

LANDSCAPE MANAGEMENT PLAN

Buttai Gravel Pty Limited (Daracon Quarries)

DRAFT

August 2023



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QMS Certification Services

Acknowledgement of Country

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1.0 Introduction

1.1 Background

Ardglen Quarry (the Quarry) is located on Lot 218 DP 751028, Lot 1 DP 1001734, Lot 187 DP 751028, Lot 39 DP 751028 and Lot 49 DP 751028, adjacent to the small rural community of Ardglen. Ardglen is approximately 5 kilometres (km) northwest of Murrurundi and 60 km southwest of Tamworth. The Quarry is owned and operated by Buttai Gravel Pty Ltd (trading as Daracon Quarries).

NSW Railways owned and operated the Quarry for over 100 years prior to the purchase by Daracon. In 2008 Daracon was granted approval under Part 3A of the Environmental Planning and Assessment Act 1979, to extend quarrying activities into the adjacent lot west of the existing operation, Lot 218 DP 751028. In December 2010 Daracon was granted approval for a modification to the Project Approval (Mod 1) and most recently in March 2021 approval was granted for a second modification to the Project Approval (Mod 2) (the Project Approval).

The Project Approval permits:

- The extraction and processing of up to 500,000 (tpa) of material
- Transport of a combined total 500,000 tonnes/year of quarrying products from the site by road and/or rail by either:
 - transport of 250,000 (tpa) of quarrying products from the site by rail
 - transport of 500,000 (tpa) of quarrying products from the site by road
 - installation of noise management measures including barriers/bunds
 - modify the sediment basin, in pit sump and water treatment measures
 - import of up to 80,000 tonnes/year for blending with quarried materials.

The relevant Project Approval conditions and EA Commitments including where they are addressed this plan are provided in **Section 2.0**.

The operations undertaken at the Quarry are also required to be undertaken in accordance with the requirements of the EPBC Approval (EPBC2007/3442) which provides conditions related to the management of offsets and rehabilitation works required to be undertaken at the Quarry. These EPBC approval conditions and where they have been addressed in this document are detailed in **Section 2.2**.

Quarrying operations at the Quarry are undertaken in order to comply with the relevant provisions of all legislation relating to the project, as well as safeguards and mitigation measures identified within the Environmental Assessments (EAs) and Statement of Commitments (SoCs). Operations are conducted in accordance with the Project Approval to minimise, any material harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under the Project Approval.

1.2 Purpose and Scope

The purpose of this Landscape Management Plan (LMP) is to describe the rehabilitation and biodiversity management strategies, procedures, controls and monitoring programs to be implemented for the management of offset areas and rehabilitation required to be undertaken by Daracon. This LMP includes the following documents as required by the Project Approval:

- Draft Doughboy Hollow Creek Rehabilitation Strategy (in draft and not yet finalised however approval was given by DPE in November 2021 to prepare the LMP in a staged manner, and this covers the preparation of this Strategy. The approval from DPE is included in **Appendix 3) (Section 4.0)**
- Biodiversity Offset and Rehabilitation Management Plan (**Section 5.0**) and
- Quarry Closure Plan (**Section 6.0**).

This LMP has been developed to address the requirements of Schedule 3, Conditions 24 to 30A of the Project Approval and the EA Commitments.

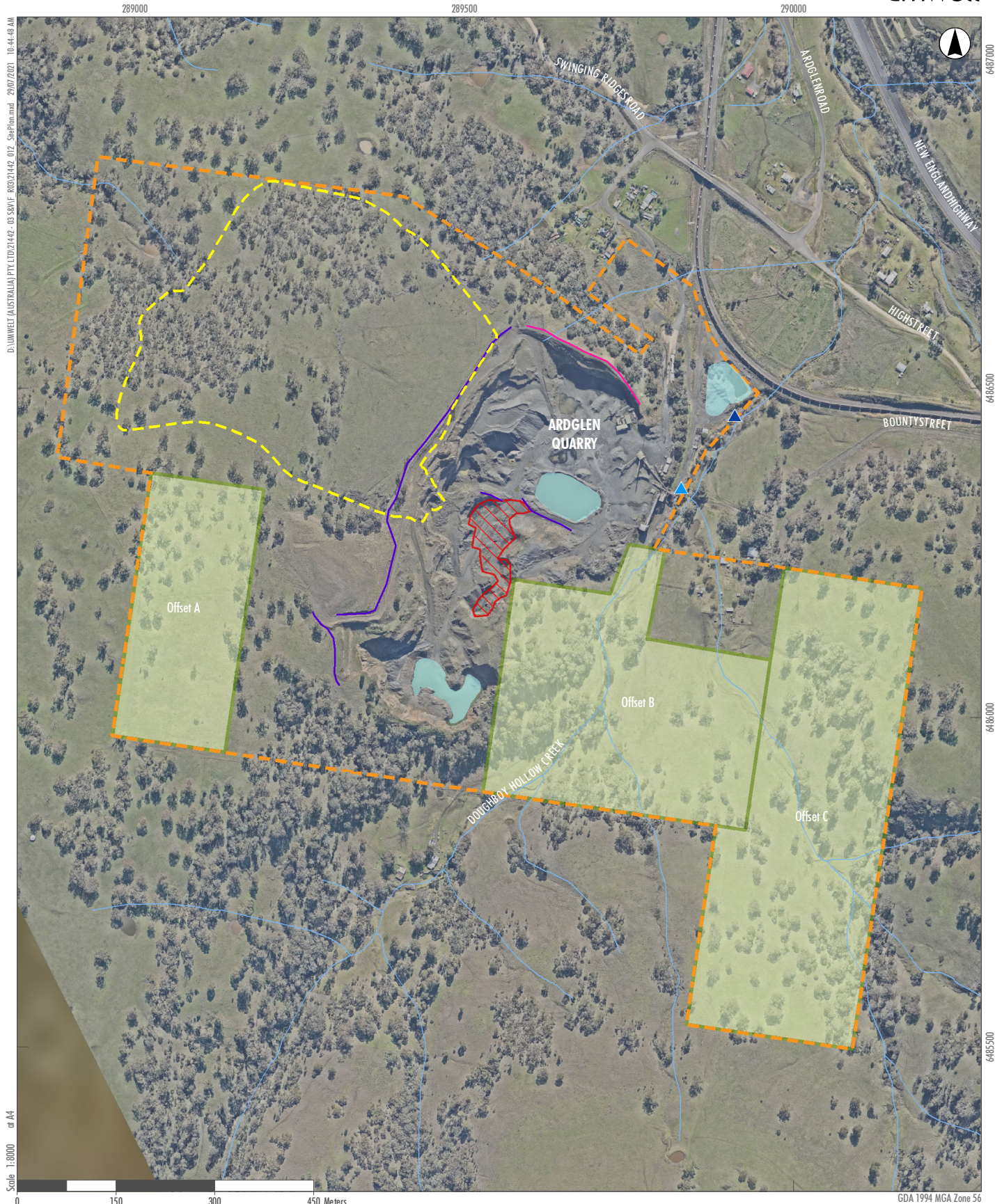
Due to current operational status of the Quarry Site, considered to be a state of 'care and maintenance' as no extraction has occurred for a number of years, this LMP will be revised and submitted to relevant agencies for consultation on a progressive basis in accordance with Schedule 2, Condition 10 of the Project Approval, also refer to **Section 1.4**.

As outlined in the Project Approval, this LMP will be implemented during, and following quarrying operations at the Quarry.



FIGURE 1.1

Locality



- Legend**
- Site Boundary
 - Pit Extension Boundary
 - Biodiversity Offset Area Boundary
 - Proposed Crushing Pad
 - Noise Barrier
 - Noise Bund
 - Rock Weir along Doughboy Hollow Creek
 - Causeway

FIGURE 1.2

Ardglenn Quarry Site Plan

1.3 Objectives of the LMP

The key objective of this LMP is to provide direction for the short, medium and long term management and enhancement of the rehabilitation and biodiversity values of the Quarry site including its offsets. The LMP also aims to provide a detailed description of the measures to be implemented to achieve this over the next 3 year and 5 year periods.

