehabilitation and two analogue sites. Monitoring to be completed by suitably trained / qualified person and a report prepared summarising performance of the rehabilitation against the completion criteria / analogue monitoring points, annually until criteria are met.	
Weeds are not competing or impacting on rehabilitated area.	Revegetation monitoring confirms that, after 2 years, the non-target species (weeds) represent less than 30% of projected foliage cover or equivalent to analogue sites not disturbed by Quarry activities.						
Grazing by native and domestic fauna not adversely impacting on ecosystem development.	Domestic grazing animals are excluded from the rehabilitation area (except for controlled grazing to manage pasture development / reduce bushfire hazard). Feral animal control programs implemented if required.						

Table 10 (Cont'd)  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria – New Berrima Quarry

Final Land Use Domain	Mining Domain	Spatial Ref.	Rehabilitation Objective	Indicator	Rehabilitation Completion Criteria	Validation Method	
Agricultural – Grazing (Cont'd)	Infrastructure Area, Water Management Area, Overburden Emplacement Area, Active Mining Area (Open Cut Void) (Cont'd)	B1, B3, B4, B5	<b>Ecosystem Development Phase</b>				Establish a minimum of one monitoring point per 5ha of rehabilitation and two analogue sites. Monitoring to be completed by suitably trained / qualified person and a report prepared summarising performance of the rehabilitation against the completion criteria / analogue monitoring points.
			Maintenance of self-sustaining vegetation.	The rehabilitated area does not constitute an erosion hazard.	Total projected foliage cover after 5 years remains greater than 70% cover or equivalent to analogue sites not disturbed by Quarry activities.		
				Weeds are not competing or impacting on rehabilitated area.	Revegetation monitoring confirms that, after 5 years, the non-target species (weeds) represent less than 30% of projected foliage cover or equivalent to analogue sites not disturbed by Quarry activities.		
			<b>Rehabilitation Completion / Relinquishment Phase</b>				
			Relinquish lease and return of the security lodged over the mineral owners mining lease.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all completion criteria.	Relinquishment report, prior to relinquishment, prepared by suitably qualified or experienced person(s).	
Water Management Area	Water Management Area	F3	<b>Decommissioning Phase</b>				Single occurrence relinquishment inspection & report, including photographs, following decommissioning (unless follow up actions identified).
			All infrastructure.	All infrastructure removed from site.	All infrastructure removed.		
			<b>Landform Establishment Phase</b>				Single occurrence relinquishment inspection and report, including photographs, following decommissioning (unless follow up actions identified).
			Structures suitable for providing long-term clean water management.	Stabilised diversion banks / drains.	Retained diversion banks / drains are stable and contain suitably stabilised outlets for dissipation of outflow water to surrounding drainage lines.		
			<b>Growth Medium Development, Ecosystem Establishment and Development Phases</b>				
			Phases not applicable to Final Land Use Domain F Water Management Area				
<b>Rehabilitation Completion / Relinquishment Phase</b>							
			Relinquish lease and return of the security lodged over the mineral owners mining lease.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all completion criteria.	Relinquishment report, prior to relinquishment, prepared by suitably qualified or experienced person(s).	
Water Storage Area	Water Management Area	G3	<b>Decommissioning Phase</b>				Single occurrence relinquishment inspection & report, including photographs, following decommissioning (unless follow up actions identified).
			All infrastructure.	All infrastructure (pumps, flocculation systems, etc.) removed from site.	All infrastructure removed.		
			<b>Landform Establishment Phase</b>				Single occurrence relinquishment inspection and report, including photographs, following decommissioning (unless follow up actions identified).
			Structures suitable for providing long-term clean water storage.	Dam structures are stable and contain a suitably stable spill way for overflow of water to surrounding drainage lines.	Dam walls and spillways do not show signs of active erosion and are assessed to be stable.		
			Domain stable and non-polluting.	Water quality monitoring results show the domain is non-polluting.	Water quality meets the following criteria or as otherwise specified within the Environment Protection Licence. pH: 6.5 to 8.5. Total Suspended Solids: <50mg/L. Oil & Grease: nil visible.	Water samples analysed by NATA accredited laboratory until monitoring confirm compliance with criteria.	
			<b>Growth Medium Development, Ecosystem Establishment and Development Phases</b>				
Phases not applicable to Final Land Use Domain G Water Storage Area							
<b>Rehabilitation Completion / Relinquishment Phase</b>							
			Relinquish lease and return of the security lodged over the mineral owners mining lease.	Demonstrated compliance with all performance indicators.	Demonstrated compliance with all completion criteria.	Relinquishment report, prior to relinquishment, prepared by suitably qualified or experienced person(s).	

Table 10 (Cont'd)  
Proposed Rehabilitation Objectives and Rehabilitation Completion Criteria – New Berrima Quarry

Final Land Use Domain	Mining Domain	Spatial Ref.	Rehabilitation Objective	Indicator	Rehabilitation Completion Criteria	Validation Method	
Infrastructure Area	Infrastructure Area	11	<b>Decommissioning Phase</b>				Contamination report prepared by qualified person, following decommissioning with follow up validation testing as required.
			Domain safe and free from hazardous materials and contaminants.	Contaminated land identified and remediated.	Contaminated land assessment indicates contamination acceptable for final land use.		
				No hazardous materials remain.	All hazardous materials removed.		
			<b>Landform Establishment Phase</b>				Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
			Final landform is safe and stable.	Retained access roads are in suitable condition.	The retained access road surface provides access suitable for four-wheel drive vehicles and road batters do not present an erosion hazard.		
			<b>Growth Medium Development, Ecosystem Establishment and Development Phases</b>				
			Phases not applicable to Final Land Use Domain I Infrastructure Area				
<b>Rehabilitation Completion / Relinquishment Phase</b>				Demonstrated compliance with all completion criteria.	Relinquishment report, prior to relinquishment, prepared by suitably qualified or experienced person(s).		
Relinquish lease and return of the security lodged over the mineral owners mining lease.	Demonstrated compliance with all performance indicators.						

## 4.2 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA – STAKEHOLDER CONSULTATION

**Table 11** presents a summary of consultation undertaken with relevant stakeholders with regards to the rehabilitation objectives, rehabilitation completion criteria and proposed final land uses and landforms presented in this Plan. This table will be updated with each revision to this Plan to include details of further consultation with relevant and interested stakeholders.

**Table 11**  
**Community Consultation Activities**

Stakeholder	Consultation Activities
Wingecarribee Shire Council (Council)	<ul style="list-style-type: none"> <li>• Form of Consultation: Letter (email transmission).</li> <li>• Date: 11 July 2022</li> <li>• Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans.</li> <li>• Outcomes: <ul style="list-style-type: none"> <li>– Council responded on 11 July 2022.</li> <li>– Confirmation of receipt only.</li> </ul> </li> </ul>
Illawarra Local Aboriginal Land Council	<ul style="list-style-type: none"> <li>• Form of Consultation: Letter (email transmission).</li> <li>• Date: 11 July 2022</li> <li>• Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans.</li> <li>• Outcomes: <ul style="list-style-type: none"> <li>– Illawarra Local Aboriginal Land Council responded on 12 July 2022.</li> <li>– Confirmation of receipt only.</li> </ul> </li> </ul>
Community Consultative Committee	<ul style="list-style-type: none"> <li>• Form of Consultation: Letter (email transmission).</li> <li>• Date: 11 July 2022</li> <li>• Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans.</li> <li>• Outcomes: No response received as of 1 August 2022.</li> </ul>
NSW Resources Regulator	<ul style="list-style-type: none"> <li>• Form of Consultation: Letter (email transmission).</li> <li>• Date: 11 July 2022</li> <li>• Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans.</li> <li>• Outcomes: <ul style="list-style-type: none"> <li>– The Resources Regulator will review, assess and determine the rehabilitation objectives statement and rehabilitation completion criteria once formally submitted for approval.</li> </ul> </li> </ul>
Environmental Protection Authority	<ul style="list-style-type: none"> <li>• Form of Consultation: Letter (email transmission).</li> <li>• Date: 11 July 2022</li> <li>• Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans.</li> <li>• Outcomes: <ul style="list-style-type: none"> <li>– No response received as of 1 August 2022.</li> </ul> </li> </ul>
Mining, Exploration and Geoscience	<ul style="list-style-type: none"> <li>• Form of Consultation: Letter (email transmission).</li> <li>• Date: 11 July 2022</li> <li>• Matters Subject to Consultation: Rehabilitation Objectives and Rehabilitation Completion Criteria, and Final Land Use Domain Plans.</li> <li>• Outcomes: <ul style="list-style-type: none"> <li>– No response received as of 1 August 2022.</li> </ul> </li> </ul>

## 5. FINAL LANDFORM AND REHABILITATION PLAN

### 5.1 FINAL LANDFORM AND REHABILITATION PLAN

**Plan 1** presents the final landform features for the Quarry and **Plan 2** presents the final landform contours for the Quarry.

## 6. REHABILITATION IMPLEMENTATION

### 6.1 LIFE OF MINE REHABILITATION SCHEDULE

Austral Bricks proposes to undertake rehabilitation progressively throughout the life of the Quarry. As such, extraction operations have been designed to be undertaken in a staged manner across the southern and northern extraction areas to allow for progressive rehabilitation and reduction of impacts on visual amenity.

**Figure 7** depicts the current extent of disturbance at the Quarry (i.e. the Mining Domains). **Plans 3 to 9** present the indicative rehabilitation schedule for the Quarry by depicting those areas which would be rehabilitated during each 5-yearly increment between the commencement of this plan and Quarry closure.

In summary, it is anticipated that minimal rehabilitation works will be achieved by 2037 (**Plans 3 to 5**), with the majority of the Quarry Site being utilised for operational purposes prior to the commencement of revegetation of the southern extraction area in 2038 (**Plan 6**). Following the cessation of extraction operations in the southern extraction area, landform establishment works will commence to ensure stability and safety of the slopes at an angle of 1:3 (V:H). This will be achieved via removal of the central visibility barrier and using the material to reshape and revegetate the southern Extraction Area (**Plans 7 and 8**). Extraction operations in the northern extraction area will be undertaken concurrently with rehabilitation of the southern extraction area.

It is noted that the schedule presented on **Plans 3 to 9** is applicable only until the completion of the Ecosystem and Land Use Establishment phase of rehabilitation operations within all Mining Domains (see Section 6.2). Approximate timings for the Ecosystem and Land Use Development phase of rehabilitation have not yet been defined as this phase will principally involve the monitoring and maintenance of completed rehabilitation works until completion criteria identified in Section 4.1 have been achieved.

Following the cessation of extraction operations within the North-South Quarry, all other Mining Domains would be subject to decommissioning, landform establishment, growth medium development and ecosystem and land use establishment rehabilitation phases.

