

# **Landscape Management Plan**

for the

## **New Berrima Clay/Shale Quarry**

PA08\_0212

Approved

*Prepared by:*



**R.W. CORKERY & CO. PTY. LIMITED**

March 2016

**Approved by**  
the Secretary's nominee, Howard Reed,  
on 13 May 2016

# Landscape Management Plan

for the

## New Berrima Clay/Shale Quarry

PA08\_0212

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**Prepared for:**

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## **COMMONLY USED ACRONYMS**

AHD	Australian Height Datum
AS	Australian Standard
CCC	Community Consultation Committee
DPE	Department of Planning and Environment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPL	Environment Protection Licence
NATA	National Association of Testing Authorities
OEH	Office of Environment and Heritage
PA	Project Approval

## KEY FACTS AND FIGURES

<b>Project Areas (approximate)</b>	Quarry Site – 51 ha
	Extraction Area Stages 1-4 – 5.5 ha
	Extraction Area Stages 5-7 – 5.0 ha
	Surplus Overburden Stockpile Area – 1.5 ha
	Final Landform Area South – 1.4 ha
	Total Area of Disturbance - 14 ha
<b>Annual Production</b>	Maximum 150 000t per year
<b>Approved Quarry Life</b>	Until 30 June 2045
<b>Capital Investment</b>	Approximately \$1 million
<b>Employment</b>	Approximately four full time equivalent positions
<b>Extraction Equipment</b>	Scraper, bulldozer, haul truck, front-end loader
<b>Extraction Floor</b>	640m AHD
<b>Extraction Stages and Resources</b>	Stages 1 to 4 (southern section of extraction area) Approximately 1.6 million tonnes
	Stages 5 to 7 (northern section of extraction area) Approximately 2.3 million tonnes
<b>Hours of Operation</b>	Monday to Friday - 7:00am to 5:00pm
	Saturday - 8:00am to 1:00pm
	Sundays and Public Holidays – No Operations
<b>Length of Sealing of Quarry Access Road</b>	Approximately 400m (from Berrima Road)
<b>Traffic Volumes (approximate)</b>	Typical day - 0 to 34 truckloads (0 to 68 truck movements)
	Typical transport campaign day – 17 to 34 truckloads (34 to 68 truck movements)
	Maximum per day - 68 truckloads (132 truck movements)
<b>Visibility Barrier Dimensions (approximate)</b>	Central Visibility Barrier - approximately 8m to 12m high, 30m to 45m wide, and 420m long (Area = 1.5 ha)
	Northern Visibility Barrier - approximately 8m to 9m high, 35m to 50m wide, and 160m long (Area = 0.7 ha)
	Southern Visibility Barrier – up to 4m high, up to 20m wide, and up to 350m long (Area = 0.7 ha)

## 1. INTRODUCTION

This *Landscape Management Plan* (the Plan) has been prepared by R W Corkery & Co Pty Limited on behalf of The Austral Brick Company Pty Ltd (Austral) for the New Berrima Quarry (the Quarry). The Quarry is located approximately 1.5km east of New Berrima in the Southern Highlands of NSW (**Figure 1**).

This Plan has been prepared in satisfaction of *PA Conditions 3(35), 3(19), 3(21) and 5(3)* of Project Approval (PA) 08\_0212 and describes the following.

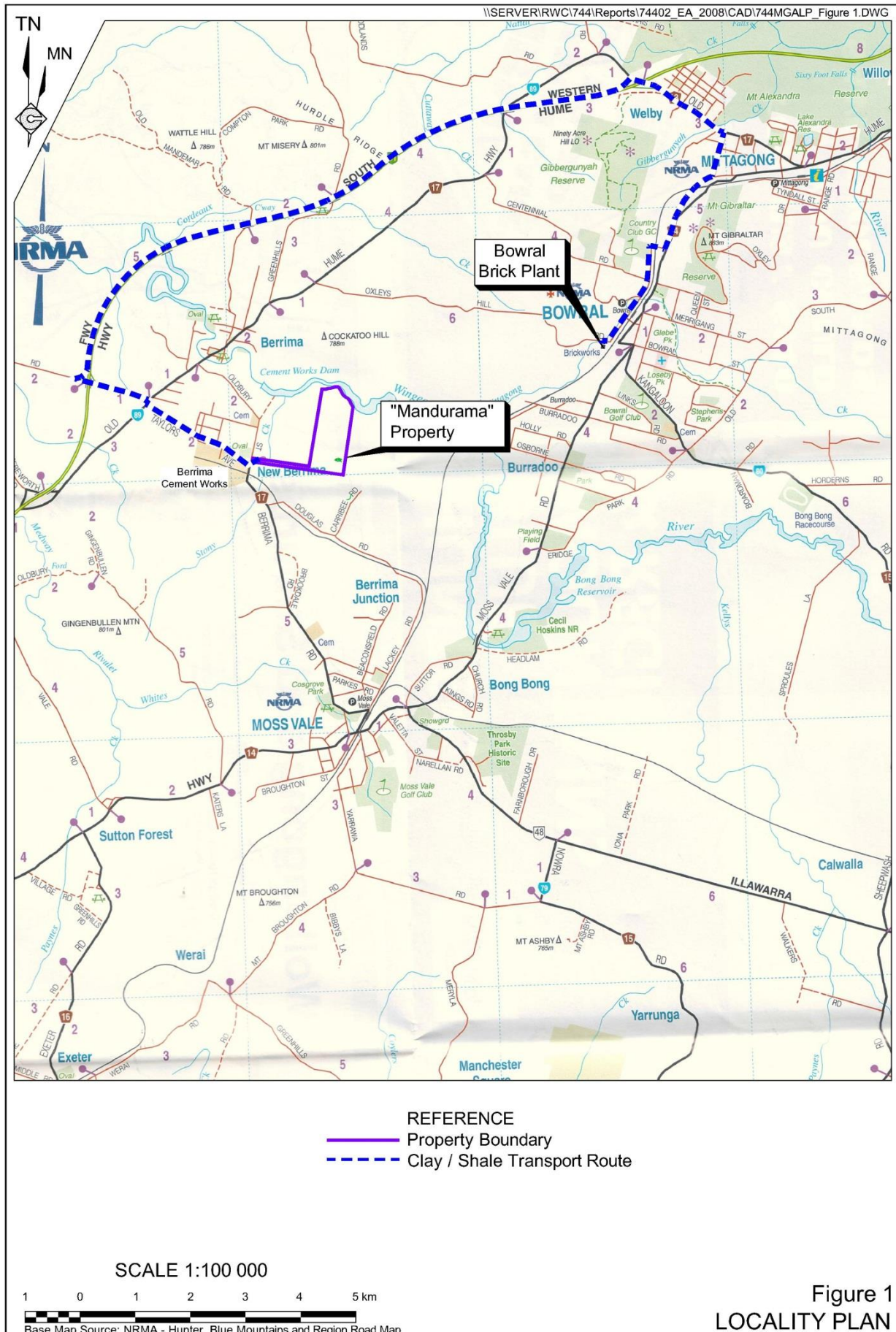
- The activities approved under PA 08\_0212.
- The consultation undertaken during preparation of this Plan.
- The legal and other requirements associated with rehabilitation and landscape management within the Quarry.
- The objectives and key performance outcomes for this Plan and the Quarry.
- Roles and responsibilities.
- Competence training and awareness.
- Surrounding vantage points with the potential for views of disturbed sections of the quarry operations.
- Mitigation measures to be undertaken
- Complaints handling and response procedures that will be implemented.
- Incident reporting procedures.
- Publication of monitoring information.

