



OBERON**QUARRIES**

LANDSCAPE AND REHABILITATION

MANAGEMENT PLAN

Oberon Quarries Pty Ltd

V6 2025

Document Status

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1.0 Introduction

1.1 Background

Oberon Quarries Pty Ltd (Oberon Quarries) operates Oberon Quarry (the Quarry), an existing hard rock quarry located approximately 4 kilometres (km) south of Oberon, New South Wales (NSW) (refer to **Figure 1.1**). Oberon Quarries has been operating at the site since 1995. The original Oberon Quarries Development Consent (DA92/164) was granted on 1 October 1993 by the NSW Minister for Planning and was surrendered on 2 December 2015. The existing operations have been developed in accordance with DA92/164 (incorporating the 2000, 2002, 2004, 2007 and 2013 modifications) and Environment Protection Licence (EPL) 4442.

On 14 September 2015, Oberon Quarries was granted Development Consent (SSD_6333) (Development Consent) for Oberon Quarry Continuation Project by the NSW Minister for Planning to extend the life of the Quarry for an additional 30 years.

The Development Consent allows for continued operations of the Quarry including increasing the extraction area by approximately 1 hectare (ha) to avoid sterilisation of a small section of additional high quality basalt resources. The Development Consent SSD 6333 provides for a maximum production level of 400,000 tonnes per annum (tpa) and the transport of up to 3,000 tonnes per day of quarry product from the Quarry.

Oberon Quarries is committed to implementing continued quarrying operations in the context of updated and contemporary environmental management requirements. This Landscape and Rehabilitation Management Plan (LRMP) has been prepared in accordance with Schedule 3, Condition 24 of the Development Consent.

1.2 Project Description

The Oberon Quarries Development Consent (SSD_6333) provides for the following:

- 1.2.1 continued quarrying operations within the approved project area as defined by SSD_6333 until 30 August 2045
- 1.2.2 maximum production level of 400,000 tpa and transport of up to 3,000 tonnes per day of product from the Quarry
- 1.2.3 replacement of some of the existing screening plant, reconfiguration of the alignment of screens and the inclusion of an additional cone crusher
- 1.2.4 inclusion of a second diesel fuel storage tank of approximately 28,000 litre capacity
- 1.2.5 inclusion of a 1.0 ha extension to the existing extraction area to avoid the sterilisation of approximately 500,000 tonnes of high quality basalt resource
- 1.2.6 inclusion of a Finlay 750e Hydrasander (or equivalent) to separate silt and clay from sand size particles in the crusher fines
- 1.2.7 duplication of approximately a 180 metre (m) section of the internal haul road to improve road safety and
- 1.2.8 continued extraction of the high quality basalt from the existing extraction areas as required, with extraction at times occurring on the upper and lower benches.

1.3 Purpose and Scope

The purpose of this LRMP is to describe the landscape and rehabilitation management strategies, procedures, controls and monitoring programs that are to be implemented as a result of quarrying related disturbance impacts and rehabilitation requirements as described in the Proposed Extended Life of Operations and Development Changes to Oberon Quarry Environmental Impact Statement (EIS) (Umwelt, 2015). The area covered by this plan is the approved project boundary as shown on **Figure 1.1**. The approved quarrying plan has been designed to include a number of biodiversity impact mitigation factors and rehabilitation design factors. These measures are further described in **Section 5.0**.

This LRMP also addresses the requirements detailed in the Development Consent. The Development Consent conditions and Statement of Commitments relevant to this plan is provided in **Sections 2.1** and **2.2** respectively, including a checklist of where each condition has been addressed within this document.

The LRMP outlines the control measures to be implemented as part of the continued operations at the Quarry to minimise the potential impacts on biodiversity as a result of quarrying activities and to minimise risks associated with unsuccessful post-quarrying rehabilitation of the site.

1.4 Objectives

The objectives of the LRMP including the following:

- 1.4.1 detail the controls to be implemented to minimise impacts to biodiversity as a result of clearance activities for approved disturbance areas and fauna habitat features
- 1.4.2 address the relevant conditions of the Development Consent and approvals (refer to **Section 2.1**)
- 1.4.3 establish management techniques associated with the clearance of vegetation for the Quarry pit extension area
- 1.4.4 establish general management requirements for the rehabilitation of the Quarry pit
- 1.4.5 establish rehabilitation monitoring requirements and
- 1.4.6 detail the reporting requirements associated with carrying out conservation management strategies detailed in this plan.



Figure 1.1 Locality Plan

2.0 Regulatory Requirements

2.1 Development Consent

The Development Consent for the Oberon Quarry Continuation Project was assessed under the *Environmental Planning and Assessment Act 1979* (EP&A Act). Approval for the project was granted by the Minister for Planning on 14 September 2015. The requirement for this LRMP arises from Schedule 3, Conditions 22 to 26 of the Oberon Quarry Development Consent. The requirements from the Development Consent relating to landscape and rehabilitation, and where these requirements are addressed within this document, are provided in **Table 2.1**.