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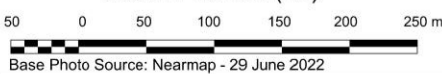


- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Final Land Use Domain**
- A Native Ecosystem (Vegetation Screen)
  - B Agricultural - Grazing
  - F Water Management Area
  - G Water Storage Area
  - I Infrastructure Area

Final Land Use Domain	Mine Domain	Ref	Area (ha)
Native Ecosystem (Vegetation Screen)	Active Mining Area (Open Cut Void)	A5	0.2
Native Ecosystem (Vegetation Screen)	Other (Vegetation Screen)	A8a	1.6
Agricultural - Grazing	Infrastructure Area	B1	3.4
Agricultural - Grazing	Water Management Area	B3	0.1
Agricultural - Grazing	Overburden Emplacement	B4	1.9
Agricultural - Grazing	Active Mining Area (Open Cut Void)	B5	12.3
Water Management Area	Water Management Area	F3	0.6
Water Storage Area	Water Management Area	G3	0.5
Infrastructure Area	Infrastructure Area	I1	0.8

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 1 Final Landform Features
Anticipated Year of Relinquishment	2057
Date Plan Created	4 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135

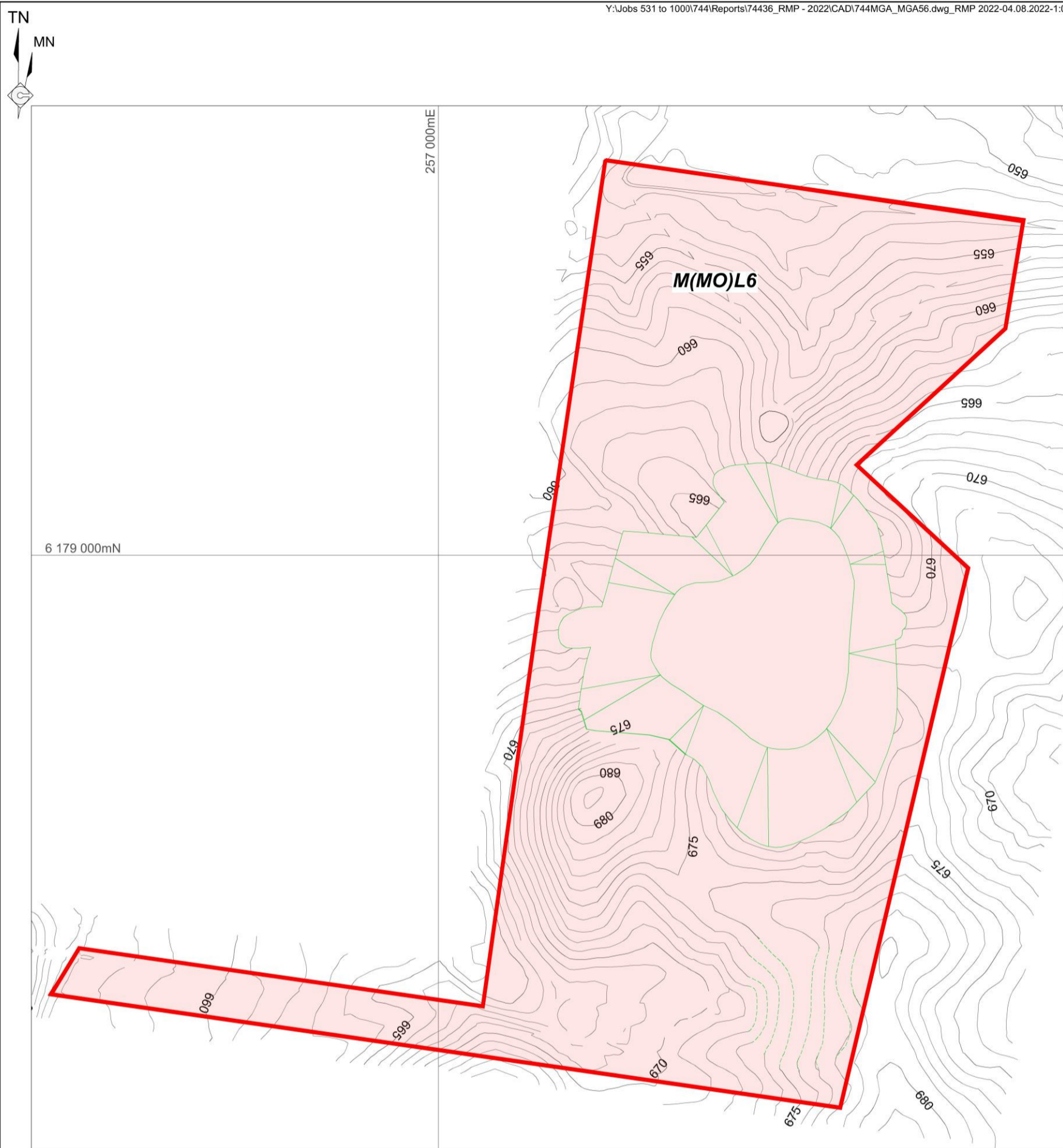
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Base Photo Source: Nearmap - 29 June 2022

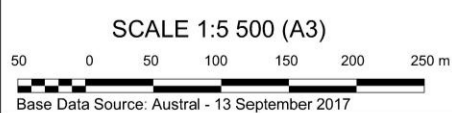
Plan 1  
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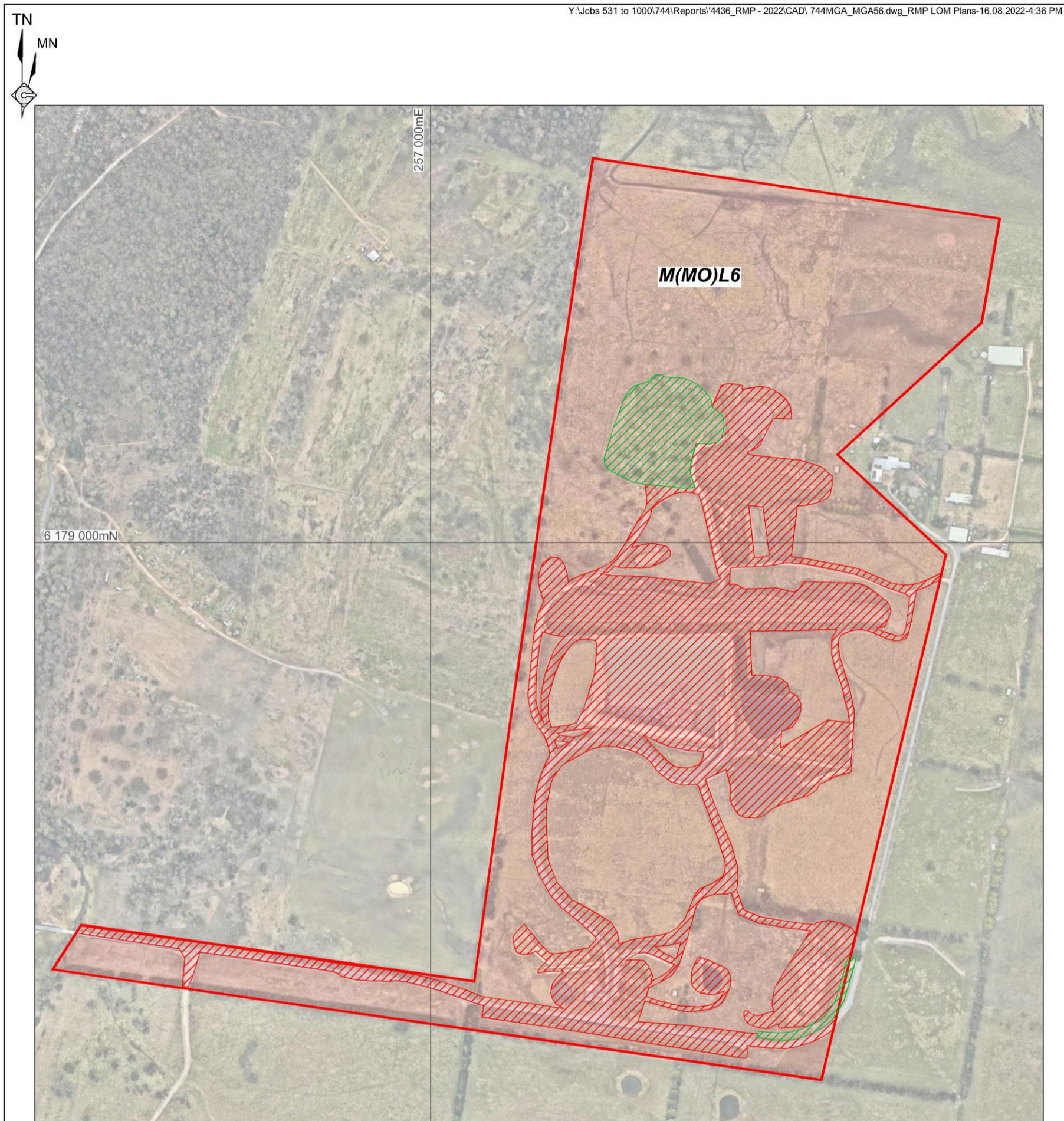
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  - Existing Contour (mAHD)(Interval =0.5m)
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Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 2 Final Landform Contours
Anticipated Year of Relinquishment	2057
Date Plan Created	4 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135



Plan 2  
FINAL LANDFORM CONTOURS

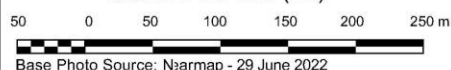
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- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 3 Progressive Rehabilitation Schedule - Years 2022-2026
Anticipated Year of Relinquishment	2057
Date Plan Created	16 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135

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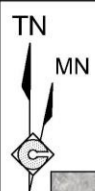


Base Photo Source: Ntarmap - 29 June 2022

Plan 3  
PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2022-2026

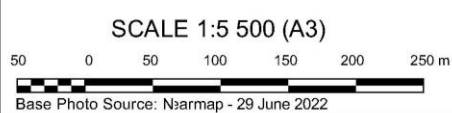


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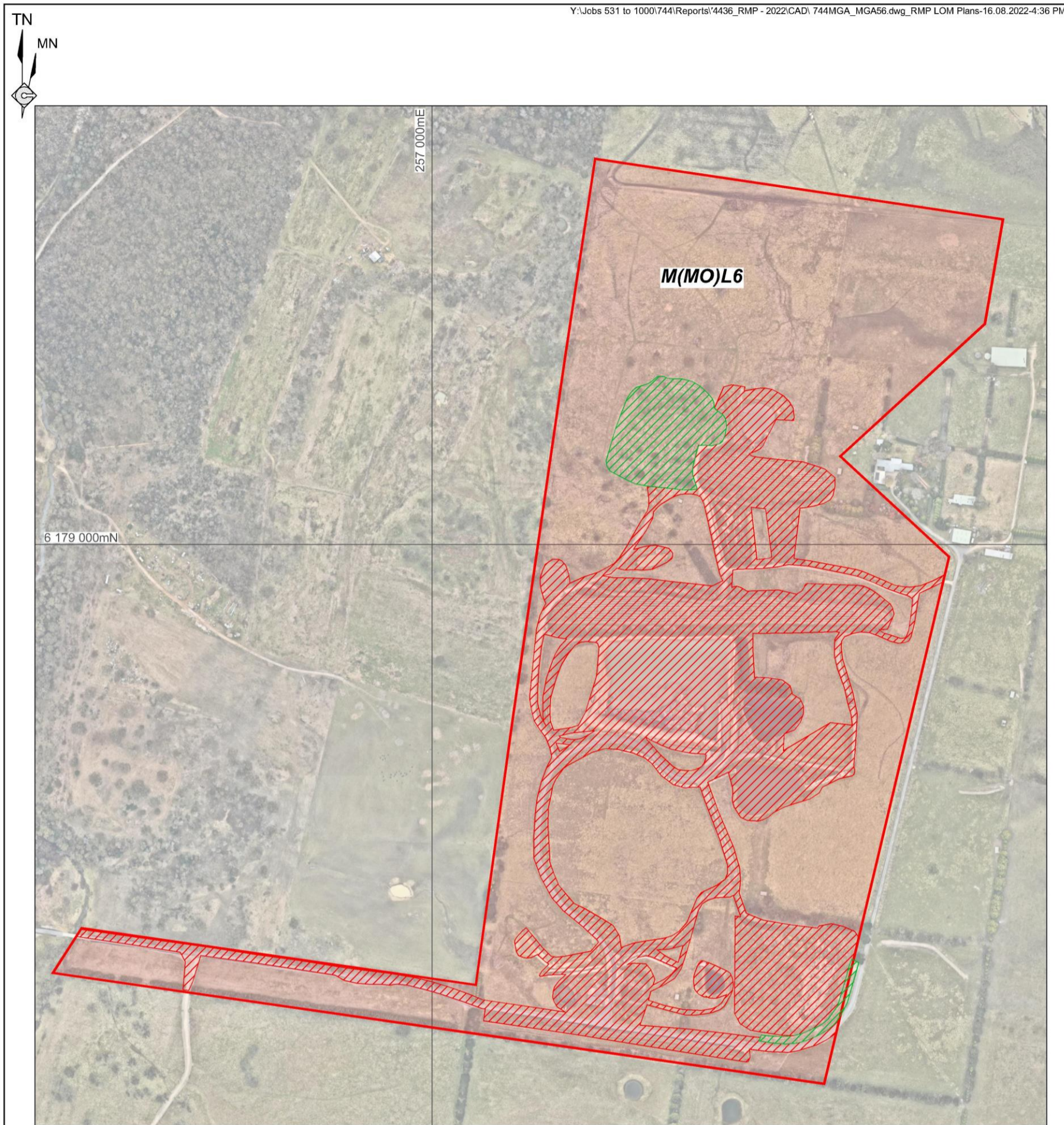
- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 4 Progressive Rehabilitation Schedule - Years 2027-2031
Anticipated Year of Relinquishment	2057
Date Plan Created	4 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135