The objectives of this LMP are to:

- Identify and describe the areas of land that will be required to be managed in accordance with this LMP
- Provide clear and concise instructions for the management measures to be implemented in accordance with the Project Approval in order to achieve management objectives and minimise the impacts of key risks/threats
- Describe management measures, monitoring, performance evaluation and reporting procedures that are to be implemented at the Quarry
- Guide the restoration of grassy woodland and ongoing vegetation management within the three (3) 'offset' sites adjoining the Quarry.
- Describe the approach to rehabilitation of the section of Doughboy Hollow Creek.

The rehabilitation objectives to be achieved at the Quarry as defined by the Project Approval are detailed in **Section 2.1**.

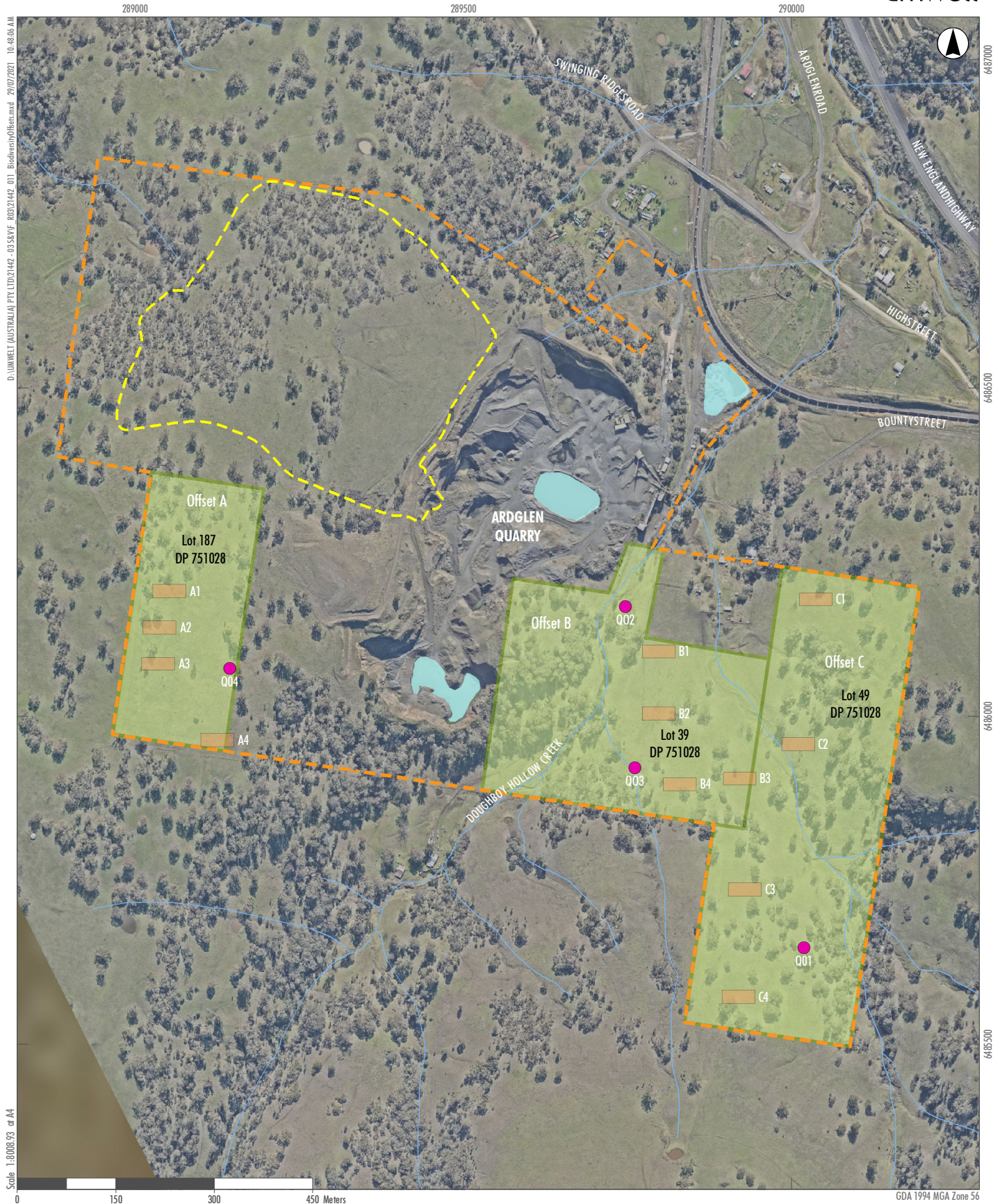
1.4 LMP Staging

This LMP has been prepared as a staged LMP for Ardglen Quarry. The below **Table 1.1** defines the hold points which are required to be addressed at each stage, prior to Ardglen Quarry progressing to the next stage. An approved LMP which reflects the requirements of the following stage is required to be approved by DPE prior to Ardglen Quarry progressing to the next phase of operations. It is noted that **Table 1.1** below relates to actions specifically for the LMP, and that other management plans (e.g. Air Quality) may be required to be updated in accordance with the Project Approval prior to works being undertaken in the respective phases. These updates are addressed within the respective management plans.

Table 1.1 Ardglen LMP Staging

Staging	Aspects to be Addressed
Construction	All works required to be undertaken prior to the commencement of construction activities have been completed.
Care and Maintenance	Version 6 and Version 7 of the LMP have been developed to address the requirements to be implemented at Ardglen Quarry.
Construction and Operations Stage – Existing Footprint	Version 7 of the LMP has been developed to include the requirements to be addressed for the commencement of operations within the Site boundary for all areas outside of the "Pit Extension Area" as defined on Figure 1.2 .
Construction and Operations Stage – Extension Area	Prior to the commencement of operations In the "Extension Area" (as defined in Figure 1.2), a revised LMP will be prepared by Daracon and submitted the DPE for approval. The revised LMP will be approved by DPE prior to the commencement of operations within the Extension Area. The revised LMP will include: • An Offset Strategy prepared in accordance with Schedule 3 Condition 25 of the Development Consent

	• Confirmation that Biodiversity Offset Areas have been secured in accordance with Schedule 3 Condition 26 of the Development Consent. • A revised Doughboy Hollow Creek Rehabilitation Strategy prepared in accordance with Schedule 3 Condition 28 of the Development Consent. The strategy will be prepared in consultation with BCS, DPIE, Crown Lands and DPI Water. • A revised Rehabilitation and Biodiversity Offset Management Plan developed in accordance with Schedule 3 Condition 29 of the Development Consent. • A Quarry Closure Plan developed in accordance with Schedule 3 Condition 30 of the Development Consent, except if Daracon have obtained the Planning Secretary's approval for an alternative timetable for completion and approval of the Quarry Closure Plan.
Quarry Closure and Rehabilitation Phase.	A revised LMP including a Detailed Quarry Closure Plan which builds upon the Conceptual Closure Plan will be developed either: • three years prior to the planned closure and rehabilitation of the operation, or • three years prior to the expiry of the Development Consent on 31 August 2038 (i.e 31 August 2035).



- Legend**
- Site Boundary
 - Pit Extension Boundary
 - Biodiversity Offset Area Boundary
 - Permanent Floristic Monitoring Plots
 - Natural Regeneration Monitoring Plot

FIGURE 1.3

Ardglan Quarry Biodiversity Offsets

2.0 Legal and Other Requirements

2.1 Project Approval

Table 2.1 below outlines the relevant Project Approval conditions and where they have been addressed within the LMP. This plan has been prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary (refer to **Appendix 1**).