Table 2.1 Development Consent Conditions

Conditions		Addressed in Section														
Schedule 3 – Environmental Performance Conditions																
Rehabilitation Objectives																
22.	The Applicant shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy set out in the EIS and the conceptual final landform shown in Appendix 3 and must comply with the objectives in Table 5. Table 5: Rehabilitation Objectives <table><tr><th></th><th></th></tr><tr><td>Site (as a whole)</td><td> • Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land </td></tr><tr><td>Surface Infrastructure</td><td> • Decommissioned and removed, unless DRE agrees otherwise </td></tr><tr><td>Quarry Benches</td><td> • Landscaped and vegetated using native tree and understorey species </td></tr><tr><td>Quarry Pit Floor</td><td> • Landscaped and revegetated using improved pasture species, native trees and understorey species </td></tr><tr><td>Final Void</td><td> • Minimise the height and slope of batters • Minimise the drainage catchment </td></tr><tr><td>Community</td><td> • Ensure public safety • Minimise the adverse socio-economic effects of quarry closure </td></tr></table>			Site (as a whole)	• Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land	Surface Infrastructure	• Decommissioned and removed, unless DRE agrees otherwise	Quarry Benches	• Landscaped and vegetated using native tree and understorey species	Quarry Pit Floor	• Landscaped and revegetated using improved pasture species, native trees and understorey species	Final Void	• Minimise the height and slope of batters • Minimise the drainage catchment	Community	• Ensure public safety • Minimise the adverse socio-economic effects of quarry closure	This document
Site (as a whole)	• Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land															
Surface Infrastructure	• Decommissioned and removed, unless DRE agrees otherwise															
Quarry Benches	• Landscaped and vegetated using native tree and understorey species															
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Final Void	• Minimise the height and slope of batters • Minimise the drainage catchment															
Community	• Ensure public safety • Minimise the adverse socio-economic effects of quarry closure															

Conditions		Addressed in Section
Schedule 3 – Environmental Performance Conditions Progressive Rehabilitation		
23.	The Applicant 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 stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation. Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in future.	Section 5.0
Schedule 3 – Environmental Performance Conditions Landscape and Rehabilitation Management Plan		
24.	The Applicant shall prepare and implement a Landscape and Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must:	
	(a) be submitted to the Secretary for approval within 6 months of the date of this consent, unless otherwise agreed by the Secretary;	Appendix 1
	(b) provide details of the conceptual final landform and associated land uses for the site;	Section 4.3
	(c) describe the short, medium and long-term measures that would be implemented to ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent;	Section 5.0
	(d) include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following the 3 years covered by the initial approval of the plan) including the procedures to be implemented for:	
	maximising the salvage of environmental resources within the approved disturbance area for beneficial reuse;	Section 5.3.1
	protecting vegetation and fauna habitat outside the approved disturbance area on-site;	Section 5.3.2
	minimising the impacts on native fauna;	Sections 5.1 and 5.2
	landscaping the site to minimise visual and lighting impacts;	Section 5.3.3
	reviewing improved pasture species and application rates;	Section 5.3.4
	controlling weeds and feral pests;	Sections 5.6 and 5.7
	controlling erosion;	Section 5.2.3
	controlling access; and	Section 5.2.4
	bushfire management;	Section 5.2.5

Conditions		Addressed in Section
	(e) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;	Section 7.0
	(f) identify the potential risks to the successful rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate these risks; and	Section 10.0
	(g) include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 11.0
Schedule 3 – Environmental Performance Conditions		
Rehabilitation Bond		
25.	Within 6 months of the approval of the Landscape and Rehabilitation Management Plan, the Applicant shall lodge a Rehabilitation Bond with the Department to ensure that the rehabilitation of the site is implemented in accordance with the performance and completion criteria set out in the plan and relevant conditions of this consent. The sum of the bond shall be determined by: (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 Secretary. Notes: • If capital and other expenditure required by the Landscape and Rehabilitation Management Plan is largely complete, the Secretary may waive the requirement for lodgement of a bond in respect of the remaining expenditure. • If the rehabilitation of the site is completed to the satisfaction of the Secretary, then the Secretary will release the bond. If the rehabilitation of the site is not completed to the satisfaction of the Secretary, then the Secretary will call in all or part of the bond, and arrange for the completion of the relevant works.	Noted
Schedule 3 – Environmental Performance Conditions		
Landscape and Rehabilitation Management Plan		
26.	Within 3 months of each Independent Environmental Audit (see condition 10 of Schedule 5), the Applicant shall review, and if necessary revise, the sum of the Rehabilitation Bond to the satisfaction of the Secretary. This review must consider the: (a) effects of inflation; (b) likely cost of rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the development); and (c) performance of the implementation of rehabilitation of the site to date.	Noted

Conditions		Addressed in Section
Schedule 5 – Environmental Management, Reporting and Auditing Management Plan Requirements		
2.	The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	
	(a) detailed baseline data;	Section 3.0
	(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 development or any management measures;	Sections 2.0 and 4.0
	(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 5.0
	(d) a program to monitor and report on the: - impacts and environmental performance of the development; and - effectiveness of any management measures (see (c) above);	Section 7.0
	(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 8.3
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 9.0
	(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 8.0
	(h) a protocol for periodic review of the plan.	Section 9.0
Schedule 5 – Environmental Management, Reporting and Auditing Annual Review		
9.	By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:	Section 8.1
	(a) describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;	

Conditions		Addressed in Section
	(b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this consent; • monitoring results of previous years; and • relevant predictions in the EIS;	
	(c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;	
	(d) identify any trends in the monitoring data over the life of the development;	
	(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	
	(f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	
Schedule 5 – Environmental Management, Reporting and Auditing Access to Information		
12	Within 6 months of the date of this consent, the Applicant shall:	
	(a) make the following information publicly available on its website: • The documents listed in condition 2 of Schedule 2; • current statutory approvals for the development; • all approved strategies, plans and programs required under the conditions of consent; • a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of the consent, or any approved plans and programs; • a complaints register, updated monthly; • the annual reviews of the development; • any independent environmental audit, and the Applicant's response to the recommendations in any audit; and • any other matter required by the Secretary; and	Section 8.0
	(b) keep this information up-to-date, to the satisfaction of the Secretary.	Section 9.0

2.2 Statement of Commitments

The Statement of Commitments relevant to the NMP, and where they are addressed in this document, is detailed in **Table 2.2**.