Plan 4  
PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2027-2031

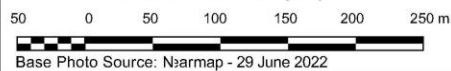
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- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 5 Progressive Rehabilitation Schedule - Years 2032-2037
Anticipated Year of Relinquishment	2057
Date Plan Created	4 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135

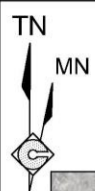
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Base Photo Source: Ntarmap - 29 June 2022

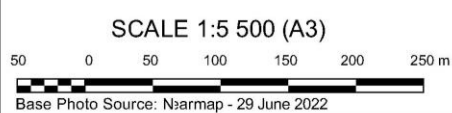
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PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2032-2037

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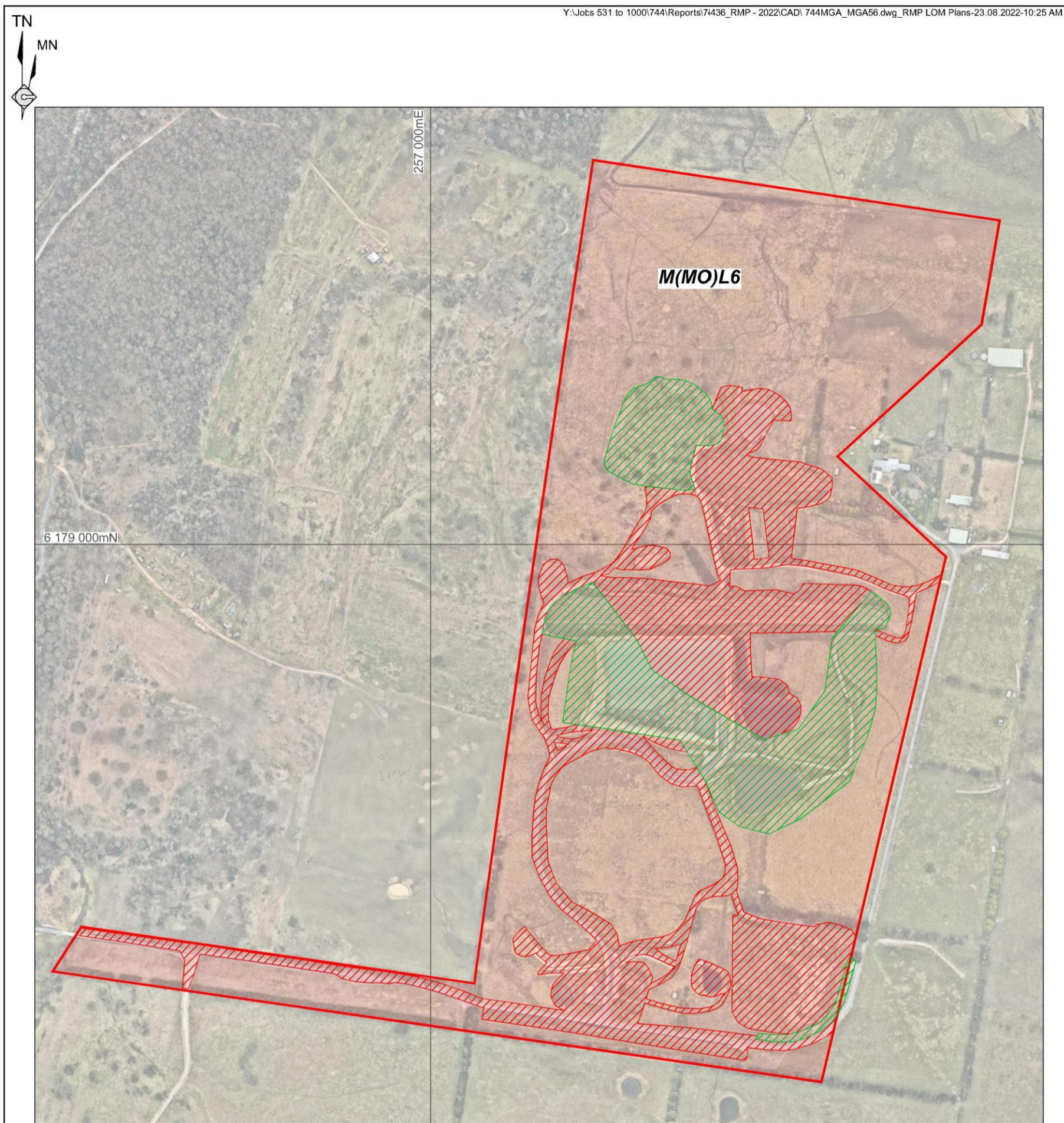
- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 6 Progressive Rehabilitation Schedule - Years 2038-2042
Anticipated Year of Relinquishment	2057
Date Plan Created	23 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135



Plan 6  
PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2038-2042

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- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

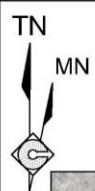
Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 7 Progressive Rehabilitation Schedule - Years 2043-2047
Anticipated Year of Relinquishment	2057
Date Plan Created	23 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135

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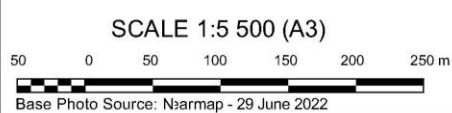
Plan 7  
PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2043-2047

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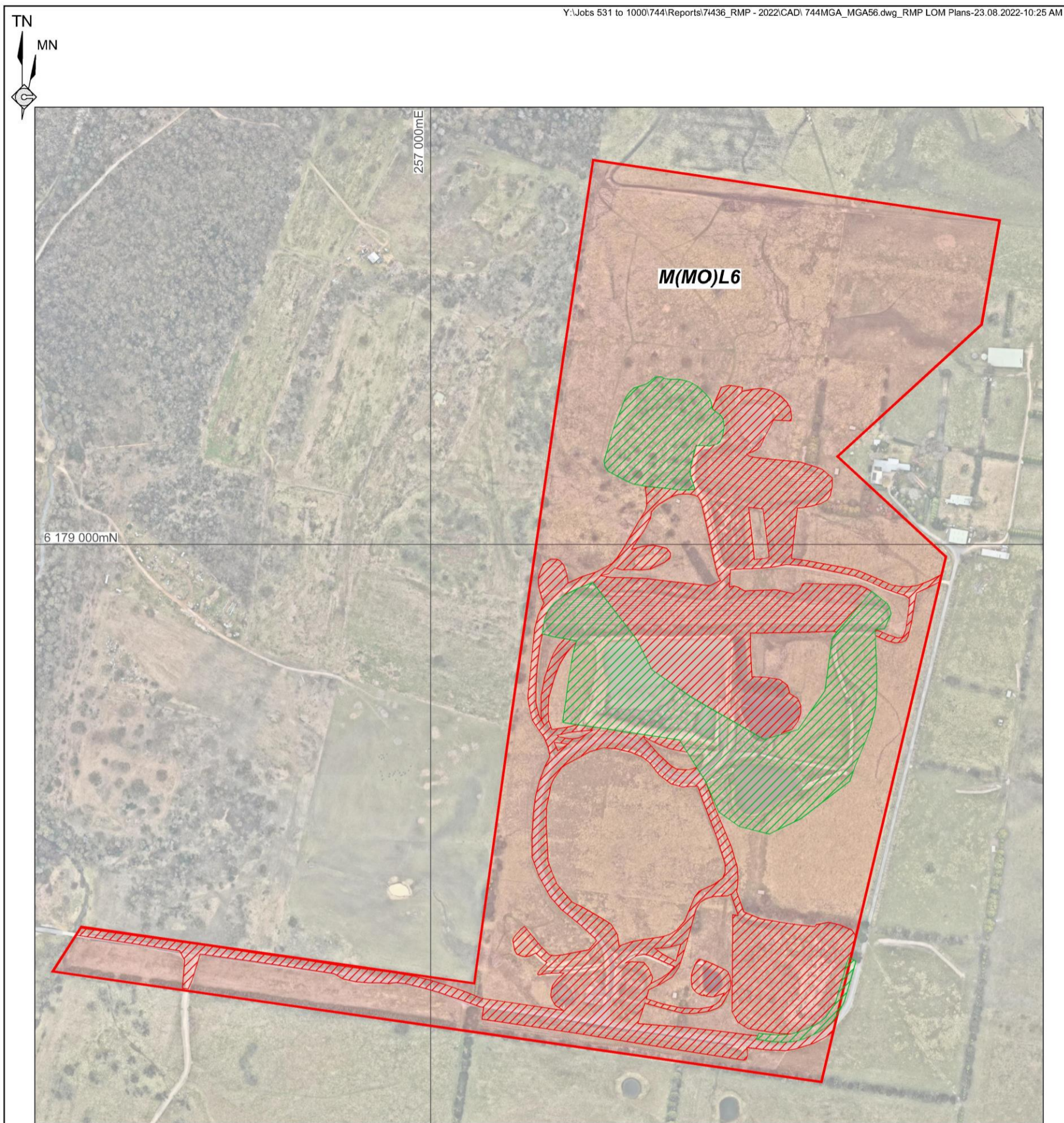
- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 8 Progressive Rehabilitation Schedule - Years 2048-2052
Anticipated Year of Relinquishment	2057
Date Plan Created	23 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135



Plan 8  
PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2048-2052

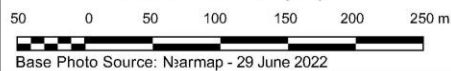
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- REFERENCE**
- Mining Lease Boundary
  - Project Approval Boundary
- Rehabilitation Forecast**
- Forecast Disturbance
  - Forecast Land Prepared for Rehabilitation
  - Ecosystem and Land Use Establishment

Mine Name	Austral Brick - New Berrima Quarry
Plan Name	Plan 9 Progressive Rehabilitation Schedule - Years 2053-2057
Anticipated Year of Relinquishment	2057
Date Plan Created	23 August 2022
Data Theme Submission ID Numbers	3127,3128,3129,3130,3131,3132,3133,3135

SCALE 1:5 500 (A3)



Base Photo Source: Ntarmap - 29 June 2022

Plan 9  
PROGRESSIVE REHABILITATION SCHEDULE - YEARS 2053-2057

## 6.2 PHASES OF REHABILITATION AND GENERAL METHODOLOGIES

### 6.2.1 Active Mining Phase

#### 6.2.1.1 Soils and Materials

Two discrete soil mapping units have previously been identified within the Quarry Site.

- **Soil Mapping Unit 1**  
This soil mapping unit occurs on the hilltops and upland drainage depressions and covers approximately the southern half of the Quarry Site, including the extraction area. The topsoil is a silty loamy sand/clay loam/clay and recorded a pH 6.0 to 6.5 and showed moderate dispersibility. The subsoil is a clay/clay loam, with a pH of 4.5 to 7.0 and showed negligible to high dispersibility.
- **Soil Mapping Unit 2**  
This soil mapping unit occurs on the midslopes, lower slopes and drainage depressions and covers approximately the northern half of the Quarry Site. The topsoil is a light clay/light to medium or medium clay and recorded a pH 5.5 to 6.0 and showed slight to moderate dispersibility. The subsoil is a medium to heavy clay, with a pH of 4.5 to 5.5 and showed negligible to moderate dispersibility.

The following management measures will continue to be implemented prior to / during soil stripping, stockpiling and construction of each visibility barrier to maximise the integrity of the topsoil and material resources for future use in rehabilitation.