The LMP was to be submitted to the Planning Secretary for approval within three months of the determination of MOD 2. However, Daracon notified DPE (formally DPIE) on 11 June 2021 of its intention to submit this LMP on or before 31 July 2021. DPIE subsequently approved this request on 06 October 2021. Between July 2021 and November 2021, the LMP was reviewed by DPIE, who then requested that Daracon apply for approval to submit the LMP in a staged manner. Daracon subsequently applied for this approval, which was granted by DPIE in November 2021.

Version 5 (V5) of this LMP was submitted to DPE for review in December 2021. Comments from DPE were received in May 2022, which commenced a further revision of the document, Version 6 (V6). V6 was submitted to DPE for review in June 2022.

As per Schedule 2, Condition 16 of the Project Approval, the Quarry will continue to apply the version of the LMP approved prior to the approval of MOD 2, until the approval of the LMP following the determination of MOD 2.

Table 2.1 Rehabilitation and Biodiversity Related Project Approval Conditions/Environmental Assessment Commitments

Condition	Description	Section/s Addressed
Schedule 2		
Obligation to Minimise Harm to the Environment		
1	In addition to meeting the specific performance measures and criteria in this consent, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under this consent.	Section 1.1
Terms of Consent		
2	The Applicant must carry out the development	Section 1.1
	a) generally in accordance with the EA;	
	b) generally in accordance with the EA MOD 2;	Section 1.1
	c) generally in accordance with the Statement of Commitments; and	Section 1.1
	d) in compliance with the conditions of this consent.	Section 1.1
Note: The general layout of the development is shown in Appendix 1.		
Revisions of Strategies, Plans or Programs		
15	Within three months of:	Section 7.5
	a) the submission of an incident report under condition 3 of Schedule 5;	
	b) the submission of an Annual Review under condition 4 of Schedule 5	

Condition	Description	Section/s Addressed
	c) the submission of an Independent Environmental Audit under condition 5 of Schedule 5;	
	d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise) the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.	
16	The Applicant must continue to apply existing management strategies, plans or programs approved prior to the approval of MOD 2, until the approval of a similar plan, strategy or program following the determination of MOD 2.	Section 2.1
Schedule 3		
Rehabilitation		
24	The Applicant must progressively rehabilitate the site in a manner that is generally consistent with the conceptual rehabilitation principles and proposed rehabilitation strategy in the documents listed in condition 2(a)-(c) of Schedule 2 and as shown conceptually in Appendix 2 (of the Project Approval and must comply with the objectives in Table 11.	
	Table 11 Rehabilitation objectives	
	Feature	Objective
	All areas of the site affected by the development	Safe
		Hydraulically and geotechnically stable
		Non-polluting
		Fit for the intended post quarrying operations land use(s)
		Final landform is 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 otherwise agreed by the Planning Secretary
	Quarry benches and pit floor	Landscaped and vegetated using native tree and understorey species representative of Yellow Box White Box Blakely's Red Gum Woodland EEC
	Overburden infill area	Backfilled areas integrated with surrounding natural landforms as far as is reasonable and feasible
		Emplacement areas integrated with the site water management system
Establish grassland to support sustainable agricultural activities		
Use species found in the local area that are suitable for pasture production		

Condition	Description	Section/s Addressed
Offset Strategy		
25	Prior to undertaking any works in the Extension Area, the Applicant must revise the Biodiversity Offset Strategy described in the EA and Response to Submissions (shown conceptually in Appendix 3), to the satisfaction of the Planning Secretary. The revised strategy must be prepared in consultation with the BCS and include additional areas where Yellow Box White Box Blakely's Red Gum Woodland EEC would be actively re-established within the identified Biodiversity Offset Areas shown in Appendix 3 (of the Project Approval).	Section 5.2
26	Prior to undertaking any works in the Extension Area (or other timeframe as agreed by the Planning Secretary), the Applicant must make suitable arrangements to provide appropriate long-term security for the Biodiversity Offset Areas to the satisfaction of the BCT.	Section 5.2.6
26A	By the end of June 2021, the Applicant must ensure that the Biodiversity Offset Areas are fenced to an appropriate standard to exclude stock access. The Applicant must maintain the exclusionary fencing over the life of the development, to the satisfaction of the Planning Secretary.	Section 5.2.1.1
Landscape Management Plan		
27	The Applicant must prepare a detailed Landscape Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	Section 2.1 and Appendix 1
	a) be prepared by suitably qualified expert/s whose appointment/s have been approved by the Planning Secretary;	
	b) submitted to the Planning Secretary for approval within three months of the determination of MOD 2 (or other timeframe as agreed by the Planning Secretary); and	Section 2.1
	c) include a: • Doughboy Hollow Creek Rehabilitation Strategy; • Rehabilitation and Biodiversity Offset Management Plan; and • Quarry Closure Plan. <i>Note: The Department accepts that the initial Landscape Management Plan may not include the detailed Quarry Closure Plan. However, if this occurs, the Applicant will be required to seek approval from the Planning Secretary for an alternative timetable for the completion and approval of the Quarry Closure Plan.</i>	Section 4.0 Sections 5.0 Section 6.0
Doughboy Hollow Creek Rehabilitation Strategy		
28	The Doughboy Hollow Creek Rehabilitation Strategy must:	
	a) be prepared in consultation with BCS, DPIE Crown Lands and DPIE Water;	Section 2.3
	b) describe the measures that would be implemented to: • remove the weir from Doughboy Hollow Creek; • rehabilitate the creek within or directly adjacent to Lot 1 DP1001734 and Lot 39 DP 751028; and • rehabilitate and/or re-establish riparian vegetation within Lot 39 DP 751028.	Section 4.4.2 Section 4.4 Section 4.4

Condition	Description	Section/s Addressed
Rehabilitation and Biodiversity Offset Management Plan		
29	The Rehabilitation and Biodiversity Offset Management Plan must: d) be prepared by suitably qualified expert/s whose appointment/s have been approved by the Planning Secretary;	Section 2.1
	e) describe in general the short, medium, and long term measures that would be implemented to: - rehabilitate the site; - implement the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy; and - manage the remnant vegetation and habitat on the site;	Section 5.3 Section 5.0 Section 5.3.2
	f) include a detailed description of what measures would be implemented over the next 3 years to implement the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy;	Sections 4.6 & 5.2.7
	g) include a detailed description of what measures would be implemented over the next 5 years to rehabilitate the site, including the procedures to be implemented for: - progressively rehabilitating areas disturbed by quarrying as shown conceptually in Appendix 2 (of the project approval); - implementing revegetation and regeneration as shown conceptually in Appendix 2 (of the project approval), including establishment of canopy, sub-canopy (if relevant), understorey and ground strata; - managing the remnant vegetation and habitat on site; - managing impacts on fauna; - reducing the visual impacts of the development, including the vegetation of the noise barrier shown in Appendix 2 (of the project approval) and the establishment of screen planting as described in EA MOD 2 and the Statement of Commitments; - landscaping the site to minimise visual impacts; - protecting areas outside the disturbance areas; - conserving and reusing topsoil; - collecting and propagating seeds for rehabilitation works; - salvaging and reusing material from the site for habitat enhancement; - controlling weeds and feral pests; - controlling access; and - bushfire management;	Section 5.3 Section 5.3.2 Section 5.3.2 Section 5.3.1.1 Section 5.3.1.1, Section 5.3.2.2 Section 5.3.2.2 Section 5.3.1.5 Section 5.3.1.2 Section 5.3.1.4 Section 5.3.1.3 Sections 5.2.1.2 & 5.2.1.3 Section 5.2.1.1 Section 5.2.1.4
	h) detailed performance and completion criteria for the rehabilitation of the site and implementation of the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy;	Sections 5.2.4 & 5.3.2.3
	i) a detailed description of how the performance of the rehabilitation of the site and implementation of the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy would be monitored over time to achieve the relevant objectives and completion criteria;	Sections 4.5,0 & 5.3.3
	j) a description of the potential risks to successful revegetation and/or rehabilitation in the offset areas and development area, and a description of the contingency measures that would be implemented to mitigate these risks; and	Sections 5.2.4 & 5.2.3