Table 2.2 Statement of Commitments

Commitment	Addressed in Section
To ensure the ecological impacts of the quarry are minimised, Oberon Quarries has committed to implementing the following management and mitigation measures:	
installing survey pegs to mark the extent of extraction	Section 6.0
create a stable final landform within the quarry pit consisting of self-sustaining vegetation communities characteristic of the pre-quarry environment;	Section 5.0 and 7.0
progressively conduct rehabilitation and revegetation if the post-quarry area over the life of the operations and as quarrying operations of the second bench allow (refer to Section 6.18)	Section 5.0
minimising the extent of vegetation clearance to that associated with the next blast area	Section 5.1
identifying the weed management controls for the Project Area, i.e. types of weeds known to be present, required control methods and frequencies, as well as monitoring frequencies.	Section 5.2.1

3.0 Baseline Data

3.1 Existing Environment

The original flora survey of the whole of the Project Area was undertaken as part of the 1992 EIS (Resource Planning, 1992). The survey found the area to be largely cleared of native vegetation and the grasslands improved with introduced grasses for grazing of sheep. Remnants of native vegetation were found on the slopes of Racecourse Hill and Racecourse Creek.

As detailed in the Proposed Extended Life of Operations and Development Changes to Oberon Quarry EIS (Umwelt, 2015) on 24 September 2013 an ecological assessment was conducted of two proposed disturbance areas and the surrounding area within the Oberon Quarry proposed operations area. A 1.0 ha triangular paddock on the south-western boundary of the existing extraction area and a 0.5 ha area adjacent to the existing haul road were surveyed in detail and the surrounding ecological context assessed.

The 1.0 ha triangular paddock was found to have been cleared of native vegetation and comprised improved grassland for grazing. Dominant species were cocksfoot, phalaris, prairie grass, white clover, sorrel, capeweed and spear thistle. Vegetation within this area was consistent with that found in the adjoining sections of the approved extraction area that have not been cleared yet.

The north-east fence line of the triangular paddock consisted of a planted windbreak of the introduced species, Mexican cypress. The surrounding land was also consistently disturbed with active quarry land occurring to the north, north-east and east. Paddocks to the south and west also supported improved pastures for stock grazing. Scattered eucalypt trees were visible in the wider area. With the exception of the Mexican cypress windbreak, the triangular paddock did not contain any tree or shrub cover and provided little fauna habitat.

The vegetation along proposed haul road widening area comprised introduced pasture grasses and weeds, as well as a planted treeline of Eucalypt trees. The modified groundlayer was dominated by cocksfoot, common bracken, phalaris, sweet briar, blackberry, spear thistle and white clover. Fauna habitat was limited to the planted eucalypt trees and grassy understorey. While 12 bird species were recorded in or adjacent to the proposed haul road widening area, most were recorded in the vicinity of the proposed haul road widening area or were moving between native eucalypt woodland to the south-west and native eucalypt woodland to the north-east. The removal of the proposed haul road widening area is unlikely to affect the level of connectivity for fauna species due to the small size of the area and the proximity of nearby woodland areas.

No suitable habitat for threatened fauna or flora species, endangered populations (EPs) or threatened ecological communities (TECs) was identified within the proposed disturbance areas. Given the lack of suitable habitat for threatened fauna or flora species, EPs or TECs in both proposed disturbance areas, and the small size of both areas, the removal of proposed disturbance areas is unlikely to significantly impact on any threatened fauna or flora species, EPs or TECs.

4.0 Rehabilitation Objectives and Criteria

4.1 Rehabilitation Objectives

Rehabilitation of the quarry pit will be undertaken in accordance with Table 5 of the Development Consent and are reproduced as **Table 4.1**.

Table 4.1 Rehabilitation Objectives

Feature	Objective
Site (as a whole)	• Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface Infrastructure	• Decommissioned and removed, unless DRE agrees otherwise
Quarry Benches	• Landscaped and vegetated using native tree and understorey species
Quarry Pit Floor	• Landscaped and revegetated using improved pasture species, native trees and understorey species
Final Void	• Minimise the height and slope of batters • Minimise the drainage catchment
Community	• Ensure public safety • Minimise the adverse socio-economic effects of the Quarry closure

4.2 Preliminary Rehabilitation and Closure Criteria

Rehabilitation and closure criteria will be utilised to demonstrate achievement of rehabilitation objectives. The rehabilitation undertaken on the site will be signed off by a suitably qualified expert to the satisfaction of the Secretary. The preliminary closure and rehabilitation criteria for the Quarry are outlined in **Table 4.2**.

The preliminary rehabilitation and closure criteria will be reviewed and revised throughout the life of the Quarry and used as the basis for further refinement following the commencement of rehabilitation activities; consideration of the results of rehabilitation monitoring programs; and consideration of any stakeholder feedback.

Table 4.2 Preliminary Rehabilitation and Closure Criteria

Aspect	Preliminary rehabilitation and closure criteria
Decommissioning	- All surface infrastructure will be decommissioned and removed. - Services: removal of all services (power, water, communications).
Landform	- Rehabilitated slopes are stable. - No significant erosion is present that would constitute a safety hazard or compromise the capability of supporting the end land use. - Stability of the final landform has been assessed by a qualified engineer to validate that it is stable and does not pose a safety risk, following completion of landform works. - Contour banks are stable and there is no evidence of overtopping or significant scouring as a result of runoff. - Surface layer is free of any hazardous materials.
Soil	- Topsoil or a suitable alternative has been spread uniformly over the rehabilitation surface. - Soil pH to be in the range of analogue sites. - Monitoring demonstrates soil profile development in rehabilitated areas (e.g. development of organic layer, litter layer).
Water	Runoff water quality from the site does not pose a threat to downstream water quality.
Native Vegetation	- Revegetation areas contain flora species assemblages' characteristic of the desired native vegetation communities. - Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites (i.e. evidence of fruiting of native species observed). - More than 75% of trees are healthy and growing as indicated by Long Term Monitoring. - There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.
Bushfire Hazard	Appropriate bushfire hazard controls have been implemented.
Ongoing Public Safety	Appropriate mechanisms are established to control access and manage public safety post-closure.