The approved Quarry is fully described in the *Environmental Assessment* dated May 2015 to support a modification to PA 08\_0212, and the *Environmental Assessment* dated December 2010 and associated documentation prepared to support the application for PA 08\_0212. Key facts and figures about the approved quarry are provided on the previous page and an overview of the approved activities and staged operations are outlined in Section 2.

In addition, a range of other management plans have also been prepared to guide operations within the Quarry. These include the following.

- Environmental Management Strategy.
- Transport Management Plan.
- Air Quality Management Plan.
- Water Management Plan.
- Landscape Management Plan.
- Aboriginal Cultural Heritage Management Plan.

It is noted that this plan relates to the area within the Quarry Site boundary which does not include the riparian zone adjacent to the Wingecarribee River. This area remains part of the residual property managed as a pastoral enterprise.



## 2. APPROVED ACTIVITIES AND STAGED OPERATIONS

### 2.1 APPROVED ACTIVITIES

The approved activities at the Quarry (**Figure 2**) comprise the following.

- Construction of visibility barriers to provide visual screening for the quarry operations.
- Establishment of an extraction area to extract clay/shale using standard ripping, pushing and loading techniques.
- Use of an existing Quarry access road and upgrading of two intersections.
- Transportation of up to 150 000t per year of quarry products via Berrima Road using articulated and rigid trucks not exceeding 19m in length.

The relevant limitations upon the approved activities nominated in Conditions within PA 08\_0212 are as follows.

- “The Proponent shall not carry out any development in the extraction area below a level of 640m AHD” *PA Condition 2(6)*.
- “The Proponent shall not extract more than 150 000 tonnes of extractive materials from the site in any calendar year” *PA Condition 2(7)*.
- “The Proponent shall not transport more than:
  - a) 150,000 tonnes of product from the site in any calendar year;
  - b) 68 laden trucks from the site in a day; and
  - c) 8 laden trucks from the site in an hour.

The approved quarry life is until 30 June 2045 and the approved hours of operation are outlined in **Table 1**.

**Table 1**  
**Hours of Operation**

Day	Extraction Operations	Clay/Shale Transportation
Monday – Friday	7:00am to 5:00pm	7:00am to 4:00pm
Saturday	8:00am to 1:00pm	8:00am to 1:00pm
Sundays and Public Holidays	None	None



## **2.2 STAGED OPERATIONS**

The sequence of extraction throughout the initial stages of the quarry will reflect the need to complete the construction of the central visibility barrier to the north of the southern section of the extraction area (**Figure 2**) using overburden, whilst gaining access to the underlying shale as efficiently as practicable. **Figure 3** displays the staging sequence throughout the life of the Quarry. The southern section would be extracted in four stages, namely Stages 1 to 4. Once extraction ceases in the southern section, extraction would commence in the northern section with extraction undertaken in three stages, namely Stages 5 to 7. The approximate sequence plan for extraction is as follows.

- |                |   |
|----------------|---|
| Year 1         | – Stage 1 extraction to provide material for central visibility barrier construction. Commence extraction of shale in Stage 2.      |
| Years 2 to 4   | – Complete extraction of shale in Stage 2.  |
| Years 5 to 14  | – Complete Stages 3 and 4 of extraction and complete extraction in southern section of extraction area.                             |
| Years 15 to 30 | – Commence extraction in Stage 5 to construct the northern visibility barrier. Complete extraction of Stages 6 and 7 progressively. |

## **3. CONSULTATION**

The following government agency consultation was undertaken during the preparation of this Plan.

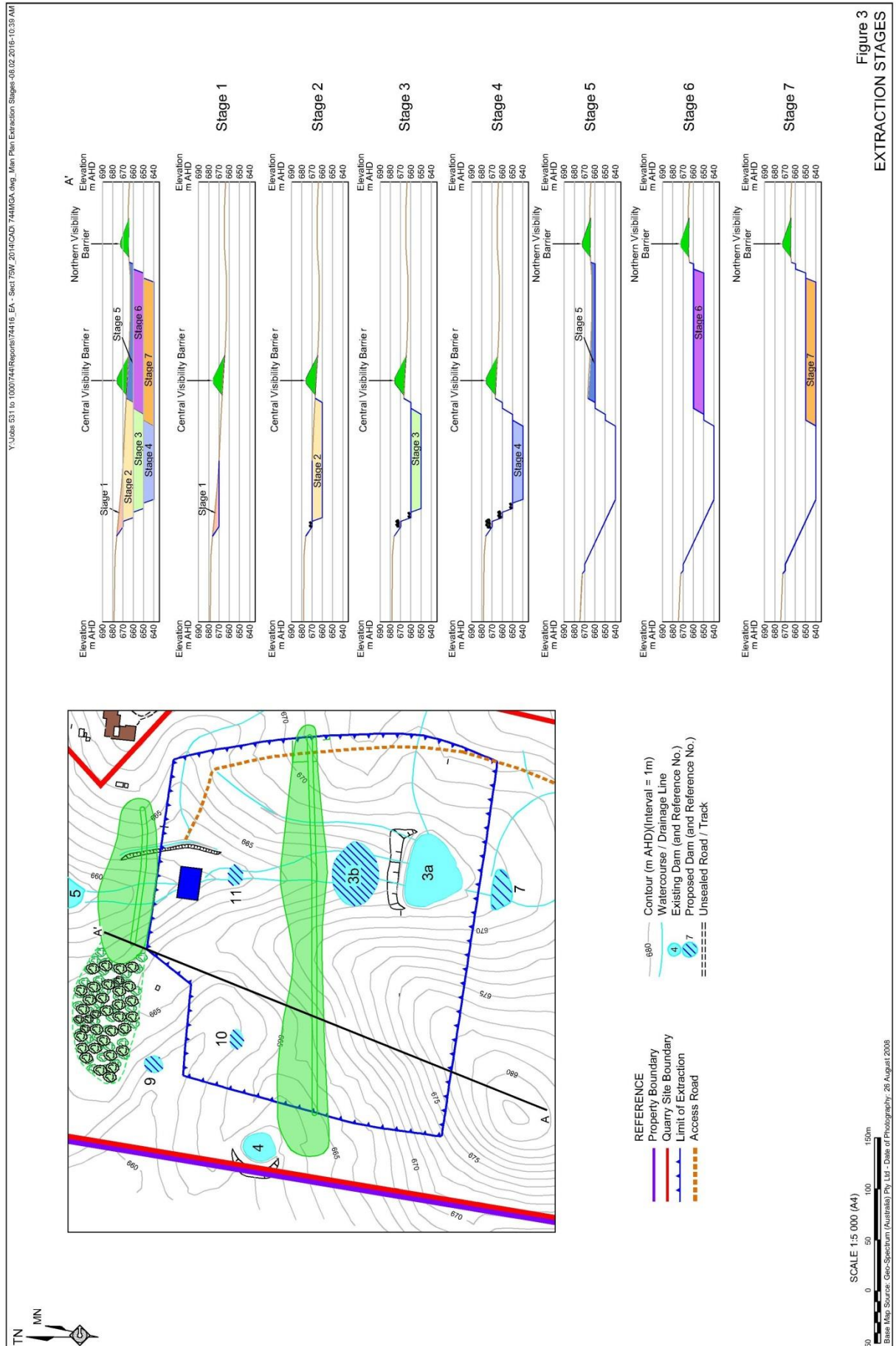
### **3.1 OFFICE OF ENVIRONMENT AND HERITAGE (OEH)**