Condition	Description	Section/s Addressed
	k) details of who is responsible for monitoring, reviewing and implementing the plan.	Section 7.0
Quarry Closure Plan		
30	The Quarry Closure Plan must:	Section 6.1.1
	l) define the objectives and criteria for quarry closure;	
	m) investigate options for the future use of the site, including any final void(s);	Section 6.1.2
	n) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the development; and	Section 6.1.3
	o) describe how the performance of these measures would be monitored over time.	Section 6.1.3
30A	The Applicant must implement the Landscape Management Plan as approved by the Planning Secretary.	Ongoing
Rehabilitation Bond		
31	Within 6 months of the approval of the Rehabilitation and Biodiversity Offset Management Plan, the Applicant must 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 the relevant conditions of this consent. The sum of the bond must be an amount agreed by the Planning Secretary and determined by:	Section 5.1
	a) calculating the cost of rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and	
	b) employing a suitably qualified, independent and experienced person to verify the calculated costs.	Section 5.1
	The calculation of the Rehabilitation Bond must be submitted to the Department for approval at least 2 months prior to the lodgement of the bond	
32	The Rehabilitation Bond must be reviewed and, if required, an updated bond must be lodged with the Department within 3 months following:	Section 5.1
	a) calculating the cost of rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and	
	b) the completion of an Independent Environmental Audit in which recommendations relating to rehabilitation have been made; or	Section 5.1
	c) in response to a request by the Planning Secretary.	Section 5.1
32A	If rehabilitation is completed generally in accordance with the relevant performance and completion criteria, to the satisfaction of the Planning Secretary, the Planning Secretary will release the bond.	Section 5.1
32B	If rehabilitation is not completed generally in accordance with the relevant performance and completion criteria, the Planning Secretary will call in all, or part of, the bond and arrange for the completion of the relevant works.	Section 5.1
Condition	Description	Section/s Addressed
Schedule 4		
Independent Review		
2	If a landowner (excluding quarry owned properties) considers that the operations of the development are exceeding the impact assessment criteria in Schedule 3 then he/she may ask the Planning Secretary in writing	Section 7.4

Condition	Description	Section/s Addressed
	for an independent review of the impacts of the development on his/her land.	
3	If the Planning Secretary is not satisfied that an independent review is warranted, the Planning Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review.	Section 7.4
4	If the Planning Secretary is satisfied that an independent review is warranted, within 3 months, or as otherwise agreed by the planning secretary and the landowner of the Planning Secretary's decision, the Applicant must: a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to: • consult with the landowner to determine their concerns • conduct monitoring to determine whether the development is complying with the relevant criteria in schedule 3 of this consent; and • if the development is not complying with that criteria, identify measures that could be implemented to ensure compliance with the relevant criteria b) give the planning secretary and landowner a copy of the independent review; and c) comply with any written requests made by the planning secretary to implement any findings of the review	Section 7.4
		Section 7.4
		Section 7.4
Condition	Description	Section/s Addressed
Schedule 5		
Environmental Monitoring		
2	Any Condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit. For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the consent or on the environmental impact of the development and an "environmental audit" is a periodic or particular documented evaluation of the development to provide information on compliance with the consent or the environmental management or impact of the development.	Sections 5.2.5 & 5.3.3
Incident Notification		
3	The Applicant must immediately notify the department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing to compliance@planning.nsw.gov.au and identify the development (including the development application number and name) and set out the location and nature of the incident.	Section 7.2
Non-Compliance Notification		
3A	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing to compliance@planning.nsw.gov.au and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the	Section 7.2

Condition	Description	Section/s Addressed
	noncompliance (if known) and what actions have been, or will be, undertaken to address the noncompliance. <i>Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.</i>	
Independent Environmental Audit		
5	Prior to 31 December 2012, and every 5 years thereafter, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. This audit must: a) be led by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the planning Secretary. b) be conducted by a suitably qualified, experienced and independent team of experts (including any expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the planning secretary; c) be carried out in consultation with the relevant agencies and the CCC d) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, water licenses and mining leases for the development (including any assessment, strategy, plan or program required under these approvals); e) review the adequacy of any approved strategy, plan or program required under the above mentioned approvals and this consent; f) recommend appropriate measures or actions to improve the environmental performance of the development and any assessment, strategy, plan or program required under the above mentioned approvals and this consent; and g) be conducted and reported to the satisfaction of the Planning Secretary.	Section 7.3
6	Within three months of commencing an Independent Environmental Audit, or within another timeframe agreed by the Planning Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementations of the recommendations. The recommendations must be implemented to the satisfaction of the Planning Secretary.	Section 7.3
Community Consultative Committee		
7	The Applicant must operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Planning Secretary, in accordance with the Department's Community Consultative Committee Guidelines: State Significant Projects (2019)	Section 7.1
Access to Information		
8	Within 3 months of the approval of any plan/strategy/program required under this consent (or any subsequent revision of these plans/strategies/programs), or the completion of the audits or Annual Reviews required under this consent, the Applicant must: a) provide a copy of the relevant document/s to the relevant agencies and CCC; and b) put a copy of the relevant document/s on its website	Section 7.6
9	During the development, the Applicant must: a) include a copy of this consent, as may be modified from time to time, on its website;	

Condition	Description	Section/s Addressed															
	b) provide a full summary of monitoring results required under this consent on its website; and																
	c) update these results on a regular basis (at least every 6 months).																
Statement of Commitments (Refer to Appendix 4 of Project Approval)																	
6	Biodiversity. The proponent will implement the biodiversity offset strategy outlined in the EA, which includes the conservation and long-term protection of the areas described in <i>Table 1</i>. <i>Table 1 Biodiversity Offset Areas</i> <table> <tr> <th>Land Description</th><th>Area (ha)</th><th>Proposed Management Strategy</th></tr> <tr> <td>Lot 187 DP 751028</td><td>8.2</td><td>stock removal, weed control, planting of EEC trees, transport of logs and rocks, provision of nest boxes</td></tr> <tr> <td>Lot 39 DP 751028</td><td>11.65</td><td>stock removal, weed control, major planting of EEC trees and grasses, transport of logs and rocks</td></tr> <tr> <td>Lot 49 DP 751028</td><td>16.3</td><td>stock removal, weed control</td></tr> <tr> <td>Total</td><td>36.15</td><td></td></tr> </table> Responsibility: Daracon Quarries Timing: Ongoing for the duration of the project.	Land Description	Area (ha)	Proposed Management Strategy	Lot 187 DP 751028	8.2	stock removal, weed control, planting of EEC trees, transport of logs and rocks, provision of nest boxes	Lot 39 DP 751028	11.65	stock removal, weed control, major planting of EEC trees and grasses, transport of logs and rocks	Lot 49 DP 751028	16.3	stock removal, weed control	Total	36.15		Section 5.2
Land Description	Area (ha)	Proposed Management Strategy															
Lot 187 DP 751028	8.2	stock removal, weed control, planting of EEC trees, transport of logs and rocks, provision of nest boxes															
Lot 39 DP 751028	11.65	stock removal, weed control, major planting of EEC trees and grasses, transport of logs and rocks															
Lot 49 DP 751028	16.3	stock removal, weed control															
Total	36.15																
7	The proponent will prepare a detailed biodiversity offset management plan in consultation with the DECC and submit it for approval by the Director-General. The plan will include: • proposed staging • planting details such as final density, species mix, sowing rates, fertiliser, proposed maintenance schedule; • proposed maintenance schedule; • weed control; • importation of rock and log shelter • topsoil handling; • fencing • pre-clearance surveys of all hollow bearing trees within the proposed quarry extension area • herbivore control; and • number and location of nest boxes. Responsibility: Daracon Quarries Timing: Plan to be submitted for approval prior to work commencing within the Extraction Area.	Section 5.2 and 5.3															
8	The proponent will make suitable arrangement to provide appropriate long-term security for the Offset Areas. Responsibility: Daracon Quarries Timing: Within 3 years of work commencing within the extraction area	Section 5.2.6															

2.2 EPBC 2007/3442

Table 2.2 below outlines the relevant EPBC Approval (EPBC2007/3442) conditions and where they have been addressed within the LMP.