- Where weeds are visibly present, an authorised herbicide will be sprayed across the area to be stripped prior to soil stripping to limit the presence of weeds in the stripped topsoil. This would occur at least 2 weeks prior to stripping (or as otherwise specified by the herbicide manufacturer).
- Groundcover vegetation and topsoil, where present, will be stripped in all areas of disturbance. Topsoil will be stripped to a depth of approximately 0.15m unless rocky or heavy clay material is encountered at which point topsoil stripping will be terminated. Where topsoil material is present to greater depths (such as in drainage lines), it will also be stripped and stockpiled for use in rehabilitation.
- Subsoil will be stripped using a bulldozer or scraper. Subsoil will be stripped within the extraction area and the footprint of the Southern Visibility Barrier to a depth of approximately 0.6m below the base of the topsoil unless rocky material is encountered, at which point subsoil stripping will be terminated.
- Soil materials will be stripped when they are moderately moist (but not overly wet) to preserve soil structure. If conditions are extremely dry, the area to be stripped will be watered utilising the water cart, a sprinkler system or similar.
- The initial topsoil and subsoil materials stripped will be stockpiled separately adjacent to the footprint of each barrier.

- Soil stockpiles will be constructed as low, flat, elongated mounds. Topsoil stockpiles will be less than 2m high and subsoil stockpiles will be less than 3m high.
- Once completed sections of visibility barriers are available, any further subsoil and topsoil that is stripped will preferentially be directly placed onto the completed northern facing sections.
- Subsoil and topsoil initially stockpiled will then be spread across the remaining faces of the barriers.
- Silt-stop fencing will be installed immediately down-slope of subsoil and topsoil stockpiles and each visibility barrier until a stable vegetation cover is established.
- A pasture seed mix will be broadcast over the spread topsoil or on soil stockpiles to be retained.
- Driving of machinery on soil stockpiles will be avoided (except where necessary for their formation or soil recovery) to minimise soil compaction and maximise soil aggregation.
- To minimise the potential for soil contamination, all refuelling and vehicle maintenance activities will be restricted to designated areas – to be identified for all site personnel.

It is noted that soil material was placed more thickly on the northern and central visibility barriers in order ensure optimum growth of vegetation and better maintain the biological value of the soil material. As the visibility barriers will ultimately be deconstructed and utilised in the rehabilitation of the extraction area, this soil will similarly be recovered at that time for final rehabilitation of the extraction area. As such, it is not anticipated that there will be a soil and/or material resource deficit for rehabilitation of the Quarry Site.

#### 6.2.1.2 Flora and Fauna

The vegetation communities within the Quarry Site include the following two vegetation communities.

- Community 1 – Cleared Pastureland Community.
- Community 2 – Remnant Open Woodland Community.

Community 1 is the dominant vegetation community within the Quarry Site which is almost completely cleared of trees and shrubs, consisting of sown ryegrass with a range of weeds evident throughout the groundcover. A small number of established eucalypts also occur but are not native to Berrima area. A row of non-indigenous trees are also present.

Community 2 is an open woodland remnant immediately northwest of the extraction area, comprising scattered trees (mostly 10m-20m apart) of mainly *Eucalyptus radiata subsp. radiata* (Narrow-leaved Peppermint) and *Eucalyptus dives* (Broadleaf Peppermint) with some *Eucalyptus mannifera* (Brittle Gum) and an occasional *Eucalyptus pauciflora* (Snow Gum). The groundcover is comprised of a mixture of the groundcover species listed for Community 1, with few native groundcover species present.



No disturbance will occur within Community 2 over the Quarry life. As a result, flora species are at minimal risk. Notwithstanding, as part of the measures for visual amenity, species utilised in tree screens will be selected from the Southern Highland Shale Woodland Endangered Ecological Community, thereby enhancing the local biodiversity.

No threatened fauna species have previously been detected during ecological surveys of the Quarry Site and given the absence of suitable habitat, it is considered unlikely that any threatened fauna species would inhabit the Quarry Site.

Environmental management controls relating to flora and fauna which would continue to be implemented at the Quarry Site are as follows.

- Vegetation clearing will be restricted to approved areas of disturbance.
- Rehabilitation and maintenance works will be implemented as advised by contracted ecological specialist.
- Weed control will continue to be undertaken by site management and contracted specialist.
- Ongoing inspections will continue to be undertaken and reported within the respective Annual Rehabilitation Report, if required.

#### **6.2.1.3 Rock / Overburden Emplacement**

Overburden material will either be utilised in the construction of the visibility barriers or temporarily placed within the Overburden Emplacement Area. As extraction progresses, overburden may also be directly placed within completed areas.

#### **6.2.1.4 Waste Management**

The principal production waste to be generated during the active mining phase is overburden material which will be managed as discussed in Section 6.2.1.3.

The principal non-production wastes types that will be generated on site include:

- general domestic type wastes and consumables;
- sewage and effluent; and
- waste oils and filters.

General waste will be segregated into recyclable and non-recyclable materials and removed from site by a licenced contractor or returned to the Bowral Brick Plant for collection at that site. All on-site bins will be fitted with lids.

All waste water and sewage generated from the on-site ablutions will be collected in a 'portaloo' style system regularly serviced by a licenced contractor. All waste from this system will be removed for off-site treatment.

No routine maintenance of trucks and machinery will be undertaken at the Quarry. Therefore, there will not be a regular source of waste oils or filters, however, in the event of emergency maintenance and repairs, small amounts of waste oils and filters would be stored temporarily in sealed containers in the on-site container and transported off site.

During operations, any hydrocarbon spills would be immediately cleaned up and any contaminated material either remediated on site or removed to a licenced waste facility.

#### **6.2.1.5 Geology and Geochemistry**

The Quarry is located close to the southwestern margin of the Sydney Basin where one of the main outcropping geological units is the Wianamatta Group with Ashfield Shale overlying the widespread Hawkesbury Sandstone formation.

A typical profile through the modified Quarry extraction area comprises approximately 4m to 6m of clay, 2m to 3m of weathered claystone and between 15m and 30m of claystone that grades laterally to laminite with occasional sandstone interbeds.

Given the geological characterisation of the Quarry, no geochemical constraints are expected from the Quarry operation. Therefore, no specific management measures are required.

#### **6.2.1.6 Material Prone to Spontaneous Combustion**

As no material in the Quarry is prone to spontaneous combustion, no specific management measures are necessary.

#### **6.2.1.7 Material Prone to Generating Acid Mine Drainage**

The Ashfield Shale typically has very low concentrations of pyrite and therefore generation of acid is not expected to occur. Furthermore, the Quarry is in excess of 600m above the elevation at which acid sulphate soils are formed. Hence, generation of acid from this source is not possible. Therefore, no specific management measures are necessary.

#### **6.2.1.8 Ore Beneficiation Waste Management (reject and tailings disposal)**

As no processing of ore is undertaken with the Quarry Site, no process residues or tailings will be produced and associated wastes have therefore not been considered further.

#### **6.2.1.9 Erosion and Sediment Control**

During operational stages, the principal sources for erosion and sedimentation at the Quarry will be the extraction area and Overburden Emplacement Area.

Erosion and sediment loss will be mitigated by implementing a series of staged Erosion and Sediment Control Plans (ESCPs) detailed in the approved *Water Management Plan* for the Quarry. A summary of the implementation strategies is provided as follows.

### Stockpile Management

Soil stockpiles will be stabilised using soil binders/hydromulch or similar with a target of achieving a C-factor (ground cover factor) of 0.15 (equivalent to about 50% soil coverage) within 20 days of final shaping and a C-factor of 0.05 (equivalent to about 70% soil coverage) within a further 40 days. If this target is not reached in these timeframes, supplementary stabilisation will be undertaken. Planting of vegetation or alternative erosion control methods such as mulch, binders, hydromulches, compost blankets or organic fibre matting may also be implemented.

Stockpiles of overburden material will be progressively stabilised following shaping, with the aim of achieving a C-factor of 0.15. Given that stockpiles will be regularly accessed and reshaped, limited areas will be available for final shaping and stabilisation until the majority of the stockpile is formed. This approach is considered acceptable given that the Overburden Emplacement Area will drain to Dam 2 (see **Figure 2**) and overburden material will not be required as a growth medium.

Clay and shale material awaiting transport will be temporarily stockpiled on the floor of the extraction area. This ensures that any erosion of this material is confined within the extraction area with no further erosion controls required.

### Sediment Basins

The primary measure for sediment control will be via sediment basins (see **Figure 2**). Sediment basins will be subject to the following design, monitoring and maintenance requirements.

- The design of the sediment basins will include an emergency spillway designed to safely convey the 100-year ARI flow (DECC, 2008).
- Waters will be discharged from a basin (after treatment if required) or transferred to Dam 12 within five days after the conclusion of inflow from a rain event if that the inflow results in the basin water level encroaching into the required settling zone<sup>1</sup>
- Markers will be installed in each sediment basin showing the Storage Zone (i.e. the lower zone) and the Settling Zone (i.e. the upper zone) in the basin.
- After discharging treated water from any sediment basin, the level of retained sediment will be inspected. If retained sediment exceeds the marked level of the Storage Zone, sediment will be removed and placed within the Extraction Area or Overburden Emplacement Area.
- Any damaged components of the sediment basins will be repaired as soon as practicable.

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<sup>1</sup> An automated water level system may be utilised to determine this.

- Diversion drains will be stabilised against scour using vegetation. Rock rip-rap will also be utilised in any areas that are not successfully stabilised using vegetation.

Other sediment control measures including rock filter dams, sediment fencing, mulch bunds etc. may be implemented at the Quarry Site at the discretion of the Raw Materials & Mining Manager or Environment Manager. However, should any erosion or sedimentation occur outside of the dedicated dirty water management system, these will be stabilised as soon as possible.

## Monitoring

The performance of the erosion and sediment control measures will be measured by regular site inspections utilising a formal erosion and sediment control inspection checklist. In summary:

- The sediment basins and erosion and sediment controls will be inspected:
  - On a quarterly basis irrespective of rainfall; and
  - following a rainfall event that causes inflow to a sediment basin that encroaches into the settling zone<sup>2</sup>; and
    - Inspect the integrity of any sediment-control measures, including sediment basins, sediment traps, etc.;
    - Look for any signs of erosion, particularly in areas that do not drain to a sediment basin or other sediment capture measure;
    - Inspect any areas subject to stabilisation to ensure they are establishing an adequate cover of vegetation in a timely manner; and
    - Complete treatment and discharge as detailed in the *Water Management Plan*.
- Necessary repairs to sediment basins or erosion and sediment controls would be undertaken as soon as practicable.
- The management procedures for the sedimentation basins will be regularly reviewed to ensure ongoing efficient operation and protection of downstream water quality.
- Before a conditional discharge the water quality will be tested, treated if necessary and re-tested if necessary to meet the targets outlined in the *Water Management Plan*.

The ESCPs will be reviewed shortly before each establishment or set of operational stages (i.e. prior to operations for Stages 1 to 4 and prior to operations for Stages 5 to 7). At the discretion of the Raw Materials and Mining Manager or Environment Manager, and in consultation with a Certified Professional in Erosion and Sediment Control, the plans will be revised if necessary. The ESCPs will also be revised during works if conditions, work practices or water quality monitoring dictate.

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<sup>2</sup> This may be measured automatically using water level sensors.

#### 6.2.1.10 Ongoing Management of Biological Resources for Use in Rehabilitation

Biological resources would be removed and retained for use in construction of the visibility barriers for visual amenity, and for use in rehabilitation activities. The management measures outlined in Section 6.2.1.1 and the approved *Landscape Management Plan* for the Quarry will be implemented prior to /during soil stripping and stockpiling and construction of each visibility barrier.

In addition, additional trees will be planted within the northern tree screen to the west of the Northern Visibility Barrier. Species to be planted will be selected from the Southern Highland Shale Woodland Endangered Ecological Community. This area will be fenced to limit losses of small shrubs from grazing stock and wildlife.