An email was sent to the Office of Environment and Heritage (OEH) on 21 October 2015 requesting any requirements for this Plan. A response was received on 5 November 2015 with the following specific requirements.

- The LMP should incorporate native species appropriate to the local area.
- Section 9.2.3 discusses the revegetation planned within the Quarry Site.
- The riparian zone is required to be maintained in perpetuity by an appropriately qualified and experienced bush regenerator, to ensure ongoing function and viability of the riparian zone and maintain habitat connectivity.

It is noted that this requirements relating to the riparian zone adjacent to the Wingecarribee River is not addressed in this document as the Quarry Site Boundary does not incorporate the riparian zone. This zone remains within the residual property maintained as a pastoral enterprise and its management is not subject to the conditions of PA08\_0812.

OEH stated that providing their specific requirements were included in this Plan, they did not wish to give further input.



### **3.2 WINGECARRIBEE SHIRE COUNCIL**

An email was sent to Wingecarribee Shire Council on 22 October 2015 to confirm any requirements for this Plan. Council replied on 3 November 2015 and stated they did not have any specific requirements in addition to the requirements in PA 08\_0212. Council requested to view a draft version of this Plan. A copy of the draft plan was forwarded to Council on 8 February 2016 with a request for feedback by 22 February 2016. Council responded 10 March 2016 indicating Council had no further comments than those in earlier correspondence in its earlier correspondence relating to the Landscape Management Plan, Council had expressed its concern regarding the reduction in the reduced riparian buffer distance to the Wingecarribee River and its preference for the use of species from the Southern Highland Shale Woodland Endangered Ecological Community in revegetation on site. Both of these issues are consistent with those raised by OEH above and the responses above are equally applicable.

### **3.3 LANDHOLDER CONSULTATION**

Austral will contact landowners north of the Quarry Site that have views towards the extraction area (Residences 13 to 17 – see Section 8) prior to the commencement of extraction activities to discuss the program for the construction of the central visibility barrier. Ongoing consultation would be undertaken with these landholders as often as required to ensure the visibility mitigation measures implemented are effective.

### **3.4 WIDER COMMUNITY CONSULTATION**

Austral will maintain contact with the wider community through the required Community Consultative Committee (CCC). This committee will be established prior to the commencement of site activities. The CCC will meet at intervals considered appropriate by the committee.

## **4. LEGAL AND OTHER REQUIREMENTS**

Austral was granted PA 08\_0212 by the Director-General of Planning and Infrastructure on 7 July 2012 pursuant to Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Modification 1 of PA 08\_0212 was approved on 15 December 2015 to incorporate modifications to the Quarry associated with an alternate extraction area boundary. PA 08\_0212 includes conditions that Austral needs to comply with and sets out the matters that need to be addressed within this Plan. Relevant landscape-related conditions associated with PA 08\_0212 are reproduced in **Table 2**. **Table 3** presents the relevant rehabilitation and landscape management-related commitments from the Statement of Commitments incorporated within PA 08\_0212 and where each is addressed in this document.

**Table 2**  
**Rehabilitation and Landscape Management-related Project Approval Requirements**

Page 1 of 3

Condition	Condition	Plan Section																									
LANDSCAPE																											
3(3)	The Proponent shall construct the Visibility Barriers prior to carrying out any quarrying operations on site under this approval to the satisfaction of the Secretary. This condition does not prohibit the winning of extractive material on site to be used in the construction of the Visibility Barriers.	Section 10.2																									
3(3A)	<p>The Visibility Barriers and surplus overburden must be constructed to meet the dimensions specified in Table 1A, unless the Secretary agrees otherwise.</p> <p><i>Table 1A - Visibility Barriers and Surplus Overburden Stockpile Dimensions</i></p> <table><tr><th>Structure</th><th>Height</th><th>Base Width (m)</th><th>Length (m)</th><th>Surface Area (ha)</th></tr><tr><td>Central Barrier (minimum)</td><td>675 (m AHD)</td><td>30 - 45</td><td>420</td><td>1.5</td></tr><tr><td>Northern Barrier (minimum)</td><td>672 (m AHD)</td><td>35 - 50</td><td>160</td><td>0.7</td></tr><tr><td>Southern Barrier (minimum)</td><td>4 metres above the natural land surface</td><td>20</td><td>350</td><td>0.7</td></tr><tr><td>Overburden Stockpile (maximum)</td><td>683 (m AHD)</td><td>-</td><td>-</td><td>-</td></tr></table>	Structure	Height	Base Width (m)	Length (m)	Surface Area (ha)	Central Barrier (minimum)	675 (m AHD)	30 - 45	420	1.5	Northern Barrier (minimum)	672 (m AHD)	35 - 50	160	0.7	Southern Barrier (minimum)	4 metres above the natural land surface	20	350	0.7	Overburden Stockpile (maximum)	683 (m AHD)	-	-	-	Section 10.2
Structure	Height	Base Width (m)	Length (m)	Surface Area (ha)																							
Central Barrier (minimum)	675 (m AHD)	30 - 45	420	1.5																							
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Southern Barrier (minimum)	4 metres above the natural land surface	20	350	0.7																							
Overburden Stockpile (maximum)	683 (m AHD)	-	-	-																							
3(19)	The Proponent shall vegetate (with grasses, shrubs and trees) the Visibility Barriers as soon as practicable after the completion of the construction of the bunds, to the satisfaction of the Secretary.	Section 10.2																									
3(19A)	Prior to transporting any product from the site, the Proponent shall establish a 0.68 ha tree screen adjacent to the Northern Visibility Barrier, as shown on Figure 1 in Appendix A of PA 08_0212. The screen shall include native plant species from the <i>Southern Highlands Shale Woodland Endangered Ecological Community</i> .	Section 9.2.3																									
3(20)	<p>The Proponent shall not erect or display any advertising structure(s) or signs on the site without the written approval of the Director-General.</p> <p><i>Note: This condition does not require approval for any business identification, traffic management, and/or safety or environmental signs.</i></p>	Section 10.2																									
3 (21)	<p>The Proponent shall</p> <p>a) implement all reasonable and feasible measures to minimise the visual impacts and any off-site lighting impacts of the project; and</p> <p>b) maintain and improve the effectiveness of the bunds and vegetative screens, listed as A – F in the project layout plans in Appendix 2, over the life of the project.</p>	Section 10.2																									
3(33)	<p>The Proponent shall rehabilitate the site to the satisfaction of the DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy in the EA (Mod 1), and comply with the objectives in Table 6.</p> <p><i>Table 6 – Rehabilitation Objectives</i></p> <table><tr><th>Feature</th><th>Objective</th></tr><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 DRE 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></table>	Feature	Objective	Site (as a whole)	Safe, stable & non-polluting	Surface Infrastructure	To be decommissioned and removed, unless the DRE 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>	Section 11													
Feature	Objective																										
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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)	The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.	Section 11																									