Table 2.2 EPBC 2007/3442 Approval Conditions related to Biodiversity and Rehabilitation

Condition	Description	Section/s Addressed
Biodiversity Offset Strategy		
1	The person taking the action must develop a Biodiversity Offset Strategy to protect and enhance White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland on Lots 187, 39 and 49 on DP751028 or an equivalent area. The Offset Strategy must specify:	Section 5.2
	a) The purpose of the Strategy including desired outcomes of implementing the Strategy;	Section 5.2
	b) The short (within 12 months from the date of this approval), medium (within three years from the date of this approval) and long term (within five years from the date of this approval) measures that would be employed to implement the Biodiversity Offset Strategy;	Section 5.2.7
	c) Strategies to create and enhance habitat linkages with surrounding woodland remnants;	Section 5.2.2
	d) Details of how the person taking the action will provide for the long-term security of the offset areas;	Section 5.2.6
	e) Procedures to be implemented for: i. Managing the remnant vegetation and habitat on site ii. Managing impacts on fauna iii. Protecting areas outside the disturbance areas iv. Controlling weeds and feral pests, and v. Controlling access	Section 5.3.1.1 Sections 5.3.1.1 Section 5.3.1.5 Sections 5.2.1.2 & 5.2.1.3 Section 5.2.1.1
	f) Detailed performance and completion criteria for the implementation of the Biodiversity Offset Strategy;	Section 5.2.4
	g) A detailed description of how the performance of the implementation of the Biodiversity Offset Strategy would be monitored over time to achieve the objectives and completion criteria;	Section 0
	h) A description of the potential risks to successful rehabilitation in the offset area, and a description of the contingency measures that would be implemented to mitigate these risks; and	Section 0
	i) Details of who is responsible for monitoring, reviewing and implementing the strategy.	Section 7.0
Biodiversity Offset Strategy		
2	The person taking the action must develop a Rehabilitation Plan to rehabilitate the existing and proposed disturbed areas on Lot 218 DP 751028 and Lot 1 DP 1001734. The Plan must Specify:	Section 5.3
	a. The purpose of the Plan including desired outcomes of implementing the Plan;	Section 5.3
	b. Detailed performance and completion criteria for the rehabilitation of the site;	Section 5.3.2.3
	c. The short, medium and long term measures that would be employed to implement the Rehabilitation Plan;	Section 5.3.4

Condition	Description	Section/s Addressed
	d. Strategies to create and enhance habitat linkages with surrounding woodland remnants;	Section 5.2.2
	e. Procedures to be implemented for: i. Progressively rehabilitating areas disturbed by quarrying; ii. Implementing revegetation and regeneration within the existing and proposed disturbance areas, including establishment of a canopy, sub-canopy (if relevant), understorey and ground strata; iii. Protecting areas outside the disturbance areas; iv. Conserving and reusing topsoil; and v. Collecting and propagating seeds for rehabilitation works.	Section 5.3.2 Sections 5.3.2.1, 5.3.2.2 Section 5.3.1.5 Section 5.3.1.2 Section 5.3.1.4
	f. A description of the potential risks to successful revegetation, and a description of the contingency measures that would be implemented to mitigate these risks;	Section 5.3.2.3
	g. Details of who is responsible for monitoring, reviewing and implementing the Plan.	Section 7.0

2.3 Stakeholder Consultation

In accordance with Schedule 3, Condition 27(a) and Condition 28 (a) of the Project Approval, the original Version 1 of this LMP has been prepared in consultation with the then DPIE and stakeholders as required by the Project Approval. Consultation undertaken with DPE in the preparation of this document is summarised in **Table 2.3** below and included in **Appendix 1**.

Table 2.3 Consultation undertaken for the Landscape Management Plan

LMP Version	Date	Consultation Undertaken With
Version 1	2010	DPIE, OEH
Version 2	2019	<i>DPIE - The draft plan has been submitted to OEH however no comments have been received to date.</i>
Version 3	April 2020	<i>DPIE - Biodiversity and Conservation Division (BCD) (formerly OEH) - Comments received from the BCD in August 2019. Response to the BCD's comments were provided by Daracon to DPIE on 18 September 2019. Commitments detailed in this response have been included in the current revision of the LMP.</i>
Version 4	July 2021	<i>DPIE – Initial comments received from DPIE in September 2021. DPIE requested approval to be sought for submission of the LMP on a progressive basis and for this to be indicated in Section 1 of the LMP. DPIE also requested clarification of the last dot point in Table 4.1. Comments have been addressed in Version 5 of the LMP.</i>
Version 5	December 2021	<i>This version of the LMP will be submitted concurrently to DPIE for comment via the DPIE Planning portal.</i>
Version 6	June 2022	<i>This version of the LMP will be submitted DPE for comment via the DPE Planning portal. Note, further consultation will be undertaken with the appropriate stakeholders during the finalisation of the Doughboy Hollow Creek Rehabilitation Strategy. This document is currently in draft therefore consultation has not yet occurred. This LMP will be updated to reflect consultation at the appropriate time.</i>
Version 7	December 2022	<i>This version of the LMP will be submitted DPE for comment via the DPE Planning portal. Note, further consultation will be undertaken with the appropriate stakeholders during the finalisation of the Doughboy Hollow Creek Rehabilitation Strategy. This document is currently in draft therefore consultation has not yet occurred. This LMP will be updated to reflect consultation at the appropriate time.</i>
Version 8	August 2023	<i>This version of the LMP will be updated to final once consultation has been undertaken in regard to the finalisation of the Doughboy Hollow Rehabilitation Strategy. This document is currently in draft therefore consultation has not yet occurred. This LMP will be updated to reflect consultation at the appropriate time.</i>

Version 1 (V1) of the LMP was prepared in consultation with the regulatory authorities as required by the Project Approval. During the revision of the LMP for this Version 2 (V2), Daracon consulted with DPIE (now DPE) on 2 November 2018 regarding DPIE providing approval of the suitably qualified person to prepare this revision of the LMP. DPIE advised on 2 November 2018 that DPIE do not approve consultants for the purpose of updating management plans and that Daracon were to proceed with updating the LMP. Comments were received from the Biodiversity Conservation Trust (BCT) on 13 August 2019. The BCT advised that additional information was required in relation to the Doughboy Hollow Creek Rehabilitation Strategy, short, medium and long term offset targets and objectives and offset monitoring methodology. Daracon provided response to the DPIE regarding the BCT comments on 18 September 2019 which included commitments to address these aspects in subsequent reviews of the LMP. Agency comments are presented in **Appendix 1**.

Daracon are continuing to liaise with the DPE and the BCT to assist in the determination of the most appropriate mechanism for securing the Quarry offset properties (refer to **Section 5.2.6**). Since the last version of this LMP (Version 3 – April 2020), Daracon have determined that a Conservation Agreement is the preferred mechanism for securing the offset properties. Daracon are currently in the process of finalising this agreement with the BCT and a draft Conservation Agreement (No CA0363) has been received by Daracon.

Note, further consultation will be undertaken with the appropriate stakeholders during the finalisation of the Doughboy Hollow Creek Rehabilitation Strategy. This document is currently in draft therefore consultation has not yet occurred. This LMP will be updated to reflect consultation at the appropriate time. Note that in 2021 DPE granted Daracon approval to submit this LMP in a staged approach.