A tree screen was also planted during the site establishment and construction phase on the southeastern periphery of the Overburden Emplacement Area. Species planted included *Eucalyptus dives* (Broadleaf Peppermint), *E. mannifera* (Brittle Gum), *E. radiata subsp. Radiata* (Narrow-leaved Peppermint) and selected wattles.

Austral Bricks will endeavour to propagate tubestock of the trees to be planted in both areas, with the seed collected from the remnant vegetation immediately north of the extraction area. For those preferred species not currently present on site, Austral Bricks will endeavour to source local provenance tube stock.

In the event that unacceptable weed generation is observed on the soil stockpiles, a weed eradication program will be implemented. There will be no vehicle access on the soil stockpiles.

#### 6.2.1.11 Mine Subsidence

As no previous underground mining has occurred within the immediate area, no specific mine subsidence management measures are necessary.

#### 6.2.1.12 Management of Potential Cultural and Heritage Issues

The Aboriginal Heritage Information Management System (AHIMS) confirms that three sites have previously been recorded within 200m of the Quarry Site, two north of the bridge access across Stony Creek and one to the south of the bridge. The two sites located north of the bridge access are axe grinding grooves, whilst the site to the south includes an extensive series of grinding grooves at seven locations and a potential archaeological deposit (PAD). A buffer zone of 'High Archaeological Constraint' around this site has been defined and extends into the Quarry Site.

As a result of surveys within the Quarry Site, an isolated stone artefact was identified within the area of the central visibility barrier which was subsequently salvaged and reburied on 13 July 2017 at a designated on-site location in consultation and in conjunction with the Illawarra LALC, Wodi Wodi Elders Corporation and Korewal Elouera, Jerrungarugh. This find is consistent with the predictive statements for the Quarry Site which indicate that low archaeological potential exists but with some potential for isolated objects to be present.

As a result of these findings, a range of management measures have been developed and detailed within the approved *Aboriginal Heritage Management Plan* for the Quarry and summarised as follows.

- All Quarry-related activities will be undertaken within the approved quarry footprint.
- Prior to the commencement of any ground disturbing activities, the areas to be disturbed will be identified by the Raw Materials & Mining Manager or their delegate with the limits of disturbance clearly identified on quarry plans and, if necessary, by on-ground marking (e.g. survey pegs, flagging tape or painted markers, etc.).
- No quarry-related activities will be undertaken within the area of “High Archaeological Constraint” (see **Figure 2**) or within the fenced boundary of the Artefact Reburial Area (the location of which is shown on mapping available to relevant site personnel).
- Implementation of erosion and sediment control measures to prevent potential impact upon any unidentified sites beyond the approved disturbance footprint.
- Implementation of the ‘Finds Procedure’ in the event an item of suspected Aboriginal origin is located.

No non-indigenous cultural heritage sites of interest were found within or surrounding the Quarry, therefore no specific management measures are required.

### **6.2.1.13 Exploration Activities**

Exploration activities that may be undertaken within the Quarry Site during the active mining phase may include the following.

- Resource extensional drilling programs.
- Diamond drilling to define shale resources adjacent to operations.

Prior to commencement of any ground-disturbing exploration activities, all necessary approvals would be sought.

Within the extraction area, drilling and sampling may also be conducted for quality control purposes to more accurately define the local variations within the clay/shale resource.

## **6.2.2 Decommissioning**

### **6.2.2.1 Site Security**

Existing site security measures will be maintained during decommissioning and active rehabilitation operations at the Quarry unless they are required to be modified for rehabilitation purposes. No public access to the Quarry Site is currently permitted, with the main site entry points secured by locked gates during and outside of operating hours. Exclusion of the public from the Quarry Site is currently provided via a combination of perimeter security fencing and stock-proof fencing.

Existing security fencing that is to be retained will be structurally assessed and repaired or replaced where necessary.

### 6.2.2.2 Infrastructure to be Removed or Demolished

**Table 12** presents a list of the site features to be decommissioned to achieve the final land use. Any infrastructure not required for the final land use will be subject to engineering assessments to identify potential risks associated with closure and decommissioning activities, where required.

**Table 12**  
**Quarry Site Assets**

<b>Mining Domain<sup>1</sup></b>	<b>Assets</b>	<b>Decommissioning and Demolition Requirements</b>
1 – Infrastructure Area	Site access and internal roads, Stony Creek bridge, site office and amenities block (transportable), storage container and covered area. northern, central and southern visibility barriers.	The site access and internal road and bridge will be retained for ongoing access. The site office, amenities, covered area and storage container will be removed from site. Central visibility barrier to be deconstructed and used in final landform creation (southern and northern barriers may be retained).
3 – Water Management Area	Up to 11 dams, clean and dirty water diversion drains, mobile pumping and flocculation system and associated piping.	Pumps, piping and flocculation system will be removed. Dams 1, 2, 4, 6, and 8 will be retained. Remaining dams to be removed together with redundant diversion drains.
4 – Overburden Emplacement Area	Overburden Emplacement Area– no specific assets.	Stockpiled overburden to be removed for use in final landform creation.
5 – Active Mining Area (Open Cut Void)	Active Extraction Area	The final void will be constructed to be a safe and stable landform using material located beneath the footprint of the northern visibility barrier to create a final landform of no steeper than 1:3 (V:H).
8a – Vegetation Screening Area	Woodland Vegetation Screen Area – no specific assets.	No decommissioning or demolition requirements. Vegetation to remain as in pre-quarrying environment.
Note 1: Domains as shown in <b>Figure 7</b> .		

As a minimum, the following controls will be implemented during demolition works at the Quarry Site.

- Sites will be continually damped down with water to suppress dust during demolition, with potentially contaminated water captured as appropriate.
- Works will be undertaken so as to minimise the generation of particulate matter.
- Works will not be undertaken during periods of high wind.
- Loads of waste material removed from demolition sites will be covered prior to transportation.

All material and waste products generated from any demolition, decommissioning and/or removal operations will be collected and either disposed of within the Quarry Site where appropriate, removed immediately from the Quarry Site or stored in appropriate (i.e. disturbed) areas for removal by a licensed waste contractor as soon as practicable.

### 6.2.2.3 Buildings, Structures and Fixed Plant to be Retained

**Figure 6** shows key infrastructure to be retained as part of the final land use. Existing infrastructure and structures to be retained include the Site Access road as well as various internal roads. Dams 1, 2, 4, 6, and 8 will be retained. No other infrastructure would be retained at the Quarry.

Short-term risks associated with the retention of nominated infrastructure are relatively low as these features have been retained to facilitate access to areas of the Quarry.

Long-term risks to public safety and the environment associated with retained infrastructure would only occur in the absence of regular maintenance. Roads will need to be inspected following high intensity rainfall events to ensure that conditions remained suitable for safe access to publicly accessible areas. Failure of roads would potentially contribute to the generation of sediment laden water which may impact water quality within local watercourses.

As part of the decommissioning and landform establishment phases of rehabilitation operations, structural and engineering assessments will be carried out as required prior to the relinquishment of retained infrastructure. Any necessary repair, replacement or re-design works recommended as part of these assessments will be carried out and assessed by a suitably qualified engineer before public access is permitted to the Quarry.

### 6.2.2.4 Management of Carbonaceous / Contaminated Material

No contaminated land is known to be present within the Quarry Site. However, in the event that contaminated materials are identified and it is not possible or practicable to remediate these materials either on or off site, contaminated materials will either be removed from the Quarry Site and disposed of at an appropriately licenced waste facility or disposed of at the Quarry Site, where appropriate.

### 6.2.2.5 Hazardous Materials Management

No hazardous materials are proposed to be stored within the Quarry Site with refuelling tanks to be brought onto Site as required. All refuelling activities will be restricted to designated areas which are either sealed, bunded or located with access to spill control kits. Regular housekeeping and maintenance will occur in areas where hydrocarbons are used. During operations, any hydrocarbon spills would be immediately cleaned up and any contaminated material either remediated on site or removed to a licenced waste facility.



### 6.2.2.6 Underground Infrastructure

The underground powerline which traverses the Quarry Site and supplies power to the Mandurama homestead beyond the boundary of M(MO)L6 is proposed to be retained as part of the final land use. In the event decommissioning or re-routing is required due to issues associated with rehabilitation of the Quarry Site, this Plan will be updated to appropriately address any potential rehabilitation risks.

## 6.2.3 Landform Establishment

### 6.2.3.1 Water Management Infrastructure

With the exception of Dams 1, 2, 4, 6, and 8, no water management infrastructure is expected to be retained as part of the final landform. These dams will be retained as clean water dams along with their associated clean water diversion channels.

### 6.2.3.2 Final Landform Construction: General Requirements

As shown on **Plan 1**, the Quarry Site will be rehabilitated to achieve a stabilised landform principally comprising areas suitable for agricultural grazing, with minor areas of woodland vegetation and water storages. **Plan 2** presents the final landform contours for the Quarry Site. In summary, the final landform incorporates final undulating slopes of approximately 1:1.5 (V:H) to 670m AHD and 1:3 (V:H) to 640m AHD, utilising material available from the Central and Northern Visibility Barriers and some recovery of material from the southern side of the extraction area and the footprint beneath the Northern Visibility Barrier at the end of the Quarry life.

Following completion of rehabilitation operations, it is not expected that these areas will present any specific geotechnical or geochemical risks. Additionally, it is not expected that these areas will require specific erosion and sediment control measures following the establishment of vegetation.

### 6.2.3.3 Final Landform Construction: Reject Emplacement Areas and Tailings Dams

No processing will be undertaken, and no tailings / residues will be generated as part of the Quarry operations.

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

The final landform will be achieved through backfilling the completed sections of the extraction area in two stages, i.e. at the end of Stages 4 and 7, i.e. in the following manner.

**End of Stage 4** – The material within the central visibility barrier will be relocated to the floor of the extraction area against the established southern benches and shaped to produce a permanent interim landform as follows.

- On the western section of the extraction area void at the end of Stage 4, the material will be placed up to the approximate level of the 670m bench, shaped to a final landform no steeper than 1:3 (V:H), except for Bench 1 which will have a slope of 1:1.5V:H, and stabilised with a permanent grass vegetative cover. The 670m bench (Bench 1) will have established trees and shrubs that will have been planted following the commencement of Stage 1 operations and will remain *in situ* on that bench. No further activities will be undertaken in this section of the Quarry.
- On the eastern section of the extraction area void at the end of Stage 4, material within the central visibility barrier will be placed against the wall of the extraction area, up to the 660m AHD bench and shaped to create an interim undulating slope no steeper than 1:3 (V:H).

**End of Stage 7** – The material within the northern visibility barrier will be relocated and placed on the western margin of the excavated void and shaped in the same manner as above, creating a final landform no steeper than 1:3 (V:H) and stabilised with a permanent grass vegetative cover.

Following the extraction of all material within the extraction area and relocation of the northern visibility barrier, the material located beneath the footprint of the northern visibility barrier will be pushed into the extraction area void to create a final landform of no steeper than 1:3 (V:H).

The final extraction area will not intersect groundwater and will be free draining. As a result, no licences or approvals under the *Water Management Act 2000* will be required.

### 6.2.3.5 Construction of Creek / River Diversion Works

No creek or river diversion works are proposed as part of Quarry operations or rehabilitation.

### 6.2.4 Growth Medium Development

The growth medium development phase involves the placement of available growth medium on the final landform and preparation of the surface for revegetation. Preparation would involve deep ripping of the compacted surfaces along the contour to establish a suitable growth medium for pasture. The floor of the excavation area will be deep ripped following the progressive completion of excavation and covered with available overburden and subsoil. Topsoil would then be applied over the deposited overburden/subsoil.

In summary, the following procedures will be implemented prior to the commencement of the growth medium development phase.

- Confirm the volume of growth medium stockpiled within the Quarry Site to ensure that the minimum required volume is available.

- Engage a suitably experienced or qualified person to assess the condition of the growth medium and provide recommendations in relation to ameliorants required.
- Establish one or more trial rehabilitation sites to test preferred rehabilitation methodologies and determine the preferred methodology.

The following procedures will be implemented during growth medium development.