4.3 Proposed Final Land Use

At the completion of extraction and rehabilitation works within the existing pit, Oberon Quarries proposes to primarily establish a native ecosystem throughout the pit and surface infrastructure areas, which is in keeping with the surrounding landscape. This also provides the opportunity to link the rehabilitation of the quarry with the vegetation located in adjacent areas. The land use surrounding the site is grazing. There are no forestry or conservation lands in the Project Area or immediate surrounds. The final land use will be returned to grazing in accordance with the land owner's requirements.

Rehabilitation of the quarry benches will commence once sufficient areas of the lower basalt layer have been extracted to enable rehabilitation to proceed without impacting on the ability to efficiently extract the high quality basalt resource. It is envisaged that rehabilitation will commence in approximately 10 years. During the intervening period, extraction will continue with the same environmental controls as have been utilised over the past 20 years of operation.

A detailed Quarry Closure Plan will be completed approximately 3 years prior to closure. In preparation of this Closure Plan, Oberon Quarries will investigate the potential for other sustainable and economically productive post-closure land uses in consideration of the local and regional land use strategies that may have further evolved towards the end of the Quarry life.

Oberon Quarries will consult with relevant stakeholders including Oberon Council and the NSW DPE in regards to the suitability of the proposed final land use as part of the development of the Quarry Closure Plan.

5.0 Rehabilitation and Landscape Management Controls

Oberon Quarries is committed to implementing reasonable and feasible rehabilitation and biodiversity measures. A range of short, medium and long-term management controls will be implemented throughout the life of the operation to achieve ongoing mitigation of potential impacts on remnant vegetation and habitat disturbance. These specific management controls are detailed further in this section.

In the first instance, to mitigate impacts to potential sensitive areas, where practicable, impacts on these areas will be avoided. Impacts will be avoided through the use of existing access tracks and planning of disturbance activities to avoid treed areas. However, where impacts cannot be avoided, the following sections detail the process to be implemented to manage potential impacts to identified ecological values.

Progressive rehabilitation and revegetation of the post-quarry area will be conducted over the life of the operations and as quarrying operations on the second bench allow. The objective is to create a stable final landform within the Quarry pit consisting of self-sustaining vegetation communities characteristic of the pre-quarry environment.

With regard to clearance activities, vegetation clearing works will be required as a result of the continued operations at the Quarry. All clearing activities will be undertaken in accordance with the procedure identified in **Section 5.1**.

5.1 Short-term Measures

5.1.1 Pre-clearance Surveys/Tree Felling

Tree disturbance as part of ongoing operations at the Quarry, will be limited to Mexican Cypress within the 1 ha extension area and possibly one or two trees along the alignment of the haul road duplication.

Where it is necessary to disturb areas of native vegetation, a pre-clearance survey will be undertaken. Where felling of habitat trees is required the tree felling procedure outlined in this section will be implemented.

Pre-clearing requirements involve the completion of a pre-clearing survey by a suitably qualified person (e.g. an ecologist). Any recommendations or mitigation measures suggested as a result of pre-clearance surveys will be implemented as necessary to minimise impacts to habitat. This survey will identify any key fauna habitat features (e.g. tree hollows, hollow logs etc.) that need to be managed as part of the clearing process. Such features will be marked and the clearing procedure outlined below followed. Where no such key features are identified, clearing can proceed without the need to implement this procedure.

The clearing of vegetation will be undertaken in accordance with the following procedure:

- all non-habitat trees will be cleared first, taking care to avoid all marked habitat trees
- within one to 2 days following the clearing of non-habitat trees, habitat trees will be cleared in the presence of a suitably qualified person. Before clearing, the trunk of the hollow-bearing tree will be shaken vigorously with heavy machinery then shaking will be paused for 30 seconds to allow any fauna present to escape, prior to felling of the tree. The machinery operator will then push the tree over as slowly as possible, so as to minimise the intensity of impact when hitting the ground

- once the tree has been felled, the qualified person will inspect the tree (particularly tree hollows) for signs of any trapped or injured fauna. Where necessary, a spotlight will be used to inspect deep hollows
- any injured fauna will be carefully captured by the qualified and experienced person, and taken to a wildlife carer or veterinary clinic
- cleared vegetation is proposed to be either mulched or placed on rehabilitation areas to assist in habitat re-establishment and
- minimising the extent of vegetation clearance to that associated with the next blast area.

5.2 Medium-term Measures

5.2.1 Weed Control

Weed species could inadvertently be brought into the Quarry with imported materials, machinery, or stock movement, or allowed to invade naturally through removal of native vegetation.

A weed control program will be implemented to limit the spread and colonisation of noxious and environmental weeds at the Quarry, and includes:

- regular inspections of the Quarry area to clarify any potential weed infestations
- the implementation of weed management measures as required including hand removal, mechanical removal and application of approved herbicides (in accordance with the *Pesticides Act 1999*) in authorised areas when favourable conditions prevail
- control of noxious weeds in accordance with the relevant legislation
- monitoring and inspections of areas to assess the effectiveness of the weed control program and to understand any requirement for further work and
- ongoing consultation with the relevant authorities, as required, regarding weed listings, weed occurrence and management technologies.

Chemicals to be used on site for the purposes of weed control will be evaluated by review of their Safety Data Sheet (SDS) and chemical label to determine their registration for control of target species, as well as the safety and environmental requirements during their use. Chemical spraying will be undertaken in accordance with the *Pesticides Act 1999*. A summary of the weed management activities undertaken on site will be reported in the Annual Review.