**Table 2 (Cont'd)**  
**Rehabilitation and Landscape Management-related Project Approval Requirements**

Page 2 of 3

Condition	Condition	Plan Section
<b>LANDSCAPE (Cont'd)</b>		
3(35)	The Proponent shall prepare and implement a Landscape Management Plan for the project to the satisfaction of the Director-General. This plan must:	Section 3
	a) be prepared in consultation with OEH and Council, and submitted to the Director-General for approval prior to carrying out any development on site under this approval;	
	b) describe the short, medium and long term measures that would be implemented to:	Section 9
	• manage the remnant vegetation and habitat on site;	NA
	• rehabilitate the riparian land adjacent to the Wingecarribee River on site;	Sections 11.6, 12
	• ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;	
	c) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, including triggering remedial action (if necessary);	Section 11
	d) include a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:	Sections 11.6, 12
	• ensuring compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;	
	• enhancing the quality of existing vegetation and fauna habitat;	Section 9
	• restoring native endemic vegetation and fauna habitat within the biodiversity areas and rehabilitation area;	Section 9
	• maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area;	Section 9.1, 9.2
	• collecting and propagating seed;	NA
	• minimising the impacts on fauna on site, including undertaking pre-clearance surveys;	NA
	• controlling weeds and feral pests;	Section 9.1
	• controlling erosion;	Sections 9.1, 11.5
3(36)	• managing grazing and agriculture on site;	NA
	• controlling access; and	Section 7
	• bushfire management.	Section 9.3
	e) a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;	Section 11.6
	f) identify the potential risks to successful implementation of the rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate against these risks; and	Section 11.6
	g) include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 6
	Within 6 months of the approval of the Landscape Management Plan, the Proponent shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the rehabilitation of the site is implemented in accordance with the performance and completion criteria of the Landscape Management Plan. The sum of the bond shall be determined by:	Section 11.7
	a) calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and	
	b) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs; to the satisfaction of the Director-General.	

**Table 2 (Cont'd)**  
**Rehabilitation and Landscape Management-related Project Approval Requirements**

Page 3 of 3

Condition	Condition	Plan Section
<b>LANDSCAPE (Cont'd)</b>		
3(37)	Within 3 months of each Independent Environmental Audit (see condition 8 of schedule 5), the Proponent shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Director-General. This review must consider: a) the effects of inflation; b) the likely cost of implementing the biodiversity offset strategy and rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of quarrying operations) next; and the performance of the implementation of the biodiversity offset strategy and rehabilitation of the site to date.	Section 11.7
5(3)	The Proponent shall ensure that the Management Plans required under this approval are prepared in accordance with any relevant guidelines, and include: a) detailed baseline data;	NA
	b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Section 4
	c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 11.2
	d) a program to monitor and report on the: • impacts and environmental performance of the project; and • effectiveness of any management measures (see (c) above);	Section 9.1, 9.2, 10.2
	e) a contingency plan to manage any unpredicted impacts and their consequences;	Sections 11.6, 12, 16
	f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Sections 11.6, 14
	g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and	Section 15
	h) a protocol for periodic review of the plan. <i>Note: The Director-General may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i>	Section 13
		Sections 14, 15
		Sections 14, 15
		Section 17
5(5)	Within 3 months of the submission of an: a) annual review under condition 4 above; b) incident report under condition 7 below; c) audit report under condition 9 below; and d) any modifications to this approval, the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General. <i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.</i>	Section 17

**Table 3**  
**Statement of Commitments Requirements**

<b>Commitment</b>		<b>Plan Section</b>
All approved activities are undertaken in the area(s) nominated on the approved plans and figures (unless moved slightly to avoid individual trees).	1.1 Survey and mark the boundaries of the areas of disturbance on the ground.	Section 9.1
Minimisation of the spread of weeds, on and off Site	6.1 Quick establishment of a selected cover crop.	Section 11.2
	6.2 Spray weeds with an authorised herbicide	Section 9.1
	6.3 Ensure all earthmoving equipment is appropriately cleaned prior to being brought to the Quarry for each campaign.	Section 9.1
Reduce visible amenity impacts.	7.1 Plant trees screenings at the eastern side of the surplus overburden stockpile area to screen stockpiles from the east.	Section 9.2.3
	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.	Section 11
Conservation of topsoil resources.	9.1 Strip all available topsoil to a depth of approximately 0.15m from the surface of each extraction stage.	Section 9.1
	9.2 Wherever practicable, place stripped topsoil directly onto the constructed visibility barriers or areas prepared and awaiting rehabilitation.	
	9.3 Stockpile topsoil around the perimeter of the surplus overburden stockpile area for later reclamation if no areas are available. Limit topsoil stockpiles to no more than 2.0m in height to minimise adverse impacts upon the biological activity of the topsoil.	
	9.4 Broadcast a pasture seed mix to assist with temporary stabilisation if topsoil stockpiles are likely to remain for extended periods.	
	9.5 Avoid excessive handling of soil during the stripping and stockpiling operation and handling when the soils are wet to protect soil structure.	
	9.6 Restrict driving of machinery on the topsoil stockpiles, as well as the respread soil, to maximise soil aggregation and prevent compaction, particularly when the stockpiles are moist.	
	9.7 Place silt-stop fencing or similar immediately down-slope of stockpiles and visibility barriers where required, until a stable vegetation cover is established.	
Minimise the potential for soil contamination.	9.8 Restrict all refuelling and vehicle maintenance activities to designated areas which are either sealed, bunded or located with access to spill control kits.	Section 9.1
	9.9 Complete regular housekeeping and maintenance of vehicle maintenance areas.	Section 9.1

## 5. OBJECTIVES AND OUTCOMES

Table 4 presents the objectives and key performance outcomes for this Plan and the Quarry.