- Undertake growth medium development in late summer to mid autumn.
- Light ripping of growth medium across contours to key in substrate to permit root development, reduce surface runoff velocities and retention moisture and seed.
- Spread a minimum of 100mm of growth medium across the area to be rehabilitated.
- Apply required ameliorants as recommended.
- Implement weed control.

Topsoil will be applied using load and haul or direct placement methods within rehabilitation areas and prior to spreading.

Weed control during growth medium development will consist of inspections and control of on-site weeds prior to and during placement of growth medium. This will include visual inspections stockpiled material. All vehicles and equipment used during rehabilitation will be inspected for weed material prior to commencement of operations.

Seasonal and local meteorological conditions will be monitored to identify conditions which may result in delaying vegetation establishment (e.g. extended drought conditions). Land preparation and growth medium spreading activities will only be undertaken where conditions are predicted to be favourable (i.e. average or above average annual rainfall) to the establishment of vegetation.

## **6.2.5 Ecosystem and Land Use Establishment**

The ecosystem and land use establishment phase occurs once monitoring illustrates the achievement of a self-sustaining vegetation cover on the final landform.

Prior to application of seed, testing of the growth medium will be undertaken to determine the most appropriate species and the need for fertiliser or other ameliorants. Review of current and forecast weather conditions will also be undertaken to determine the appropriate species and application methods. A suitably experienced contractor would be utilised to undertake the testing and supply the appropriate seed mix.

Areas recently revegetated may, if required, be watered regularly until an effective cover has been properly established and/or supplementary watering is no longer required. Further application of seed and fertiliser might be necessary later in areas of minor soil erosion and/or inadequate vegetation establishment.

Frequency of weed and pest monitoring and control operations may be increased prior to, during, and following revegetation operations to reduce as far as practicable competition from weed species and negative impacts of herbivory.

Where practicable, foot and vehicular traffic will be kept away from any such rehabilitated areas. Restriction of public access to the Quarry Site will continue to be maintained throughout revegetation.

## **6.2.6 Ecosystem and Land Use Development**

The ecosystem and land use development phase occurs once monitoring illustrates the achievement of relevant performance indicators with respect to ecosystem development and the stability and function final landform. A geotechnical assessment will be undertaken prior to relinquishment and release of the security bond.

### **6.2.6.1 Erosion, Drainage, and General Infrastructure**

Erosion and sedimentation risk will be elevated until the target ground cover criteria are reached. During this period, regular inspections will be undertaken to assess the performance of the existing controls, and identify potential remedial or additional actions, if required.

### **6.2.6.2 Weed and Pest Management and Monitoring**

A range of weed species have been identified within the Quarry Site, although none are currently listed weed species. The following management measures will be implemented to reduce the potential impacts from weeds.

- Prior to soil stripping, where weeds are visibly present, an authorised herbicide will be sprayed across the area to be stripped prior to soil stripping to limit the presence of weeds in the stripped topsoil.
- Earthmoving equipment will be thoroughly cleaned prior to being brought on site.
- Where visual inspections identify actual or potential weed infestations, weed control will be undertaken as required.

In addition to weeds, in the event that animal pests are identified as causing impacts to rehabilitation, a pest control program will be implemented. If required, the program will be implemented in consultation with Department of Industry and surrounding neighbours.

Information on erosion and sediment controls which would continue to be implemented during rehabilitation is provided in Section 6.2.1.9. Information on security infrastructure is provided in Section 6.2.2.1.

### **6.2.6.3 Environmental Management and Monitoring**

#### **Surface Water**

Visual inspections of erosion and drainage control structures as well as retained dams will be undertaken following significant rainfall events.

## Groundwater

Rehabilitation operations are not expected to result in any adverse impacts to groundwater quality or availability. Therefore, it is anticipated that ongoing monitoring of groundwater levels and quality within the Quarry Site will not be required during the ecosystem and land use establishment phase of rehabilitation.

## Land Capability

The rehabilitated area will be fenced to exclude stock and control grazing to manage and monitor land capability within the rehabilitated area.

## Revegetation

Vegetation establishment activities at the Quarry, including growth medium spreading and seeding operations, will occur only where favourable climatic conditions are expected. Consequently, prolonged drought periods may result in extended delays to these rehabilitation conditions. In the event that extended drought periods occur at the Quarry Site, rehabilitation schedules will be updated to prioritise other rehabilitation activities and opportunities to prepare additional areas for revegetation once favourable conditions return will be investigated.

The principal revegetation management measures during the ecosystem development phase of rehabilitation will be consistent with those identified in **Table 10**, namely, establishment of one monitoring point per 5ha of rehabilitation and two analogue sites.

Results from rehabilitation monitoring will be used to assess the progress of revegetated areas towards target values based on analogue sites for each of the established vegetation community types.

The results of rehabilitation monitoring will also be compared against the triggers outlined in Section 10 and additional management actions implemented as required. These additional management actions may include, but would not be limited to:

- growth medium amelioration (e.g. fertiliser or organic matter application);
- reseeded of areas with seed of target species where species assemblages are not consistent with those of analogue sites; and
- engaging a suitably qualified expert to provide recommendations to improve rehabilitation outcomes.

### 6.2.6.4 Land Management and Infrastructure Maintenance

Site infrastructure retained in the final land use, namely the roads, water storages and diversion banks identified on **Figure 6**, would be inspected on an annual basis and after significant rainfall events, as required. The results of infrastructure inspections as well as records of any required infrastructure maintenance activities and costs will be included as part of an Annual Rehabilitation Report.

## 6.3 REHABILITATION OF AREAS AFFECTED BY SUBSIDENCE

As no previous underground mining has occurred within the immediate area, no specific mine subsidence management measures are necessary.

## 7. REHABILITATION QUALITY ASSURANCE

The following section details the rehabilitation quality assurance process for the Quarry in accordance with *Guideline 3: Rehabilitation Controls (July 2021)*. The rehabilitation quality assurance checklist included in this section is intended to be used as an indicative guide for rehabilitation operation managers and practitioners responsible for the rehabilitation of the Quarry Site.

It is anticipated that rehabilitation operations within the Quarry Site will occur on a progressive basis as areas are no longer require for operational purposes. Consequently, it is noted that rehabilitation progress through the planned rehabilitation phases will not occur concurrently across all mining subdomains identified in **Figure 7**.

As part of the rehabilitation quality assurance process, relevant records and documentation will be recorded in a Rehabilitation Quality Assurance Register and reported as part of the Annual Rehabilitation Report. The Rehabilitation Quality Assurance Register will, as a minimum, include a copy of the checklists presented in **Appendix 1** as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. The Rehabilitation Quality Assurance Register will be maintained, reviewed and refined by the Raw Materials and Mining Manager and/or Environment Manager to ensure that it is reflective of current rehabilitation progress, risk controls implemented at the Quarry Site and the outcomes of any updated rehabilitation risk assessments.

**Table 13** outlines key responsibilities for the Company and Quarry personnel with regards to rehabilitation operations.

**Table 13**  
**Key Roles and Responsibilities**

Role	Responsibility
Raw Materials and Mining Manager	<ul style="list-style-type: none"> <li>Comply with applicable laws, regulations, licences and approvals.</li> <li>Ensure all contractors, sub-contractors and service personnel are appropriately qualified and/or licenced to undertake the required work.</li> <li>Ensure that appropriate resources are available to site management and personnel to enable the implementation of this Plan.</li> </ul>
Environment Manager / Site Supervisor	<ul style="list-style-type: none"> <li>Ensure that the Rehabilitation Quality Assurance register is maintained and up to date based on site activities.</li> <li>Ensure that relevant personnel and workforce participants are aware of relevant development and rehabilitation risks and management and mitigation measures, including any additional corrective and/or preventative measures.</li> <li>Ensure that the rehabilitation quality assurance process outlined in Section 7 is implemented as required.</li> <li>Ensure that the documentation and recording of rehabilitation risk controls occurs within a suitable timeframe as reasonably practicable.</li> <li>Ensure that specialist contractors adhere to the guidelines and methodologies outlined in this RMP where required, or that the guidelines and methodologies in this Plan are updated to reflect those employed at the Quarry.</li> </ul>
All Quarry Personnel	<ul style="list-style-type: none"> <li>Follow direction provided by the Environment Manager / Site Supervisor.</li> <li>Notify the Environment Manager / Site Supervisor in the event that uncontrolled rehabilitation risks are identified at the Quarry.</li> </ul>

## 8. REHABILITATION MONITORING PROGRAM

### 8.1 ANALOGUE SITE BASELINE MONITORING

The rehabilitation objectives rehabilitation completion criteria as defined in Section 4 and **Table 10** were developed with reference to visual inspections of appropriate analogue sites, namely areas of undisturbed native vegetation located within and adjacent to the Quarry Site.

The rehabilitation monitoring methodology outlined in the following subsection has been designed with the aim of achieving the nominated criteria.

### 8.2 REHABILITATION ESTABLISHMENT MONITORING

Austral Bricks' commitment to effective rehabilitation will involve an ongoing monitoring and maintenance program throughout and immediately following the life of the Quarry. Areas undergoing progressive rehabilitation will be regularly inspected and assessed by the Raw Materials and Mining Manager and/or Environment Manager against the rehabilitation objectives outlined in Section 4.

Rehabilitation monitoring will focus upon determining whether progress towards achieving the relevant performance indicators and completion and relinquishment criteria presented in Section 4 and **Table 10** is being achieved. This will consist of regular quarterly visual inspections until such time that total projected foliage within rehabilitated areas is greater than 70% or higher than those recorded in relevant analogue sites, namely areas of undisturbed native vegetation located within and adjacent to the Quarry Site.

Throughout the life of the Quarry, the following rehabilitation maintenance activities will be undertaken.

- Where monitoring indicates that rehabilitation success appears limited, the following maintenance activities will be initiated.
  - Re-seeding, re-topsoiling and/or the application of specialised treatments such as composted mulch and fertiliser to areas with poor vegetation establishment.
  - Protection against grazing by native animals and feral pests, e.g. rabbits.
  - Repair or reconstruction of drainage controls should existing controls be found to be inadequate.
- Should it be necessary, Austral Bricks will participate with its neighbours to control any feral pests in a coordinated fashion.
- Where monitoring identifies excessive erosion and sedimentation, remedial works such as importation of additional fill, subsoil or topsoil material, or re-designing of water management structures would be undertaken.
- Where monitoring identifies actual or potential weed infestations, the Company would undertake appropriate weed control or eradication programs.

No time limit has been placed on post-extraction rehabilitation monitoring and maintenance. Rather, these activities will continue until such time as the rehabilitation objectives outlined in Section 4 are met to the satisfaction of the relevant government agencies.

### **8.3 MEASURING PERFORMANCE AGAINST REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA**

Details of validation methods and indicators to be employed during monitoring to assess performance against the rehabilitation completion criteria for the Quarry are provided in Section 4.1.

The Rehabilitation Quality Assurance Register will be used to record details of any additional management measures or risk controls implemented during the ecosystem development phase in response to the analysis of rehabilitation monitoring results.

An Annual Rehabilitation Report and Forward Program will be prepared for the Quarry as required under *Condition 13* of M(MO)L6 as specified by the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*. Austral Bricks proposes to submit an Annual Rehabilitation Report and Forward Program for the Mine by 28 February each year to cover the previous 12-month calendar year period. As part of the Annual Rehabilitation Report and Forward Program, Austral Bricks will validate and certify that the security deposit covers the estimated cost of rehabilitation liabilities each year.



## **9. REHABILITATION RESEARCH AND TRIALS**

### **9.1 CURRENT REHABILITATION RESEARCH AND TRIALS**

To date, approximately 7.3ha of temporary rehabilitation has been undertaken. This was completed through the application of hydromulch, as well as planting of the Southern Highlands Shale Woodland tree screening adjacent the northern visibility barrier. Areas of the internal access road no longer required have also been ripped and hydromulched, along with all remaining disturbed areas not required for ongoing operations. In particular, the visibility barriers were covered with a premium hydromulch and a travelling irrigator utilised to ensure establishment of grass cover.