5.2.2 Pest Control

Feral fauna at the Quarry may impact native fauna species through predation and competition for resources such as food, shelter, and breeding sites. Feral animals can also have a detrimental effect on regenerating areas as well as soil stability.

Ongoing feral animal control program will include inspections for the presence of significant populations of feral fauna species.

Feral animal control programs will be completed as required. These programs typically consist of feral animal baiting. The details of feral animal sightings, control actions and the effectiveness of these control strategies will be reported in the Annual Review.

5.2.3 Erosion and Sediment Control

Appropriate erosion and sediment control works will be undertaken by Oberon Quarries within the development area. Erosion and sediment controls will also be installed, where necessary, on rehabilitated areas.

The erosion and sediment control measures that will be implemented to minimise risks associated with potential erosion and sediment impacts will be undertaken in accordance with the Oberon Quarry Water Management Plan (Umwelt, 2016a).

5.2.4 Controlling Access

As part of ongoing management of the site the following will be undertaken:

- the extraction area will be fenced and vehicular access to the extraction area will be restricted for appropriate vehicles only
- existing Quarry site boundary fencing will be maintained and
- the entrance gate to the site will be locked at night to prevent access during non-operational periods and opened by the Quarry Manager or delegate at 5.30 am.

5.2.5 Bushfire Management

Water for use in fire-fighting is provided for by the site water management system. On-site storage is adequate to ensure that there is sufficient water available on site for bushfire fighting purposes.

Fire-fighting equipment will continue to be provided at all infrastructure areas and mobile equipment maintained in accordance with Australian Standards and OHS guidelines.

Oberon Quarries has a long history of safe operation of the Quarry and implementation of appropriate measures on site for managing bushfire risk. Oberon Quarries will continue to implement the appropriate measures to reduce the risk of fire ignition and the spread of bushfire across the site in consultation with the NSW Rural Fire Service (RFS).

5.3 Long-term Measures

5.3.1 Salvage of Environmental Resources

Where feasible, the salvage and relocation of hollow logs, fallen timber and boulders will be undertaken to augment habitat complexity within any areas to be rehabilitated (if this area has low occurrences of such habitat resources). The purpose of this will be to increase habitat complexity in these areas, to make them more habitable for native species.

Habitat features suitable for salvage will be identified and marked in the field as part of pre-clearance surveys. The procedure for salvaging and reinstating habitat features is as follows:

- salvage hollow bearing trees identified as part of pre-clearance surveys, where practical and safe to do so
- hollow bearing trees can be stockpiled in unused areas, if necessary, until able to be reinstated
- identify suitable areas to reinstate hollow bearing trees

- carefully reinstate hollow bearing trees to identified area and
- hollow logs can be placed in small piles to increase habitat complexity, while others can be placed individually in post-quarrying rehabilitation areas

5.3.2 Protecting Vegetation Outside the Disturbance Footprint

Vegetation clearance associated with the Quarry will be undertaken in accordance with Schedule 3, Condition 24(d) of the Development Consent. Pre-clearance surveys will be undertaken prior to any vegetation being cleared during construction activities (refer to **Section 5.1**). The disturbance area will be demarcated for the duration of the Project to ensure that only areas within the approved maximum disturbance area.

5.3.3 Visual

The natural topography, existing bunds, existing vegetation and distance of the quarry from surrounding residences and vantage points, heavily restrict the visibility of the quarry. The ongoing operations will not result in visual impacts above those considered as part of the 1993 Development Consent.

In accordance with Schedule 3, Condition 27 of the Development Consent, the Quarry will implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development. Where practical, this may include:

- minimising night lighting impacts on the surrounding community by ensuring that lighting plants are positioned such that lighting is directed towards work areas and not towards private residences
- all buildings and infrastructure potentially visible to the public to be coloured in suitable natural tones and
- progressive rehabilitation of disturbed areas to reduce visual impacts.

5.3.4 Reviewing Improved Pasture Species and Application Rates

Rehabilitation will be reviewed and updated as necessary at least 2 years prior to any planned or notified closure of the Quarry.

Progressive rehabilitation, both completed and planned works, will be reported in the Annual Review (refer to **Section 8.1**). Planning details for final landform and decommissioning will be submitted to planning and other relevant stakeholders closer to the end of the life of the Quarry operations.

Pasture species to be planted and sowing rates as specified by the land holder are provided in **Table 5.1**.

Maintenance of rehabilitated areas will be undertaken until a stable vegetative cover is achieved. If pasture establishment is unsuccessful, improved pasture species and application rates will be reviewed as necessary in consultation with the land holder and relevant stakeholders.

Table 5.1 Improved Pasture Species and Application Rates

Improved pasture species	Application rate per hectare
<i>Saroso phalaris</i>	4.5 kg
Porto coxfoot	9.0 kg
Ryegrass	9.0 kg
White clover	2.25 kg
Subterranean Clover	9.0 kg
Cereal ryecorn	16.0 kg

6.0 Rehabilitation Strategy for the next 3 Years

During the next 3 years, the primary rehabilitation activities within the Quarry will involve ongoing development of quarrying areas and control of weed and feral species. The objective will be to undertake pre-disturbance activities that aim to minimise the ecological impacts of the quarrying operation as well as commence rehabilitation as soon as practical behind the quarrying activities so as to minimise the extent of disturbance on site. As such, the key rehabilitation and ecological management strategies to be adopted over this time include:

- installing survey pegs to mark the extent of extraction
- pre-clearance inspections ahead of the construction and quarrying operations in accordance with **Section 5.1**. Based on the outcomes of these inspections, undertake the following where required:
 - implement specific tree felling procedures as outlined in **Section 5.1**, in order to minimise the impacts to flora and fauna from the quarrying operation and
 - salvage and protect the viability of the vegetation and soil resources for later use in rehabilitation, as per **Section 5.2**.
- undertake soil characterisation works to assess their potential constraints to rehabilitation and the stability of the final landform (refer to **Section 4.2**)
- undertake ongoing feral animal and weed monitoring and treatment works as required (refer to **Sections 5.6 and 5.7**)
- undertake rehabilitation activities in accordance with the general requirements of **Section 5.0** and
- undertake rehabilitation monitoring activities as per the rehabilitation monitoring program outlined in **Section 7.0**.