**Table 4**  
**Objectives and Key Performance Outcomes**

OBJECTIVES	KEY PERFORMANCE OUTCOMES
<b>Rehabilitation and Landscape Management</b>	
(a) To ensure compliance with all relevant project approval conditions, statements of commitment and reasonable community expectations.	(i) Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with the relevant government agencies.
(b) To implement appropriate progressive rehabilitation and landscape management and mitigation measures during all stages of the Quarry	(ii) All identified rehabilitation and landscape management and mitigation measures implemented.
(c) To appropriately manage site preparation works to ensure that suitable rehabilitation material remains for rehabilitation operations during all stages of the Quarry	(iii) Sufficient, viable rehabilitation materials are available for rehabilitation operations during all stages of the Quarry
(d) To ensure that the visual amenity of residences and public vantage points is not unacceptably impacted by Quarry-related activities.	(iv) Visual amenity management measures implemented and effective in a timely manner.
(e) To implement an appropriate complaints handling and response protocol	(v) Complaints (if any) handled and responded to in an appropriate manner.
(f) To implement appropriate corrective and preventative actions, if required.	(vi) Corrective and preventative actions implemented, if required
(g) To implement an appropriate incident reporting program, if required.	(vii) Incidents (if any) reported in an appropriate manner.

## 6. ROLES AND RESPONSIBILITIES

Table 5 presents the roles and responsibilities for the implementation of this *Landscape Management Plan*.

**Table 5**  
**Roles and Responsibilities**

<b>Roles</b>	<b>Responsibilities</b>
NSW Manufacturing Manager	Must ensure adequate resources are available to enable implementation of the Plan.
Quarry Manager/ Supervisor	Accountable for the overall environmental performance of the Quarry operations, including the following outcomes of this Plan. <ul style="list-style-type: none"> <li>• Implement management measures identified in Section 9 of this Plan.</li> <li>• Ensure all relevant information is made available to relevant government agencies and the public as described in Section 16 of this Plan.</li> </ul>
Environmental Officer	Manage the implementation of the following components of this Plan. <ul style="list-style-type: none"> <li>• Ensure measures identified in Section 9 of this Plan are correctly implemented.</li> <li>• Coordinate the consultation with the landowners to the north of the Quarry Site.</li> <li>• Inspecting rehabilitated progress as outlined in Section 11.6</li> <li>• Complaints handling and response as outlined in Section 13.</li> <li>• Incident reporting as outlined in Section 15.</li> <li>• Publication of monitoring data and reports as outlined in Section 16.</li> <li>• Review of this Plan as outlined in Section 17.</li> </ul>
All personnel	Ensure training and awareness induction has been undertaken. Compliance with this Plan.

## **7. COMPETENCE TRAINING AND AWARENESS**

All Austral personnel and contractors and their employees will undergo Company and site-specific inductions, incorporating basic information in relation to the operation of this plan as a component of the site induction program. The following areas will be covered in the induction.

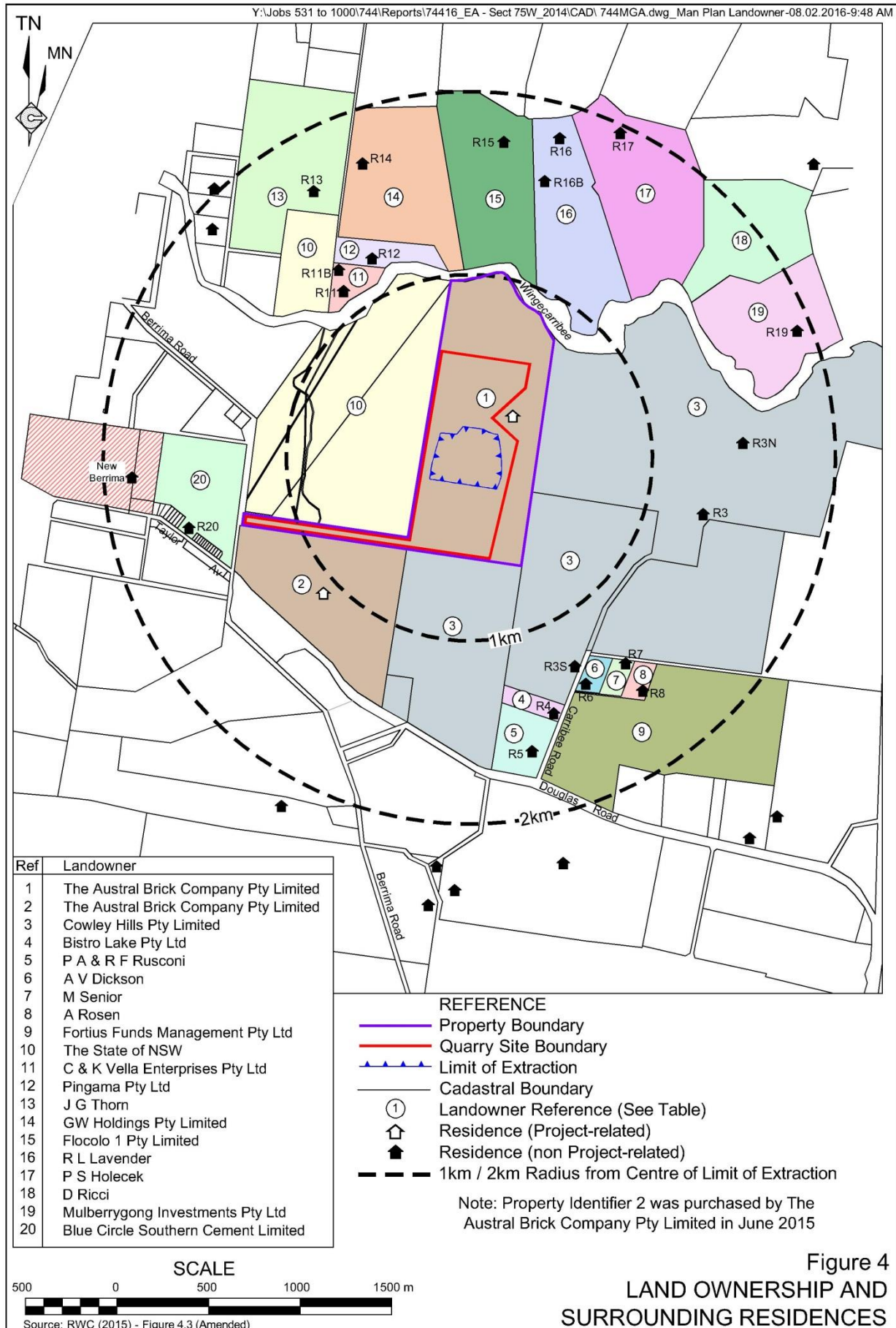
- Areas for which non-approved access is not permitted, typically, the non-operational sections of the Site such as revegetation and rehabilitation areas.
- All equipment brought onto site for each campaign is fully cleaned before entering the Quarry Site.
- Areas to be progressively rehabilitated.
- The ongoing management of visibility barriers and vegetation screens.

The Quarry Manager will be responsible for ensuring the appropriate training is included in the induction.

Access to the Quarry will be restricted to authorised personnel.

## **8. SURROUNDING RESIDENCES**

**Figure 4** displays the locations of all residences within 2km of the Quarry. Section 10.1 describes the visibility of the Quarry from surrounding residences.



## **9. SOIL AND VEGETATION MANAGEMENT MEASURES**

### **9.1 PREPARATORY ACTIVITIES AND SOIL MANAGEMENT**

The following management measures will be implemented during each preparation campaign prior to Stages 1 and 5, during soil stripping and stockpiling and construction of each visibility barrier.