Topsoil has also been stripped and respread over completed dam embankments and the completed visibility barriers. Additional soil not required for these rehabilitation activities has been retained for future rehabilitation. It is noted that soil material has been placed more thickly on the northern and central visibility barriers in order ensure optimum growth of vegetation and better maintain the biological value of the soil material. As the visibility barriers will ultimately be deconstructed and utilised in the rehabilitation of the extraction area, this soil will similarly be recovered at that time for final rehabilitation of the extraction area.

It should be noted that, as the areas which have been rehabilitated may be disturbed into the future for either operations or final rehabilitation works, all areas of rehabilitation have been classified as temporarily rehabilitation. As such, no final rehabilitation has been undertaken to date.

### **9.2 FUTURE REHABILITATION RESEARCH AND TRIALS**

Given that the methodologies to achieve temporary rehabilitation of the areas outlined above have been considered successful and will be utilised for rehabilitation of the remainder of the Quarry Site, it is considered that no further rehabilitation research or trials are required.

## 10. INTERVENTION AND ADAPTIVE MANAGEMENT

**Table 14** presents the Trigger Action Response Plan for each of the rehabilitation threats and potential adverse outcomes identified in **Table 9** as having a risk rating of moderate or above.

**Table 14**  
**Trigger Action Response Plan**

Rehabilitation Risk	Potential Adverse Outcome	Trigger	Action / Response
<b>Ecosystem and Land Use Establishment Phase of Rehabilitation</b>			
Adverse weather and climatic influences (e.g. drought; intense rainfall events; bushfire and climate change).	Delay to or failure of vegetation establishment.	Visual monitoring during and/or after adverse weather/climatic events identifies limited opportunities for progressive rehabilitation or negative effects on vegetation establishment	Review of rehabilitation schedule and update to forward schedule.
			Rehabilitation areas are assessed for damage and necessary repairs and/or revegetation efforts are employed as required.

The results of rehabilitation trials, including the development of any additional procedures to be implemented during rehabilitation operations, will be continually reviewed and reported in the Annual Rehabilitation Report for the Quarry. Where rehabilitation trial outcomes suggest that rehabilitation methods outlined in this Plan may not support the realisation of rehabilitation completion criteria, this Plan will be updated to detail additional or alternative rehabilitation methods as required.

## 11. REVIEW AND IMPLEMENTATION

**Table 15** presents the triggers for reviewing this Plan. Following each review, this Plan will be revised if significant structural amendments are necessary and provided to the Resources Regulator. Additionally, further consultation with relevant stakeholders will be undertaken where revisions to this Plan result in significant changes to proposed final land uses final landforms, rehabilitation objectives, rehabilitation completion criteria and/or the rehabilitation schedule. Milestones as documented in this Plan will be updated in the Annual Rehabilitation Report and will trigger an update to this Plan in the event that a significant change in rehabilitation risks and/or proposed rehabilitation methodologies is identified.

**Table 15**  
**Rehabilitation Management Plan Review Triggers**

Trigger	Review
Request from the Resources Regulator or other relevant government agency to review the Plan.	As required by any notice
Modification of an existing development consent.	Within 3 months
Modification of M(MO)L6.	Within 3 months
Preparation of a revised Rehabilitation Risk Assessment.	Within 1 month
Submission of each Annual Rehabilitation Report and Forward Program.	Within 1 month
Completion of a rehabilitation trial.	Within 1 month
Review and re-development of any of the following. <ul style="list-style-type: none"> <li>• <i>Environmental Management Strategy</i></li> <li>• <i>Noise Management Plan</i></li> <li>• <i>Air Quality Management Plan</i></li> <li>• <i>Water Management Plan</i></li> <li>• <i>Transport Management Plan</i></li> <li>• <i>Aboriginal Heritage Management Plan</i></li> <li>• <i>Landscape Management Plan</i></li> </ul>	Within 3 months
Consultation with relevant stakeholders with significant implications for the final land use and/or final landform.	Within 3 months
Consultation with relevant stakeholders with significant implications for rehabilitation objectives and/or rehabilitation completion criteria.	Within 3 months

In addition to reviews of this Plan as outlined in **Table 15**, a Rehabilitation Quality Assurance Register will be developed and regularly maintained to ensure that mining and rehabilitation activities at the Quarry are being conducted in accordance with this Plan. The Rehabilitation Quality Assurance Register will include the checklist presented as **Appendix 1** as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. Additionally, the Rehabilitation Quality Assurance Register will include:

- records of any contaminated water or hazardous materials collected at the Quarry Site and disposed of off site;
- the latest map of weed distribution at the Quarry Site;
- the latest map of contamination at the Quarry Site; and

details of any additional rehabilitation measures and/or risk controls implemented within individual subdomains during rehabilitation operations.

## 12. REFERENCES

**Department of Environment and Climate Change (DECC) (2008).** *Managing Urban Stormwater, Soils and Construction*

**R.W. Corkery & Co. Pty Limited (RWC) (2018).** *Mining Operations Plan for the New Berrima Clay/Shale Quarry*, prepared for The Austral Brick Company Pty Limited, August 2018

**R.W. Corkery & Co. Pty Limited (RWC) (2010).** *Environmental Assessment for the New Berrima Clay/Shale Quarry* prepared for The Austral Brick Company Pty Limited – December 2010

# Appendix 1

## Rehabilitation Risk Control Checklist

(Total No. of pages including blank pages = 14)

**Table A**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Phase: Active Mining (Production)</b>	
<b>Soil and Materials Management</b>	
Develop and maintain a materials and soils balance and database to include the following information: <ul style="list-style-type: none"> <li>• volume of overburden, topsoil and subsoil stockpiled.</li> <li>• location, age and quality of stockpiles.</li> <li>• chronology of treatments (e.g. weed control, application of cover crop) undertaken on the stockpile.</li> <li>• volume of material, topsoil and subsoil required for application to current and future disturbance areas (e.g. overburden emplacement areas).</li> <li>• an estimate of the volume of suitable alternative material required to be imported onto site to supplement potential material, topsoil and subsoil deficits.</li> <li>• record data on the location of the stockpiled material including date stripped, source area, indicative volume, pre-strip plant community type.</li> </ul> Information is to be stored using site-based GIS.	
Locate soil stockpiles away from traffic areas and at an appropriate distance from watercourses.	
Locate soil stockpiles on level or gently sloping areas to minimise the potential for erosion and soil loss.	
Limit soil stockpiles to less than two to three metres high and set out in windrows to maximise surface exposure and biological activity.	
Install appropriate erosion, dust and sediment controls around soil stockpiles to reduce the potential for soil loss.	
Appropriately sign-post soil stockpiles to identify the area and minimise the potential for unauthorised use or disturbance.	
Monitor and control weed growth on soil stockpiles.	
<b>Materials Handling</b>	
Develop and maintain a register of any contaminated sites, waste landfill sites and bioremediation areas and where they are located.	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Environmental Monitoring</b>	
Develop, maintain and document an environmental monitoring program that includes: <ul style="list-style-type: none"> <li>• surface and groundwater</li> <li>• flora</li> <li>• land contamination</li> <li>• heritage</li> </ul>	
<b>Management of potential heritage issues</b>	
Before demolition activities, undertake any necessary assessments to determine potential heritage approvals and or management measures that may be required (e.g. retention/restoration of building, archival recording).	
<b>Site Services</b>	
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.	
<b>Buildings and Fixed Plant</b>	
Before demolition, the infrastructure should be evaluated in terms of the presence of hazardous substances (e.g. asbestos, radiation devices and sources) 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.	
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 relevant Australian Standard.	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Buildings and Fixed Plant (Cont'd)</b>	
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.	
<b>Buildings and Fixed Plant to be Retained</b>	
<p>Where infrastructure is approved to remain as part of the final land use, a structural assessment should be prepared by a suitably qualified person to:</p> <ul style="list-style-type: none"> <li>• determine the structural integrity of the structure.</li> <li>• identify the associated short and long-term risks to public safety and the environment from the infrastructure remaining in situ, which should identify potential modes of failure.</li> </ul> <p>Based on assessment, identify and implement controls to address any potential residual risks and modes of failure.</p>	
<b>Equipment Storage Areas, Hardstand Areas, Roadways, Sealed and Unsealed Roads and Car Parks</b>	
Any redundant plant or equipment will either be sold for reuse, recycled (e.g. scrap metal) or disposed of at an authorised landfill facility.	
Removal of ore spillages and hazardous materials.	
Storage areas and hardstands will be assessed for potential contamination (e.g. hydrocarbons, salt accumulation) and remediation undertaken as required.	
<p>Waste material (e.g. bitumen, concrete, ore) generated as part of the removal of car parks and hardstands is to be managed in accordance with relevant guidelines under the Protection of the Environment Operations Act 1991. The relevant guidelines can be found on the Environment Protection Authority's website.</p> <p>Where authorised to dispose of on the site, waste material must be buried at depth or suitably capped to ensure that it does not compromise the final land use.</p>	
<b>Management of Contaminated Material</b>	
<p>Any contaminated material should be managed in accordance with relevant guidelines under the <i>Contaminated Land Management Act 1997</i>.</p> <p>Records will need to be retained to validate that contamination has been remediated or managed effectively to meet the final land use rehabilitation objectives and rehabilitation completion criteria.</p>	



**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Hazardous Materials Management</b>	
All remaining hydrocarbons such as diesel and lubricants and other hazardous materials will be either used or discarded by an authorised waste contractor.	
Removal of any oily water treatment system, following the demolition of the workshop and associated facilities.	
Removal of sewage treatments systems and associated sewerage network.	
Storage tanks of hazardous materials will be removed and, depending on their condition, either sold or disposed at an authorised facility.	
Specific consideration should be given to managing asbestos materials, radiation devices, hydrocarbon as well as other contaminated substances/materials/soils in accordance with relevant guidelines that can be found on the Environment Protection Authority's website.	
<b>At the Completion of Exploration Activity</b>	
Remove and lawfully dispose of all grid pegs, tags, sample bags, flagging tape, drill chips and other waste.	
Remove all drill core.	
Survey, seal and rehabilitate all boreholes.	
Remove and lawfully dispose of all plant and equipment (including surface pipelines) and imported fill material.	
Removal of concrete and footings.	
Undertake a visual contamination assessment where potential pollution generation activities have occurred (e.g. hazardous substance storage, saline water storage) to identify potential signs of contamination. Where contamination is present, develop and implement a contamination remediation program to ensure that the rehabilitation objectives and rehabilitation completion criteria for the intended post-exploration land use are met.	