The commencement of rehabilitating the Quarry is contingent on the construction of the final landform. This can only occur once the extraction of the first and second benches has been completed within sections of the Quarry pit and as space within the pit floor allows. It is also noted that the supporting processing area is required for the duration of the extraction activities. As such, rehabilitation of this area can only occur at the end of the Quarry life. Based on the current stage of the Quarry and projected extraction rates, it is envisaged that it will be approximately 10 years (i.e. 2028) before any significant rehabilitation works can be undertaken without interfering with quarrying operations and without quarrying operations interfering with rehabilitation activities. During this time disturbed areas will be within the perimeter of Racecourse Hill, which drain to the Quarry water management system and temporary revegetation/stabilisation works will be undertaken, were possible.

7.0 Rehabilitation Monitoring

Ecological and rehabilitation monitoring is required by Schedule 3, Condition 24(e) of the Development Consent. This section details the rehabilitation and analogue site monitoring program and requirements for the Quarry.

7.1 Residual Vegetation Monitoring (Analogue Sites)

The condition of residual vegetation within the Quarry will be monitored to identify any deterioration or improvement in habitat quality during the life of the Quarry as well as to provide a comparison when assessing the performance of rehabilitation sites. This monitoring will involve the establishment of permanent reference plots within the residual vegetation of the Quarry and will be preferentially established in derived native grassland community.

Progressive rehabilitation of the Quarry will be undertaken once the Quarry has reached its maximum depth and as sections of the Quarry (benches and floor) are no longer needed for operational purposes or no further disturbance works are planned to be undertaken. The Quarry Manager will identify when the final landform has been achieved. The rehabilitation monitoring program outlined below will then be initiated and be undertaken every 2 years, thereafter. Where results are showing negligible change, the frequency of monitoring may be reduced in consultation with the DPE.

The monitoring approach will involve surveys at permanent reference plots.

Photo monitoring points will be established within each of the permanent reference plots, to enable a visual assessment of changes over time.

The monitoring surveys will typically assess and systematically record the following vegetation characteristics:

- floristic composition (including cover and abundance of species) and structure
- general health of vegetation
- evidence of natural regeneration
- occurrence and abundance of weed species
- presence of threatened or other significant species
- signs of disturbance, either by stock, feral animals or humans
- any observable impacts of the Quarry, such as the effectiveness of fencing and weed control actions.

7.0 Annual Rehabilitation Inspections

Annual inspections (or other frequency as agreed with the DPE) of final landform/rehabilitated areas will be undertaken over the life of the quarrying operations to assess:

- soil conditions and erosion (i.e. stability)
- drainage and sediment control structures
- runoff water quality
- germination rates
- plant health
- weed infestation.

This will be done by visual inspection and photographing of rehabilitation areas. Water quality of runoff from the Quarry disturbance area will be monitored in accordance with procedures set out in the Oberon Quarry Water Management Plan (Umwelt, 2016a).

Outcomes of the rehabilitation inspections will be recorded and any required management actions that are identified as part of the inspection, are to be implemented within one month of issue identification. Where necessary, rehabilitation and revegetation procedures will be amended accordingly with the aim of continually improving standards. The results of the rehabilitation inspections will be compared with the rehabilitation objectives and performance indicators.

Dependent upon the outcomes of the rehabilitation inspection as outlined above, the scope of the rehabilitation care and maintenance phase may include the following:

- re-seeding/planting of rehabilitation areas that may have failed
- weed and feral animal control
- fire management
- additional watering requirements for dry areas
- thinning of colonising species to reduce competition, if required
- erosion control works
- maintenance fertilising
- repair of fence lines, access tracks and other general related land management activities.

It is envisaged that this program will be continued as required until it can be demonstrated that the rehabilitation of the Quarry has satisfied the closure criteria.

7.1 Fauna Monitoring

At each of the residual vegetation reference sites (refer to **Section 7.1**), a range of fauna observations will be employed to assess ongoing fauna use of habitat.

In the event that threatened species are identified at the Quarry the monitoring program will incorporate surveys to adequately assess and monitor these species.

7.2 Rehabilitation and Revegetation Methodology Records

Oberon Quarries will record the details of each rehabilitation and revegetation campaign so that they are available for later interpretation of rehabilitation monitoring results. This will allow the continual improvement of rehabilitation and revegetation standards on site. Amongst the key monitoring parameters to be included in the program are the following:

- landform design details
- drainage design details
- substrate characterisation
- site preparation techniques (e.g. topsoil and source, time of sowing, soil ameliorants used, etc.)
- revegetation methodologies (e.g. cover crop and rate, seed viability)
- weather conditions
- photographic records
- initial follow-up care and maintenance works.

7.3 Monitoring Rehabilitation Progress against Closure Criteria

Preliminary closure criteria for the Quarry are provided in **Section 4.2**. Rehabilitation monitoring against completion criteria will be undertaken progressively during rehabilitation of site areas. Refinement of closure criteria will be undertaken through the development of a Quarry Closure Plan, which will be developed 3 years from closure. The Quarry currently has a Development Consent to operate until 2045.

Monitoring rehabilitation progress against closure criteria provides a positive feedback loop whereby, based on the results of monitoring, specific actions can be implemented to assist in the progression of rehabilitation and achievement of rehabilitation goals and objectives.