- All areas to be cleared will be clearly pegged on the ground.
- All equipment operators will be made aware of the areas to be prepared.
- Should it be necessary, an authorised herbicide may 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 any clearing.
- Groundcover vegetation and topsoil will be stripped in all areas of disturbance, where practicable, using a bulldozer or scraper. Topsoil will typically be stripped to a depth of approximately 0.15m.
- Subsoil will be stripped using a bulldozer or scraper. Subsoil, will be stripped to a depth of approximately 0.6m below the base of the topsoil.
- If practicable, soil materials will be stripped when they are moderately moist (but not overly wet) to preserve soil structure.
- The initial topsoil and subsoil materials stripped will be stockpiled separately adjacent to the footprint of each barrier.
- Subsoil and topsoil will be placed directly onto the initial northern sections of the visibility barriers once they are constructed.
- 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.
- Subsoil and topsoil initially stockpiled will be spread across the remaining northern face 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 to assist with temporary stabilisation if topsoil stockpiles are likely to remain for extended periods.
- Driving of machinery on stockpiles will be avoided where possible to minimise soil compaction and maximise soil aggregation.
- To minimise the spread of weeds, earthmoving equipment will be appropriately cleaned prior to being brought to the Quarry for each campaign.
- 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.

## 9.2 VEGETATION MANAGEMENT

### 9.2.1 Existing Vegetation

As part of the 2010 Environmental Assessment, two vegetation communities were identified within the Quarry Site (Geoff Cunningham Natural Resource Consultants, 2010).

- Community 1 – Cleared Pastureland Community; and
- 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 and sown with ryegrass with a range of weeds evident within the groundcover. A small number of established eucalypts occur within the Quarry Site but are not native to Berrima area. A row of non-indigenous trees traverse the extraction area.

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

### 9.2.2 Vegetation Disturbance

A total of approximately 14ha of Community 1 will be disturbed by Quarry operations. None of the area of Community 2 will be disturbed by Quarry operations, and as such there will be no disturbance of any flora species native to the area. There will be no impacts to any threatened flora species or threatened ecological communities, and trees to be removed are not potential habitat trees.

The absence of hollow-bearing trees or trees providing fauna habitat within the extraction area will negate the need for any pre-clearance fauna surveys.

### 9.2.3 Revegetation

The following tree planting will take place at the Quarry (as shown on **Figure 2**).

- Austral will plant additional trees 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 will be planted during the site establishment and construction phase on the southeastern periphery of the Surplus Overburden Stockpile Area. Species to be planted will include *Eucalyptus dives* (Broadleaf Peppermint), *E. mannifera* (Brittle Gum), *E. radiata subsp. radiata* (Narrow-leaved Peppermint) and selected wattles.

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

Reliance will be placed upon natural regeneration and use of standard pasture seed mixes for the revegetation of the visibility barriers on site rather than harvesting seed from the property.

### **9.3 BUSHFIRE MANAGEMENT**

The Quarry site is predominantly cleared land, and as such does not present a high bushfire risk. Removal of 14ha of cleared pastureland that exists prior to establishment of the Quarry will reduce the bushfire risk at the Quarry Site.

## **10. MANAGEMENT OF VISUAL AMENITY**

### **10.1 VISIBILITY OF QUARRY**

Views of the Quarry will be shielded from the south, east and west by natural topography and existing tree windrows. Without mitigation measures, the southern side of the extraction area will be visible from a number of elevated properties on the northern side of the Wingecarribee River. There will be no direct line of sight to active extraction faces from any residence from Extraction Stage 2 onwards due to the construction of visibility barriers. Residences 13 and 16B which are located approximately 1.5km and 1.4km respectively from the closest edge of the extraction area (**Figure 4**) have clearest views towards the extraction area. Residences 14 and 16 also have restricted views over the extraction area. All other residences on the northern side of the river are screened from the extraction area by vegetation or natural topography, or the extraction area is only visible at a considerable (>2km) distance. It is also noted that existing views to the south from residences north of the river include the Berrima Cement plant and the Inghams Stock Feed plant. **Figure 5** presents visual amenity sections from Residences 13 and 16B throughout the life of the quarry.

### **10.2 MITIGATION MEASURES**

The Quarry will change the visual landscape through the progressive clearing of approximately 14ha of pasture, the establishment of visibility barriers and temporarily through the introduction of earthmoving equipment. However, due to the existing topography and the implementation of a number mitigation measures, the altered landscape will be largely screened from view or be vegetated consistent with a range of native and exotic vegetation and pasture in the area.

In order to minimise adverse visual amenity impacts associated with the Quarry, the following management and mitigation measures will be implemented.

- A central visibility barrier will be constructed during site establishment, prior to commencing extraction of product. This barrier will be approximately 8m to 12m high (approximately 675m AHD), approximately 30m to 45m wide (north to south), and approximately 420m long (east to west). This barrier will ensure limited direct line of sight to active extraction areas from Stage 1 to Stage 4 of extraction.



- The central visibility barrier batter will be shaped, and constructed with a 1:5 (V:H) northern slope, spread with topsoil from active areas within the extraction area and planted with fast growing shrubs and trees to minimise the visibility of the extraction area highwall from the residences to the north.
- Construction of the northern visibility barrier will occur prior to extraction Stage 5. This barrier will be approximately 8m-9m high (approximately 672m AHD), approximately 35m-50m wide (north to south), and approximately 160m long (east to west). This barrier will ensure limited direct line of sight to active extraction areas from Stage 5 to Stage 7 of extraction. The northern batter of the barrier will also be constructed with a 1:5 (V:H) slope.
- The southern visibility barrier will be constructed after completion of the central visibility barrier if surplus material is available. This barrier will be up to 4m high, up to 20m wide (north to south), and up to 350m long (east to west).
- All outside slopes and tops of the visibility barriers will be revegetated with a quick growing cover crop for rapid stabilisation and a seed mix of native grasses and indigenous shrubs and known to have high establishment success.
- Additional tree planting will be undertaken within the northern tree screen (as detailed in Section 9.2.3).
- A tree screen will be planted around the Surface Overburden Stockpile Area (**Figure 2**) – as detailed in Section 9.2.3.
- Following the removal of material to construct the central visibility barrier, the 670m AHD bench will be rehabilitated with overburden placed on the bench and revegetated.
- The overall quarry design ensures that the extraction of Stages 2 to 7 will be topographically lower than the visibility barriers and shielded from direct line of sight from the north.
- At the end of Stage 4 of extraction, the material within the Central Visibility Barrier will be relocated to the extraction area against the established southern benches and shaped to produce a permanent interim landform (see Section 11.4).
- In accordance with *PA Condition 3(20)*, no advertising signs or structures will be erected at the Quarry (excluding business identification, safety, environmental, and traffic management signs).

## 11. REHABILITATION

### 11.1 INTRODUCTION

Austral will implement and adopt a progressive approach to the rehabilitation of disturbed areas within the Quarry Site to ensure that, where practicable, areas where extraction and activities are completed are quickly shaped and vegetated to provide a stable landform.