Table A (Cont'd)  
 Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Phase: Landform Establishment</b>	
<b>Characterisation of Waste Materials (Geochemical and Geotechnical)</b>	
Characterisation analysis is conducted and geochemical and physical properties of waste materials are understood. Consideration should be given to the following as relevant: <ul style="list-style-type: none"> <li>• adopt an appropriate geological model (typically block model for metalliferous mines) to determine source of problematic material.</li> <li>• collect rehabilitation material erosion data for calibration of landform stability models.</li> <li>• establish an ongoing sampling program to identify potential changes in material properties.</li> <li>• ensure material handling field practices are in accordance with relevant plan/procedure.</li> </ul>	
<b>Emplacement Areas</b>	
The geotechnical stability of the emplacement areas during construction must be understood and a strategy implemented to ensure: <ul style="list-style-type: none"> <li>• location of waste/reject emplacement areas are clearly defined.</li> <li>• emplacement dimensions (e.g. height – RL) are consistent with those approved by the development consent.</li> <li>• consideration is given to geotechnical stability during placement, including methods to promote compaction/consolidation during construction.</li> <li>• consideration is given to material selection and treatment (e.g. handling low strength or dispersive/sodic soils).</li> <li>• material handling field practices are in accordance with defined management practices – location, dump process, lift heights, compaction/consolidation treatment.</li> </ul>	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Landform Design/Shape</b>	
<p>The final landform design should build on the minimum requirements of the development consent and, wherever practicable, take into account the following:</p> <ul style="list-style-type: none"> <li>• a landform that is commensurate with surrounding natural landform and, where appropriate, incorporates geomorphic design principles.</li> <li>• appropriate use of landform design stability principles of reduced slope length and surface water management structures.</li> <li>• use of erosion models to optimise the landform design and to show where high-risk erosion areas are likely to occur (and to nominate how risk controls will be incorporated into the final landform design to appropriately treat these risks).</li> <li>• potential for settlement and how this will be accounted for in the design (especially differential settlement).</li> <li>• long-term stability of voids/pit walls and steep slopes, including determination of engineering treatments required for walls/ steep slopes.</li> </ul>	
<p>Develop specific strategies (e.g. selective handling and placement) for materials management to address potential geochemical constraints for rehabilitation (e.g. saline and sodic materials) based on sampling and testing of overburden/interburden materials used to construct the final landform.</p>	
<p>Develop specific strategies (e.g. selective handling and placement) to address any potential geotechnical issues associated with the final landform, including seepage pathways into groundwater and surface waters, for example saline seepage. Based on risk, these strategies may need to be developed in consideration of geotechnical studies.</p>	

Table A (Cont'd)  
Rehabilitation Risk Control Checklist

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Final Voids</b>	
<p>Where a final void is approved to remain as part of the final landform (e.g. by the development consent), the design and construction should be developed in accordance with the minimum requirements of the development consent, associated environmental assessments/environmental impact statements and in consideration of the following:</p> <ul style="list-style-type: none"> <li>• a constraints and opportunities analysis of final void options (including backfilling or partial backfilling) to identify and implement the most feasible and environmentally sustainable option (where this option is not inconsistent with the development consent) to minimise the sterilisation of land post-mining.</li> <li>• a geotechnical assessment should be undertaken to determine the likely long-term stability risks associated with the proposed final landform, including any remaining highwalls or low walls (if any). Based on the outcome of this assessment, suitable measures (e.g. bunding and highwall fences) are to be implemented to minimise potential risks to public safety as well as support the final land use(s).</li> <li>• updated surface and groundwater assessments should be undertaken in relation to the likely final water level in the void and post mining water take (groundwater inflows into the void and surface water capture). This should include an assessment of the potential for fill and spill, along with measures required to be implemented to minimise associated impacts to the environment and downstream water users.</li> </ul>	
<p>The final void must address any relevant approval requirements of regulatory authorities and demonstrate the satisfaction of licensing requirements under the relevant legislation (e.g. <i>Water Management Act 2000</i>).</p> <p>This should include whether sufficient licence shares are available in the water source(s) to account for the water inflow into the final void(s).</p>	
<p>The final stabilisation and revegetation strategy associated with the final void should be designed and implemented based on the outcomes of the above assessments.</p>	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Water Management Infrastructure</b>	
<p>Depending on the final land use, issues that should be addressed as part of the post-mining water management system may include:</p> <ul style="list-style-type: none"> <li>• removal of excess sediment (e.g. saline sediment) from the surface dams for future use by the subsequent land owner or alternatively filling or removing the dams if they are no longer required.</li> <li>• the installation of appropriate sediment and erosion control measures.</li> <li>• water within final voids is appropriately licensed in perpetuity (e.g. under the <i>Water Management Act 2000</i>).</li> </ul>	
<p>Sediment material extracted from surface dams should be analysed to determine the potential for contamination and, if present, must be appropriately managed.</p>	
<b>As-Constructed Drawings</b>	
<p>Prepare 'as-constructed' drawings to verify that drainage and landform have been completed in accordance with design before 'growth medium development' phase.</p>	
<b>Phase: Growth Medium Development</b>	
<b>Before Commencing Rehabilitation (substrate preparation)</b>	
<p>Develop rehabilitation methodologies in consideration of site-specific constraints (e.g. topsoil and subsoil availability and quality, presence of contamination) required to achieve the approved, or if not yet approved, proposed rehabilitation objectives and rehabilitation completion criteria.</p>	
<p>Where revegetation is required, analyse representative samples to characterise the nature of the substrate (e.g. sodicity, acid-generating potential, particle size distribution, nutrient levels for planting) and determine any potential limitations to rehabilitation and sustainable plant growth.</p> <p>Immediately prior to application, collect and analyse samples of topsoil stockpiles to characterise material to determine any potential impacts to vegetation (e.g. sodicity, limited microbial activity, nutrients, organic matter).</p>	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Before Commencing Rehabilitation (substrate preparation) (Cont'd)</b>	
<p>Use the results to determine specific amelioration techniques (e.g. addition of gypsum, lime, organic matter, fertiliser) that will be used to overcome potential limitations to landform stability, vegetation establishment and growth.</p> <p>Apply ameliorants (e.g. gypsum or lime) and organic material (e.g. mulch) based on the outcomes of the substrate characterisation analysis (as appropriate to address limitations in the revegetation substrate).</p> <p>Before revegetation activities, analyse the prepared substrate to determine whether amelioration measures have been successful.</p>	
<p>Implement suitable erosion control measures (e.g. catch drains, sediments dams, silt fences, mulches, cover crops) to minimise soil loss from areas undergoing rehabilitation.</p>	
<p>Preferentially schedule and undertake revegetation activities in or just before suitable seasonal conditions.</p>	
<p>Where permissible, should revegetation be delayed due to unsuitable seasonal conditions, undertake temporary stabilisation measures (e.g. sterile cover crops, erosion and sediment controls) to avoid erosion and further land degradation.</p>	
<p>Return topsoil and subsoil layers in sequential order, assuming suitability of material for the final land use.</p>	
<b>During Rehabilitation (general methodologies)</b>	
<p>Use appropriate earthmoving equipment to avoid compacting the rehabilitation substrate.</p>	
<p>Restore soil structure by scarifying or ripping (if soil compaction or erosion has occurred) in parallel with the contour. Apply soil ameliorants (where required) such as fertiliser to the substrate before the start of revegetation activities.</p>	
<p>Implement erosion and sediment controls in accordance with Managing Urban Stormwater: Soils and Construction Volume 2E, Mines and Quarries (DECC 2008b).</p>	
<p>Where direct seeding is planned, rip final surfaces parallel with the contour before the application of seed to provide for an adequate seed bed.</p>	
<p>Where access tracks are to be removed (e.g. not to be left as part of the final land use as defined by rehabilitation objectives and rehabilitation completion criteria), remove imported fill material (where used) and reprofile the disturbance area to the pre-existing landform.</p>	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>During Rehabilitation (general methodologies) (Cont'd)</b>	
Topsoil shortages are to be supplemented with 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.	
Identify key habitat requirements for key fauna species.	
Use structures such as tree hollows, logs and other woody debris, rock material to augment the target habitat value of native rehabilitation (if appropriate, in consideration of bushfire risks).	
<b>Phase: Ecosystem and Land Use Establishment</b>	
<b>During Rehabilitation (revegetation – native ecosystem)</b>	
Native revegetation activities in rehabilitation areas should preferentially use local provenance seed for direct seeding or tube stock propagation.	
Use of seed orchards or onsite nurseries should be considered to ensure an appropriate stock is maintained for rehabilitation works.	
Consider techniques such as brush-matting where disturbed areas are situated directly adjacent to mature native ecosystems/area of clearing associated with mining that provide a good source of local seed, to stabilise the site while natural recruitment occurs.	
Where adverse seasonal conditions (e.g. drought) or other factors affect the availability of local provenance seed and supplementary non-local provenance seed is required, seed stock should be purchased from reputable suppliers with quality control processes including seed viability testing. (It is good practice to record the name of the supplier and batch of seed being applied. Recording such details may assist in prevention/management of misidentified seeds).	
If revegetation is delayed due to unsuitable seasonal conditions, undertake temporary stabilisation measures (e.g. sterile cover crops, erosion and sediment controls) to avoid erosion and further land degradation.	
Undertake treatment of seed in terms to address issues such as seed dormancy and insect predation. Timing of treatment is to be aligned to timing of application with a focus on reducing the storage time of treated seed.	
Confirm the availability of seed and plant material and amend the seed mix or schedule of revegetation based on material supply.	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>During Rehabilitation (revegetation – native ecosystem) (Cont'd)</b>	
Spread seed as soon as possible following ripping/scarifying. If seeding is delayed following ripping/scarifying, undertake an assessment to determine whether further re-ripping/tilling is required before applying seed to ensure sufficient surface roughness (e.g. to break up any crusting that may have resulted from rainfall events).	
Develop a bushfire management plan (having regard to relevant ecological considerations and species fire tolerance) in consultation with NSW Rural Fire Service. Bushfire considerations should be factored into rehabilitation design (e.g. access tracks).	
Revegetation mix to capture species of all strata aligned to the plant community type. (If foundation species are being used, ensure that they do not compromise the attainment of the targeted plant community types).	
Use appropriate earthmoving equipment to avoid compacting the rehabilitation substrate.	
Weed/pathogen control on equipment for sensitive sites to prevent the spread of pathogens.	
Rehabilitation can include direct seeding and/or tube stock planting. Seed germination and seeding/seedling rate records are to be retained so that future rates can be assessed to ensure that target densities are achieved.	
Maximise the number of target species (groundcover, mid-story and canopy) within the first round of revegetation activities to facilitate species richness. If the target plant community type requires a staged seeding approach to achieve the species mix, underrepresented species may be prioritised in subsequent revegetation rounds.	
Stock control fencing should be erected where required to protect ecological rehabilitation areas.	
<b>Rehabilitation Establishment Inspections</b>	
Conduct an initial establishment inspection no later than three months following the completion of each rehabilitation campaign to determine whether performance issues have occurred or are emerging, which have the potential to delay revegetation establishment.	
Conduct regular site inspections (e.g. at least quarterly) 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.	



**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Rehabilitation Establishment Inspections (Cont'd)</b>	
Record outcomes of inspections and 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.	
<b>Rehabilitation Monitoring Programs</b>	
Implement long-term rehabilitation monitoring program and evaluate trajectory of rehabilitation against achieving rehabilitation objectives and rehabilitation completion criteria.	
Broadly, the scope of the ecosystem rehabilitation monitoring program will be required to include indicators that measure site condition, vegetation composition and vegetation structure and ecosystem function. The range of indices should directly relate to the rehabilitation objectives and rehabilitation completion criteria identified for the specific ecological outcome.	
While the program should be designed to be comparable between monitoring periods, the program will also need to be flexible to enable incorporating evolving best practice in monitoring techniques.	
Include the monitoring and control of changes to surface and groundwater quality over time.	
The scope of the monitoring program should usually include photographic monitoring from fixed points.	
<b>Rehabilitation Management and Maintenance Program</b>	
<p>Develop and implement a rehabilitation management and maintenance program based on the needs identified in the rehabilitation monitoring program. Examples of what this program may include are as follows:</p> <ul style="list-style-type: none"> <li>• weed and feral animal control.</li> <li>• erosion and drainage control works.</li> <li>• reseeding/planting of failed rehabilitation areas (e.g. through lack of germination, high plant mortality rate).</li> <li>• repairing fence lines, access tracks and other general related land management activities.</li> <li>• regular site inspections to assess rehabilitation performance.</li> </ul> <p>The objective of this program is to facilitate rehabilitation progressing towards achieving the rehabilitation objectives and rehabilitation completion criteria in accordance with an approved progressive rehabilitation schedule (forward program).</p>	

**Table A (Cont'd)**  
**Rehabilitation Risk Control Checklist**

Rehabilitation Phase / Activity	Comment / Completion Date(s)
<b>Phase: Ecosystem and Land Use Development (Management of Rehabilitated Lands)</b>	
<b>During Rehabilitation (revegetation – native ecosystem)</b>	
Continue rehabilitation management and maintenance program (refer to Ecosystem Establishment Phase) until rehabilitation can be demonstrated to have achieved the approved rehabilitation objectives, rehabilitation completion criteria and (for large mines) the final landform and rehabilitation plan.	
Continue rehabilitation monitoring programs (refer to Ecosystem Establishment Phase) until rehabilitation can be demonstrated to have achieved the approved rehabilitation objectives, rehabilitation completion criteria and (for large mines) the final landform and rehabilitation plan.	
Actively manage rehabilitated lands to achieve the approved final land use(s).	