7.3.1 Process for Review and Refinement of Criteria

The preliminary criteria will be reviewed and revised in consultation with the DPE throughout the life of quarrying operations and used as the basis for further refinement following:

- ecological management activities
- consideration of the results of rehabilitation monitoring programs
- consideration of stakeholder feedback.

It is envisaged that this process will occur as part of subsequent reviews of the LRMP that are submitted to the DPE.

The gradual achievement (or otherwise) of these completion criteria will be assessed and discussed in the annual documentation of monitoring results, which will include the identification of instances where criteria is not met, and measures taken to address any such issue.

8.0 Reporting

8.1 External Reporting

A summary of rehabilitation monitoring results will be provided in the Oberon Quarry Annual Review. The following information will be reported in the Annual Review in accordance with Schedule 5, Condition 9 of the Development Consent.

By the end of March each year Oberon Quarries shall review the environmental performance of the development to the satisfaction of the Secretary. The requirements of the review are detailed in **Table 2.1**.

In addition, in accordance with *Protection of the Environment Legislation Amendment Act 2011* (Amendment Act) and Schedule 5, Condition 12 of the Development Consent, Oberon Quarries will also publish rehabilitation monitoring results on the Oberon Quarries website (<http://www.oberonquarries.com.au>).

8.2 Material Harm Incident Reporting Protocol

Incidents that have caused, or threaten to cause material harm to the environment will be reported to the Department, EPA and relevant stakeholders immediately once Oberon Quarries becomes aware of the incident in accordance with the Quarry's Pollution Incident Response Management Plan (PIRMP). Reporting for material harm incidents will be undertaken in accordance with Schedule 5, Condition 7 of the Development Consent.

Within 7 days of the incident, Oberon Quarries will provide the DG and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

8.3 Adaptive Management and Contingency Measures

In accordance with Schedule 5, Condition 6 of the Development Consent, Oberon Quarries will assess and manage biodiversity and rehabilitation related risks to ensure compliance with the criteria outlined in **Section 4**.

Where a non-compliance relating to biodiversity and rehabilitation impact has occurred, Oberon Quarries, at the earliest opportunity will:

- take all reasonable and feasible steps to ensure the exceedance ceases and does not reoccur
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action
- implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.

Contingency measures that will be implemented while reasonable and feasible options are being explored include demarcating affected areas to prevent further access, implementing additional sediment and erosion controls including use of straw bales, geotextile and rock gabions to minimise potential for further disturbance.

8.4 Compliant Response

Complaints relating to noise from the Quarry will be managed in accordance with the requirements of the Oberon Quarry EMS (Umwelt, 2016) and Complaints Management Policy and Procedure. In accordance with Condition M5 of EPL 4442, a community complaints line is operated by Oberon Quarries during the hours of operation. The complaints line is displayed on Oberon Quarries website (<http://oberonquarries.com.au/>).

The Complaints Line number is (02) 6336 0259.

The Complaints line has been operational for many years and provides the community with a mechanism by which to raise any concerns that they have with operations at Oberon Quarry. The Quarry Manager is responsible for the implementation of the complaints management process and will ensure a timely initial response to any complaints received and then, as appropriate, will provide a more detailed response outlining any complaint investigation findings and corrective actions implemented.

Records of complaints will be kept for a minimum of 4 years in a register to be maintained by the Quarry Manager, the complaints register is available on Oberon Quarries website. This register will be updated when/if a genuine notifiable complaint is received. The community complaints will also be reported annually in the Annual Review.

9.0 Review and Improvement

Ongoing monitoring and review on the performance and implementation of this LRMP will be undertaken in accordance with Oberon Quarry EMS (Umwelt, 2016b).

In accordance with Schedule 5, Condition 5 of the Development Consent, Oberon Quarries shall review, and if necessary revise, the strategies, plans, and programs required under Development Consent to the satisfaction of Secretary, within 3 months of the submission of an:

- (a) *incident report under condition 7 below;*
- (b) *annual review under condition 9 below;*
- (c) *audit report under condition 10 below; and*
- (d) *any modifications of this consent,*

the Applicant shall review the strategies, plans, and programs required under this consent, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.

The Quarry Manager and Oberon Quarries environmental personnel will review and if necessary, revise this LRMP and resubmit to DPE every year or earlier if required.

Any changes made to the LRMP as a result of the review will be made in consultation with relevant stakeholders. A copy of the revised LRMP will be supplied to the Secretary for approval. The LRMP will reflect changes in environmental requirements, technology and operational procedures. Updated versions of the approved LRMP will be made publicly available on the Oberon Quarries website (<http://oberonquarries.com.au/>).

Continuous improvement will also occur through independent review as a result of the 3-yearly compliance audit, which is required in accordance with Schedule 5, Condition 10 of the Development Consent.

10.0 Risks and Corrective Actions

10.1 Risk Assessment

A risk based approach to the implementation of this LRMP has been considered such that risks to the establishment and management of rehabilitation areas are identified and a strategy developed to avoid or minimise the potential for them to occur (refer to **Tables 10.1** and **10.2**).