3.0 Ardglen Quarry Environmental Setting

3.1 Topography

The Ardglen Quarry and Offset Areas can be characterised as occurring on moderately steep and rocky hillslopes which contain ephemeral gullies. Elevation ranges from approximately 650 – 750 m AHD.

3.2 Geology and Soils

The Ardglen Quarry and Offset Areas are mapped as being underlain by Liverpool Range beds comprised of basalt, dolerite, polymictic conglomerate, quartzose sandstone, shale and bole (1:250,000 Tamworth Geological Map Sheet, Geoscience Australia). Site observations revealed that basalt weathers to a 10 - 15 m deep brown clay subsoil (Orogen, 2010).

3.3 Vegetation

A total of four vegetation communities were recorded during an initial site inspection by Orogen on the Quarry expansion and Offset Areas in 2010 (Orogen, 2010). During the 2019 spring offset monitoring, these vegetation zones were assigned a Plant Community Type (PCT) in order to be comparable with the PCT benchmarks and track condition and progress over time. These PCTs have been described using floristic data, broad-scale vegetation mapping and using knowledge of the local topography and landscape. The vegetation zones recorded by Orogen with their corresponding PCT, allocated by Umwelt, are outlined in Table 3.1 below.

Table 3.1 Vegetation Zones with Corresponding PCTs

Vegetation Zone and Description (Orogen 2010)	PCT Name
Blakelys Red Gum (+/- Yellow Box) Dry Sclerophyll Grassy Woodlands/Open Woodland on the steep, rocky hillslopes and hillcrests. Associated canopy species comprised red stringybark (<i>E. macrohyncha</i>), Blakely's red gum (<i>E. blakelyi</i>), yellow box (<i>E. melliodora</i>) and brittle gum (<i>E. mannifera subsp praecox</i>).	PCT 496 - Yellow Box - White Box - Silvertop Stringybark - Blakely's Red Gum grass shrub woodland mainly on the Liverpool Range, Brigalow Belt South Bioregion.
River Oak (<i>Casuarina cunninghamiana</i>) Dry Sclerophyll Woodland along sections of the ephemeral/semi-permanent Doughboy Hollow Creek adjoining the quarry.	PCT 485 - River Oak riparian grassy tall woodland of the western Hunter Valley (Brigalow Belt South Bioregion and Sydney Basin Bioregion).
White Box (<i>Eucalyptus albens</i>) and Rough barked Apple (<i>Angophora floribunda</i>) Dry Sclerophyll Grassy Woodland along some of the ephemeral gullies and lower hillslopes on the offset sites.	PCT 433 - White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, Brigalow Belt South Bioregion.
Derived grassland supporting a heavily degraded pasture dominated by the native grazing tolerant grass <i>Bothriochloa macra</i> and the perennial exotic grass <i>Paspalum dilatatum</i> . This dominant understorey state formed a mosaic in places with other grazing tolerant native perennial grasses <i>Austrodanthonia richardsonii</i> and <i>Austrostipa scabra</i> along with mostly exotic annuals and perennials. Scattered swards and patches of other native grasses and forbs indicated a pasture with at least a partially intact native soil seedbank.	PCT 796 - Derived grassland of the NSW South Western Slopes.

4.0 Doughboy Hollow Creek Rehabilitation Strategy

4.1 Introduction

Doughboy Hollow Creek is a non-permanent watercourse, which flows in response to rainfall run-off from the surrounding hills and meanders through one of the three offset sites, this being Offset Area B (refer to **Figure 1.2**.) It is understood that a small weir was established on the creek in the past as the water supply access point for the Quarry. As quarry operations primarily utilise an in-pit sump for water supply purposes, water will only be accessed at this location in accordance with the relevant active Water Access Licences. In addition, a small causeway located approximately 200 m north of the weir provides access across Doughboy Hollow Creek. The location of the causeway and weir is included on **Figure 1.2**.

In May 2022, a site inspection of the Doughboy Hollow Creek, including both the Causeway and Weir was undertaken by Darren Lyons of Umwelt, a suitably qualified consultant, to review status of vegetation and erosion within Doughboy Hollow Creek as an update of the baseline inspection undertaken in 2010.

In June 2023, a site inspection of Doughboy Hollow Creek and the surrounding riparian areas was undertaken by Amber Wilson, Senior Ecologist at Umwelt to establish a new baseline indication of native vegetation and weed coverage, species composition and to document the existing environment of the creek.

4.2 Objectives and Consent Conditions

The objectives of this rehabilitation strategy are to provide a structure to underpin the rehabilitation and restoration process of Doughboy Hollow Creek that will improve biodiversity values in this area and provide a safe and stable landform.

The Doughboy Hollow Creek Rehabilitation Strategy has been prepared to meet the requirements of Schedule 3 Condition 28 of the Development Consent (06_0264). Condition 28 has been reproduced below:

- a. be prepared in consultation with BCS, DPIE Crown Lands and DPIE Water;
- b. describe the measures that would be implemented to:
 - i. remove the weir from Doughboy Hollow Creek;
 - ii. rehabilitate the creek within or directly adjacent to Lot 1 DP1001734 and Lot 39 DP 751028; and
 - iii. rehabilitate and/or re-establish riparian vegetation within Lot 39 DP 751028.
- iv. Actions to be undertaken to meet these consent conditions are outlined further in Section 4.4.

4.3 Existing Environment

Doughboy Hollow Creek is a third order stream at the point that it enters the Study Area (refer to **Figure 4.1**). The creek itself can be described as a shallow-incised, rocky (basalt) ephemeral stream, with varying levels of erosion throughout its course. A small causeway crosses its course in the north of the Study Area, and a rocky weir crosses again 200 m south of this point.

The Study Area encompasses a roughly 20 m buffer from the centreline of the creek. The northern extent of the Study Area is bounded by a concrete culvert underneath a rail embankment through which the creek is channelled. The southern extent of the Study Area is bounded by the Offset B boundary. To the east, the Study Area is bounded by a gravel track, and to the west, there is a fence line, and existing infrastructure in the form of sheds and part of the processing plant intersects with the Study Area, see **Figure 4.1**.

Ardglen Quarry lies west of the creek line and pastoral land with scattered remnant trees occur to the east. The ephemeral creek meanders through the small valley, with the landscape forming a greater slope on the western side coming down from the Quarry. The channel is a relatively shallow incised channel of approximately 2-3 m wide, and the bed is of a rock structure. The creek is reasonably healthy, with a desirable pool-riffle sequence, and evidence of a range of macro-invertebrate species using the watercourse. See **Photo 4.1** and **Photo 4.2** for details.

The riparian vegetation within the Study Area is almost entirely exotic, with only small areas of remnant vegetation. The canopy is largely comprised of woody weeds such as willow (*Salix sp.*) and large-leaved privet (*Ligustrum lucidum*), with a single apple tree (*Malus sp.*) occurring on the east bank. Between the weedy overstorey, stands of river oak (*Casuarina cunninghamiana*) persist and remnant Eucalypts are scattered along both creek banks. The midstorey is almost entirely comprised of thick stands of small-leaved privet (*Ligustrum sinense*). Dense blackberry (*Rubus sp.*) thickets and some native shrubs such as sifton bush (*Cassinia sp.*) also occur in patches along the creek line. The ground layer is dominated by exotic perennial grasses, predominantly kikuyu (*Cenchrus clandestinus*) and Phalaris (*Phalaris aquatica*) and some areas with a significant coverage of invasive fennel (*Foeniculum vulgare*). These groundcovers particularly thrive in sections of the creek banks which are devoid of any overstorey. Madeira vine (*Anredera cordifolia*) is also present in the southern area of the Study Area. The vegetation community that occurs along the creek line most closely represents PCT 84 River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion, however the vegetation is considered to be in very poor condition.