The proposed final landform, rehabilitation procedures and the selection of the revegetation species have been based on the long-term objective of returning as much of the disturbed area to its previous use as grazing land.

### 11.2 REHABILITATION OBJECTIVES

Austral's rehabilitation objectives for all areas of quarry-related surface disturbance within the Quarry can be defined in the short term and long term. In the short term, the objectives are as follows.

- To stabilise all earthworks, drainage lines and disturbed areas no longer required for extraction-related activities in order to minimise the risk of erosion, sedimentation and air quality impacts on the environment surrounding the Quarry.
- To minimise the visual impacts of the extraction area, particularly from those residences on the northern side of Wingecarribee River through progressive rehabilitation.

Austral will ensure that progressive rehabilitation is undertaken as soon as practicable once an area is no longer required for extraction or transportation-related operations.

In the longer term, Austral's objective is to progressively provide a low maintenance, stable and safe landform that provides land capabilities on the completed extraction floor comparable with the pre-extraction land capabilities.

### 11.3 FINAL LAND USE

Austral plans to establish improved pasture on the floor of the quarry and return it to its previous use as grazing land. The slopes of the basin walls will be generally in the order of 1:3 (V:H) and will be vegetated with a pasture mix and occasional stands of native trees and shrubs.

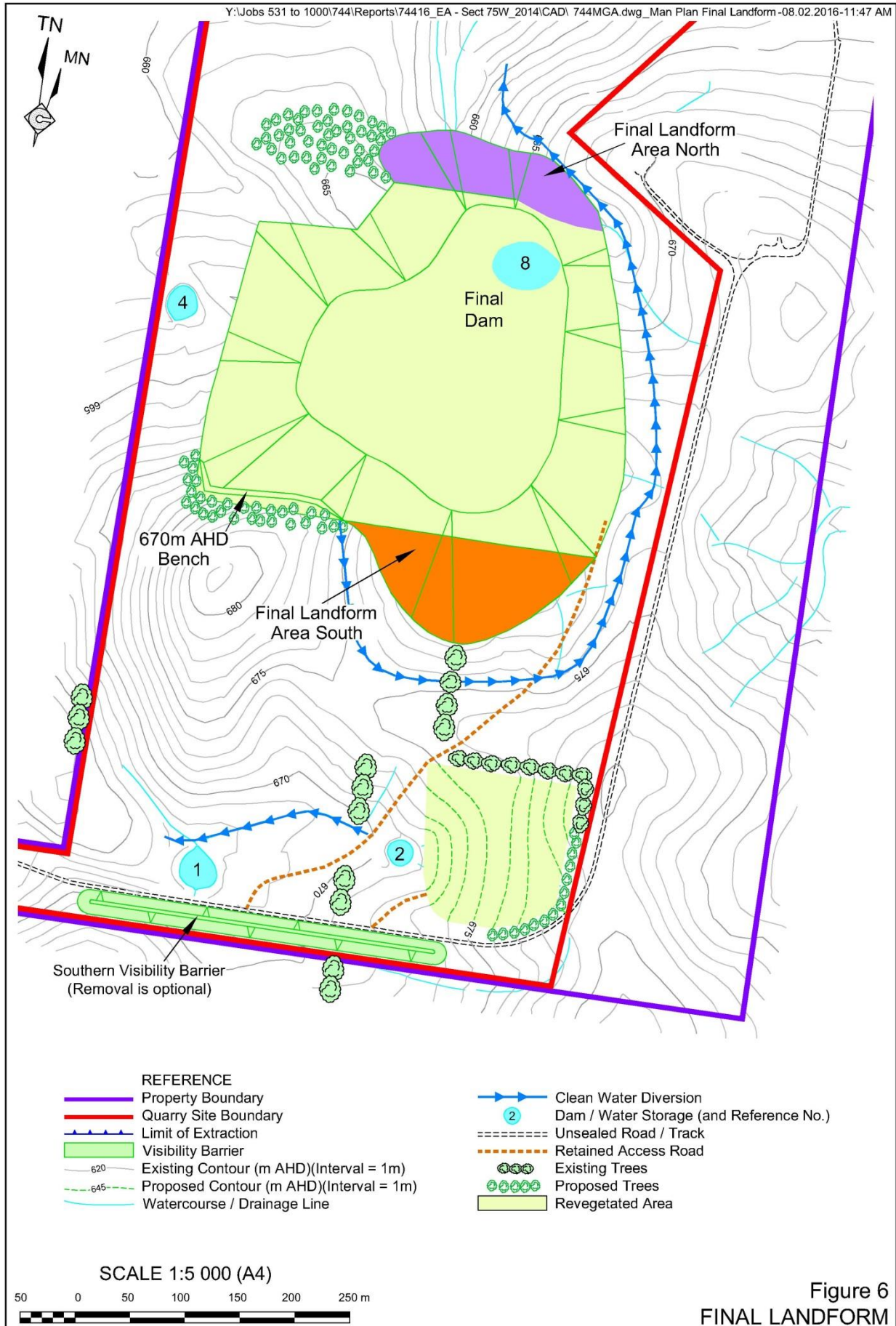
### 11.4 APPROVED FINAL LANDFORM

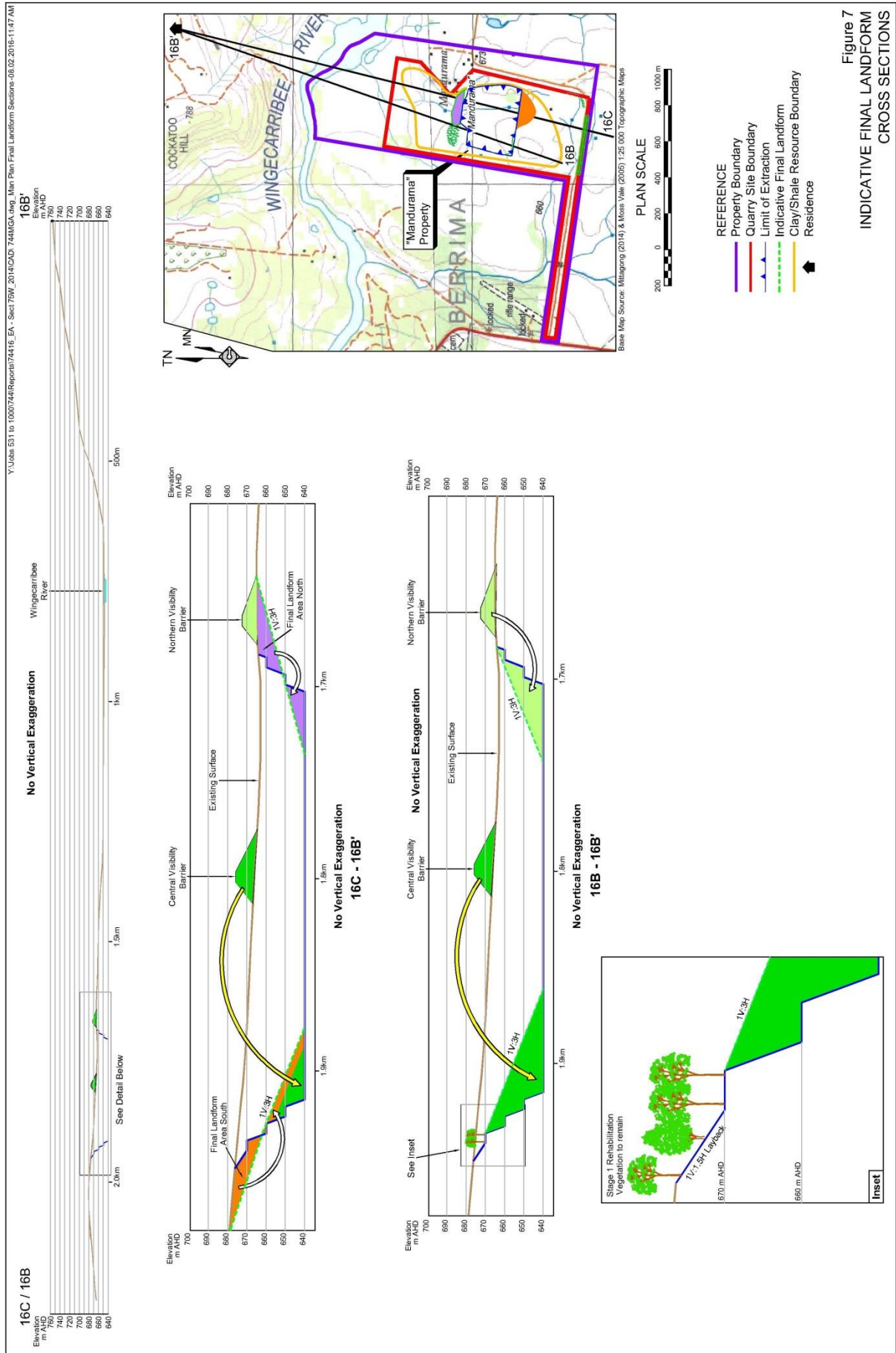
The final landform (**Figure 6**) incorporates final undulating slopes of approximately 1:3 (V:H), utilising material available from the Central and Northern Visibility Barriers and some recovery of material from the southern side of the extraction area and the footprint beneath the Northern Visibility Barrier at the end of the Quarry life.

The final landform will include a dam with a capacity of at least 2ML in the final sump location (**Figure 6**), collecting runoff from the 11.7ha internal area of the extraction area.

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 (see **Figure 7**), as outlined below.
  - On the western section of the extraction area void at the end of Stage 4 (see cross section 16B' – 16B on **Figure 7**), the material will be placed up to the approximate level of the 670m bench, shaped to a final landform of approximately 1:3 (V:H) and stabilised with a permanent grass vegetative cover. The 670m bench will have established (15 year old) 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 (see cross section 16C – 16B on **Figure 7**), 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 of approximately 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, that is creating a final landform of approximately 1:3 (V:H) and stabilised with a permanent grass vegetative cover - see cross section 16B' – 16B on **Figure 7**.
- 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 dozer pushed into the extraction area void, as shown on cross section 16B' – 16C on **Figure 7**, to create a final landform of approximately 1:3 (V:H). This underlying material will make up the shortfall of material volumes required for the creation of the final landform that could not be recovered from the Northern Visibility Barrier itself, whilst ensuring that the maximum amount of material could be extracted with only a minor and temporary disturbance footprint increase.





## 11.5 REHABILITATION ACTIVITIES

Rehabilitation will be undertaken progressively as soon as practicable after sections of the Quarry are no longer required for extraction or transport-related activities. The following procedures will be implemented throughout each rehabilitation program to ensure the rehabilitation objectives identified in Section 11.2 are achieved.

- a) Sediment and erosion controls will be re-instated as required around all areas of disturbance.