Table 10.1 Risk assessment matrix

		CONSEQUENCE (C)				
		Insignificant (F)	Minor (I)	Moderate (D)	Major (J)	Significant (S)
LIKELIHOOD (L)	Remote (R)	Negligible (N)	Negligible (N)	Very Low (L)	Low (W)	Medium (M)
	Unlikely (U)	Negligible (N)	Very Low (L)	Low (W)	Medium (M)	High (H)
	Possible (P)	Very Low (L)	Low (W)	Medium (M)	High (H)	Very High (V)
	Likely (L)	Low (W)	Medium (M)	High (H)	Very High (V)	Extreme (E)
	Almost Certain (C)	Medium (M)	High (H)	Very High (V)	Extreme (E)	Extreme (E)

Table 10.2 Potential Risks to Rehabilitation

Risk	L	C	Rating
Inadequate resourcing to implement the L&RMP	U	J	M
Inadequate resourcing to meet the monitoring and reporting requirements	U	J	M
Weed infestations leading to degradation of biodiversity values	P	D	M
Feral animal species leading to degradation of biodiversity values	P	D	M
Unauthorised/uncontrolled access leading to damage	P	I	W
Failure to meet rehabilitation targets in the quarry pit	P	D	M
Surface (wind or water) erosion leading to degradation of growth medium and rehabilitation quality	P	D	M
Poor vegetation development leading to poor habitat value	P	D	M

10.2 Corrective Actions

As identified in **Section 10.1** above, there are a range of uncertainties associated with implementation of the LRMP. In order to ensure delivery of the stated outcomes, and compliance with the approval conditions, a range of further actions are to be undertaken in the event it becomes apparent that performance indicators are not being met.

The results of monitoring will feed into the adaptive management process (refer to **Section 8.3**). The Quarry Manager will utilise the results of the monitoring activities to identify any corrective actions required to meet the objectives and targets. The indicative triggers and corrective actions outlined in **Table 10.3** that have been identified would be subject to review based on the adaptive management process.

Table 10.3 Potential Issues and Recommended Corrective Actions

Issues identified by monitoring trends or an observed non-compliance	Potential corrective actions	Timing/frequency
Unauthorised access resulting in damage	- Identify access points and repair as required - Rehabilitate any damaged areas - Review site security.	Within one week of identification during site operations or monitoring
Infestations of noxious and environmental weeds in the rehabilitation areas	- Adapt weed management strategy and modify accordingly - Actively monitor the results of modifying strategy	- Strategy to be developed within 2 weeks of identification - Control works to be undertaken within one month of identification - Monitoring to be undertaken within 3 months following identification
Infestations of feral animal species in the rehabilitation areas	- Adapt feral animal control strategy and modify accordingly - Actively monitor the results of modifying strategy	- Strategy to be developed within 2 weeks of identification - Control works to be undertaken within one month of identification - Monitoring to be undertaken within 3 months following identification
Erosion	- Adapt erosion control strategy and modify accordingly - Actively monitor the results of modifying strategy	- Strategy to be developed within 2 weeks of identification - Control works to be undertaken within one month of identification - Monitoring to be undertaken within 3 months following identification
Scarcity of key habitat features in the rehabilitation areas	- Add logs or branches - Increase the number of vegetation layers in the patch - Increase monitoring regime to determine species diversity and richness	- Develop habitat augmentation strategy within one month of identification of issue - Carry out recommendations of habitat augmentation strategy within one month of Strategy finalisation
Dense stands of colonising tree or shrub species dominant in the rehabilitation areas	- Assess whether thinning is necessary - Leave if patches are small and plants are native - Thin manually if appropriate	Undertake works within one month of issue identification

Issues identified by monitoring trends or an observed non-compliance	Potential corrective actions	Timing/frequency
Low species diversity in the rehabilitation areas	• Targeted weed control • Consider the need for active revegetation techniques including direct seeding or tubestock planting, following appropriate ground preparation such as weed control, ripping and augering	• Undertake weed control within one month of issue identification • Implement active revegetation within one month of identifying requirement
Downstream water quality impacts	• Review of site water management system • Remediate areas of sedimentation and erosion	• Review site water management system within 6 months of the date of consent and after any recorded water quality incident or identification of monitoring trends that indicate downstream water quality impacts are likely. • Remediate identified erosion issues within 2 weeks of identification
Revegetation survival	• Identify why survival is not being achieved • Implement appropriate control measures	• Within one month of identification • Within 3 months of identification

11.0 Accountabilities

Relevant roles and responsibilities associated with this L&RMP are presented in **Table 11.1** below.

Table 11.1 Accountabilities

Role	Accountabilities for this document
Quarry Manager	• provide that sufficient resources are allocated for the implementation of this LRMP • ensure that the requirements of this LRMP are effectively implemented • schedule rehabilitation activities as per this plan • authorising internal and external reporting requirements as well as subsequent revisions of this program • ensure parties undertaking monitoring and recommending/implementing conservation management measures are suitably qualified and experienced • co-ordinate the day to day implementation of the LRMP, including the implementation of all management activities • analyse and collate documentation for inclusion in the Annual Review • assess the effectiveness of the management strategies and instigate the adaptive management process as required • ensure all internal and external reporting requirements are met • ensure that all relevant records are effectively maintained on site • periodically review progress against targets and performance indicators • ensure that personnel involved in the carrying out and monitoring of the LRMP activities and values are appropriately qualified, licensed and experienced to undertake the task.
All employees and contractors	• undertake all activities in accordance with this LRMP • ensure staff and contractors accessing the Project Area are informed and trained where relevant in relation to controls on activities within the Project Area • receive training regarding controls on activities within the Project Area • observe boundaries of the Project Area when undertaking work on site • undertake activities in the Project Area in line with directions from the Quarry Manager.

12.0 References

Resource Planning Pty Limited, 1992. Environmental Impacts Statement for Hard Rock Quarry 'Langly Heights' Oberon NSW.

Umwelt (Australia) Pty Limited, 2016a. Water Management Plan. Report prepared for Oberon Quarries Pty Limited.

Umwelt (Australia) Pty Limited, 2016b. Environmental Management Strategy. Report prepared for Oberon Quarries Pty Limited.

Umwelt (Australia) Pty Limited, 2015. Proposed Extended Life of Operations and Development Changes to Oberon Quarry, Environmental Impact Statement, Report prepared for Oberon Quarries Pty Limited.

Appendix One: Landscape and Rehab Version 6 2025 Approval