The soil at the Study Area varies in composition and depth, with evidence of bank erosion at a small number of points along the creek line (see **Photo 4.3**). The substrate in northern area of the Study Area is rocky and contains aggregate and quarry rubble within the soil matrix. The substrate along the causeway is almost entirely comprised of blue metal aggregate. At the southern extent of the Study Area, deeper alluvial soils occur.

Redundant rail infrastructure including scrap metal is present both within the creek and embedded into the banks along the extent of the creek, but most of this occurs towards the southern end of the Study Area.



Legend

- Study Area
- Existing Infrastructure
- Biodiversity Offset Area Boundary
- Doughboy Hollow Creek
- Rock Weir along Doughboy Hollow Creek
- Causeway

FIGURE 4.1

Doughboy Hollow Rehabilitation
Strategy Study Area



Photo 4.1 **Doughboy Hollow Creek near to the causeway**



Photo 4.2 **Doughboy Hollow Creek looking South near to the existing quarry infrastructure**



Photo 4.3 Erosion in the South of the Study Area near to the Offset Area boundary

4.4 Rehabilitation Strategy

4.4.1 Regulator Consultation

As per the requirement of Schedule 3, Condition 28 of the Project Approval, consultation will be undertaken with BCS, DPE, Crown Lands and DPE Water. Preliminary consultation has been undertaken with BCS, Crown lands and DPE in early 2023 to understand and confirm the approach to be undertaken in regards to the development of the Doughboy Hollow Rehabilitation Strategy. It is intended that the first draft document will be sent to relevant Departments for comment. Feedback from this consultation will inform the contents of the final document, which will then be submitted to each Department for final review.

It is proposed that an Umwelt restoration ecologist will conduct a site inspection of the Study Area with a representative from each agency noted above to further consult upon the outcomes of this strategy before the submission of this document for DPE consideration.

4.4.2 Rock Weir Removal

A rock weir had previously been constructed on Doughboy Hollow Creek just outside the Quarry's central eastern boundary (east of the plant crusher and approximately 200 m south of the causeway) refer to **Figure 1.2**. The weir was reportedly constructed so that the former Ardglen Quarry operator could extract water for its processing operations.

The weir is no longer discernible as a structure and is currently underwater. A riparian condition and flow modelling assessment undertaken by Umwelt (Umwelt, 2023) found that the weir structure has minimal influence on broader stream flow conditions and given the limited height of this structure above natural bed level provides for limited backwater influence (magnitude and extent) upstream in low flow conditions. This assessment concluded that the removal of the weir is expected to provide no net improvement to the overall condition and ecological value of Doughboy Hollow Creek. This was further confirmed during an inspection in 2023. It is therefore not recommended that this structure is removed. The removal would likely result in degradation to the surrounding area providing no ecological benefit.

4.4.3 Riparian Vegetation Restoration

The Project Approval conditions require that riparian vegetation be re-established along Doughboy Hollow Creek. In accordance with Project Approval Schedule 3, Condition 28, Daracon will rehabilitate sections of the creek within or directly adjacent to Lot 1 DP 1001734 and Lot 39 DP 751028, however it is important to note that Lot 39 DP 751028 (Offset Area B) is land that is under a Conservation Agreement (refer to **Figure 1.3**). Daracon will re-establish riparian vegetation within Lot 39 DP 751028 in line with the management actions set out in the Conservation Agreement.

The existing condition of the riparian corridor will require a carefully managed restoration strategy to limit the risk of further creek line erosion, reduced water quality and to maintain connectivity along the creek line. The main objective will be to re-establish native vegetation that is representative of riparian vegetation known to occur in the wider locality. The poor conditions of the creek line and modified creekbanks and surrounds, will make it difficult to establish a PCT to meet benchmark conditions (as set out in the NSW Vegetation Classification database), therefore it is proposed the objective of restoration should be to establish vegetation species composition characteristics associated with riparian communities such as the PCT 84 River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion.

The restoration of the riparian area will require the following management actions to ensure native vegetation is re-established across the riparian corridor:

- Weed control
- Rubbish removal
- Bank stabilisation works (in channel works subject to monitoring identifying the need for bank stabilisation works and additional approvals as necessary)
- Site preparation and Revegetation
- Ongoing weed control and in fill planting (maintenance).

4.4.3.1 Weed Control

Daracon proposes to undertake a weed control program to decrease the density of exotic species (primarily high threat weed species) within the Study Area to restore natural biodiversity.

Weed control would be undertaken across the Study Area initially focusing on high threat woody weed and vine species, in preparation for revegetation works. Ideally, all large woody weeds such as willows (*Salix sp.*) and apple (*Malus sp.*) would be treated in Year One of the program with a focus on direct herbicide treatment by methods such as drill and fill and retaining the trees in-situ to provide bank stability and habitat for perching and roosting fauna species.

The remaining woody weeds such as large leaved privet (*Ligustrum lucidum*) and small leaved privet (*Ligustrum sinense*) would be removed in a progressive manner with priority given to areas surrounding any native canopy species or small patches of native vegetation. Focus would then transition on moving from the southern boundary towards the rail line. This method allows for the improvement of areas around existing native vegetation and the option of breaking up the restoration area into smaller management units therefore allows the staggering of weed control and revegetation works.

The other major woody weed is blackberry (*Rubus sp.agg.*). This is another species that will benefit from early control, in particularly in areas of revegetation. Early treatment will focus on slashing and herbicide treatment of regrowth during active growing periods, with persistent follow up control to limit the re-establishment of this species.

The vine weed madeira vine (*Anredera cordifolia*) was observed growing within native canopy species within the Study Area. The control of this species will be prioritised in the early years (1-2) of management to allow for appropriate control prior to revegetation works. Treatment of this species will be determined based on location with a mix of herbicide and manual removal.

The remaining weeds within the riparian corridor are generally lower priority groundcover species that will provide bank stability; therefore the treatment of these species will only occur in preparation for revegetation works and progressive control to allow natural recruitment to occur.

The weed control strategy will be guided by the extent of revegetation that is feasible in the following 12-24 months (with the exception of large woody weeds) to minimise risks to the Study Area.

4.4.3.2 Bank Stabilisation

Restoration works within the Study Area will be undertake in manner that would limit large areas of creekbank being exposed to erosion and stability risk. It is not proposed to implement extensive bank stabilisation works as currently the banks appear stable. Bank stabilisation works may be required periodically to ensure any active erosion areas are contained.

Bank stabilisation work may include:

- The use of Rip rap scour protection where obvious signs of high velocity water is eroding creek banks
- Minor erosion slumps or areas observed to have a risk of soil loss would be retained using cut timber and branches from woody weed biomass as erosion control measures (seed free at the time of install)
- Soil stabilisation through the use of jute mesh in highly erodible areas.

The monitoring program will assess erosion status and success of erosion mitigation measures annually as outlined in **Section 4.5**.

4.4.3.3 Rubbish Removal

There are some components of the redundant rail infrastructure (e.g. fencing, corrugated sheeting) that can be readily removed from the creek whereas other components are embedded within the creek bank. To remove these components may cause structural issues and damage to the creek banks themselves, however leaving them in situ could cause further scouring issues in the future. Where practicable and where there is a low risk to increasing erosion, rubbish would be removed from the riparian zone. The use of machinery would be limited to equipment that will not damage or exacerbate erosion to the creek banks and wider riparian area. The removal of material will be discussed in the field as part of the site inspection to be undertaken with regulatory authorities as part of the consultation on this plan.

4.4.3.4 Revegetation

As there is currently minimal native vegetation, the natural regeneration capacity of the Study Area is likely to be limited. Planting is proposed to assist the re-establishment of native vegetation within the riparian corridor.

The aim of revegetation works will be to increase native species composition and cover with a focus on the re-establishment of a canopy and shrub layer. The dense exotic ground cover currently provides a form of erosion protection therefore the control of these species would be progressive. Groundcover revegetation should only be used where there is a benefit of increasing stability to creek banks through the use of small shrubs and sedges.