- b) The operational haul road into the extraction area will be regraded to suit any changed grades of the basin walls and used as an access track into the basin within the final landform.  
  
The floor of the excavation area will be deep ripped following the progressive completion of excavation and covered with available overburden subsoil. Topsoil will be applied over the deposited overburden/subsoil.
- c) The surface of the placed topsoil will be left even but ‘roughened’ to assist with infiltration of water and seed retention.
- d) Pasture species will be seeded over all arable areas and fertilisers applied as recommended. The pasture species will be selected by Austral’s farm manager reflecting the stock being carried on the property at that time.
- e) Stock will be prevented from entering rehabilitated areas until pasture is well established.
- f) The area to be rehabilitated will be fenced and signs erected to restrict access to the area.
- g) Rehabilitation will be monitored regularly as described in Section 11.6.

## 11.6 REHABILITATION MONITORING

Austral’s 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 Austral’s Environmental Officer against the short and long term rehabilitation objectives outlined in Section 11.2.

During regular inspections, the following will be monitored.

- Evidence of any erosion or sedimentation from areas with establishing vegetation cover.
- Success of pasture establishment, where present.
- Incidence of pasture attack by pests.
- Natural regeneration of native species on visibility barriers and benches within the extraction area.
- Adequacy of drainage controls.
- General stability of the rehabilitation areas.

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 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, Austral 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 11.2 are met to the satisfaction of the relevant government agencies.

## **11.7 CONSERVATION AND REHABILITATION BOND**

Austral will provide DPE with an estimate of the bond to rehabilitate the area to be disturbed within the first three years of operation, i.e. in accordance with the provisions of *PA Condition 3(36)*. This estimate would form the basis of the Conservation and Rehabilitation bond to be issued by DPE.

Austral would submit an updated estimate for the bond every three years, i.e. within three months of each Environmental Audit being submitted to DPE, i.e. in accordance with the provisions of *PA Condition 3(37)*.

## **12. EVALUATION OF COMPLIANCE**

An annual review of rehabilitation progress will be undertaken to assess compliance with the relevant rehabilitation conditions. The results of this review will be included in each *Annual Review* (see Section 17).

### 13. CORRECTIVE AND PREVENTATIVE ACTIONS

In the event that a non-compliance with any landscape-related conditions or commitments is identified, or any issues arise relating to landscape management, rehabilitation, vegetation or visual amenity, there will be a review, which will seek to determine:

- the primary cause of the non-compliance or issue;
- any contributing factors which led to the non-compliance or issue;
- whether appropriate controls were implemented to prevent the non-compliance or issue; and
- corrective and preventative measures that may be implemented to prevent a recurrence of the non-compliance or issue.

Corrective and/or preventative actions will be assigned to relevant personnel of either Austral or its contractor. Actions will be communicated internally through planning meetings and toolbox talks and outstanding actions will be monitored for their effectiveness upon completion.

### 14. PLAN REVIEW

In accordance with PA 08\_0212 *Condition 5(5)*, this *Landscape Management Plan* will be reviewed and, if required, revised within 3 months of:

- the submission of an annual review under *PA Condition 5(4)*;
- the submission of an incident report under *PA Condition 5(7)*;
- the submission of an audit report under *PA Condition 5(9)*; and
- any modification to the conditions of PA 08\_0212.

The Quarry Manager will be responsible for the review of this Plan.