Prior to revegetation, site preparation works will be required where exotic groundcover is dense and would compete with installed tubestock. Site preparation (as detailed in **Table 4.2**) would include at a minimum:

- Slashing of exotic groundcover
- Two applications of herbicide (at least 6 weeks apart) by spot spraying tree rings at the density proposed for tree and shrub planting in **Table 4.2**. Spot spraying in patches proposed for tubestock application is preferable to broad acre spraying which increases the risk of widespread weed colonisation over time.

Revegetation works will include:

- Plants should be installed using methods such as auger drilled holes or hand mattocks to provide sufficient loose material to back fill each tube in the ground.
- Installation of tubestock at densities recommended in Table 4.1
- At the time of install each plant will have a soil conditioning medium (Terraform) applied to improve growth of each plant and watered with a minimum of 1 litre of water

- Plant guards should be installed as required to reduce grazing from native and feral animals and should be considered based on monitoring results
- Maintenance of installed tubestock should occur on as needs basis through the cooler months with a minimum of monthly maintenance visits for the proceeding spring and summer periods. Maintenance will include, weed control, water (if required).

All revegetation works should occur during the cooler months from April -September each year, and favour times after rain to ensure sufficient soil moisture is present.

Revegetation will utilise species from the indicative planting list below (refer to Table 4.1). Please note that this list is indicative, and guidance would be sought by a professional bush regenerator prior to revegetation works.

Table 4.1 Indicative Planting List

	Common name	Scientific name	Planting density - riparian corridor
Canopy	River Oak	<i>Casuarina cunninghamiana</i>	1 stem / 10m ²
	Blakely's Red Gum	<i>Eucalyptus blakelyi</i>	
	Rough-Barked Apple	<i>Angophora floribunda</i>	
	Ribbon Gum	<i>Eucalyptus viminalis</i>	
	Yellow Box	<i>Eucalyptus melliodora</i>	
	White Box	<i>Eucalyptus albens</i> (upper banks)	
	White Cedar	<i>Melia azedarach</i>	
Mid-storey	Weeping Bottlebrush	<i>Callistemon viminalis</i>	1 stem / 5m ²
	Hickory Wattle	<i>Acacia implexa</i>	
	Blackthorn	<i>Bursaria spinosa</i>	
	Native Olive	<i>Notelaea microcarpa</i>	
	Cough Bush	<i>Cassina laevis</i>	
	Tantoon	<i>Leptospermum polygalifolium</i>	
	Cheese Tree	<i>Glochidion ferdinandi</i>	
Other	Tall Sedge	<i>Carex appressa</i>	1 plant /m ²
	Spiny-Headed Mat-Rush	<i>Lomandra longifolia</i>	

Note: Species list has been comprised of native species identified during site inspections and references species which likely occurred before disturbance (derived from PCT 84 River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion).

4.4.3.5 Schedule of Works

Table 4.2 provides an indicative schedule of works and performance criteria that is proposed to restore the riparian vegetation.

Table 4.2 Indicative Doughboy Hollow Works Schedule and Performance Criteria

Management Action	Description	Performance Criteria	Timing
Weed Control			
Primary woody weed control	Control of all large willow and apple tree species within the Study Area and left in-situ	All large willow and apple tree species would be treated at least once with appropriate control method	End of Year 1
	Control of large-leaf and small leaf privet by appropriate best practice methods such as cut and paint.	50% reduction of baseline cover	End of Year 1
	Control of blackberry through slashing and herbicide treatment of regrowth during active growth period.	All primary control of woody weeds complete. No mature individuals alive	End of Year 2
Primary control of vine weeds	Primary control of madeira vine using best practice weed control methods e.g. scrap and paint, hand removal	90% reduction of baseline cover	End of Year 1
Follow up weed control	Follow up woody weed and vine control	<5% cover of woody weeds	End of Year 3
Maintenance weed control	Maintain woody and vine weed control	Maintain <5% cover	On-going from Year 4
Reduction of grassy and herbaceous weed species	Continued reduction of groundcover weed species to promote native species recruitment	<50% groundcover weed cover	End of Year 5
Bank Stabilisation			
Creek Bank Inspections	Assess the state of erosion and to determine if stabilisation works are required.	No active erosion observed within the Study Area	Annually
Revegetation/Planting			
Tubestock germination	Order predetermined tubestock at least 6-12 months prior to planting	Appropriate species selected from Table 4.1 are ready for installation 2 weeks prior to planting	Winter Year 2-3
Site Preparation works - Slashing	Slashing of revegetation areas	Complete at least 3 months prior to planting in Autumn- Winter	Complete prior to winter plantings Years 2 and 3
Site Preparation Works - Primary grass and herbaceous weed control	Treatment of groundcovers in preparation for revegetation works – spot spraying tree rings (min. 500mm diameter)	All tree rings treated at least twice prior to planting (6 weeks apart)	

Management Action	Description	Performance Criteria	Timing
Tree Planting	Installation of tubestock and soil conditioner in prepared planting areas at densities specified in Table 4.1	All trees installed and watered.	Autumn-Winter Year 2-3
Tree maintenance	Maintain a weed free tree ring through establishment	Tubestock alive and weed free	As required or at monthly intervals from spring after planting.
	Install tree guards as required	Trees are free of evidence of browsing	As required after planting.

4.5 Monitoring Program

A minimum of two permanent monitoring sites will be established in order to compare the pre-and post-rehabilitation condition of the Study Area and track the trajectory of the Study Area's condition over time.

- Baseline monitoring (prior to commencement of management) will involve the following:
- Establishment of a minimum of two monitoring plots (10 x 40 m) within the Study Area, delineated in the north east corner by a star picket or similar
- Establish baseline native vegetation condition (plots) using the Biodiversity Assessment Method (BAM)
- Establish baseline weed cover for the Study Area to inform performance criteria. Weeds should be grouped into similar growth groups woody weeds, vines, grassy and herbaceous weeds
- Conducting photo monitoring at these monitoring points, facing into the plot to the south west
- Establishment of a list of weeds with high invasive potential with current infestations on the Study Area based on Weeds of National Significance, High Threat Weeds listed under the BAM, and Biosecurity Weeds listed for the Hunter region
- Establish general notes on health and condition of the creek, including erosion status and success of erosion mitigation measures.

After the first year of management actions have been completed, the monitoring program will commence in accordance with **Table 4.3**.

Table 4.3 Monitoring Schedule

Method of Monitoring	Baseline	Timing
Establish 2 x biodiversity monitoring plot in accordance with the BAM	Yes	Year 1,2,3,4, 5
Photo monitoring point	Yes	Annual
Weed density mapping	Yes	Annual
Annual inspection (Site condition review against performance criteria)	Yes	Annual
Tree stem count	At time of install	Annual

The monitoring program will involve a baseline (pre-rehabilitation) event, followed by four, annual monitoring events to form five years of monitoring. Following the fifth year, the performance of the Study Area against the completion criteria would be reviewed, with further monitoring or actions recommended at this point. The progress of this strategy would be reported annually and included as part of the Annual Review completed for the Quarry as outlined in **Section 7.0**.

4.6 Short Medium and Long Term Management Measures

Table 4.4 outlines the short, medium and long term actions to be implemented over the next five years.

Table 4.4 Doughboy Hollow Creek Actions to be implemented 2023 - 2028

Task	Details of task	Due Date /Timing
Short Term		
Doughboy Hollow Creek Rehabilitation Strategy	The review of rehabilitation works required will include: • Consultation with DPE, BCS, DPE Crown Lands and DPE Water regarding proposed rehabilitation works, performance criteria, monitoring program, and any approval requirements. Note that this consultation has not yet been undertaken as the Strategy has not been finalised for submission to DPE; and • Following consultation with DPE, BCS, DPE Crown Lands and DPE Water a revision of this LMP will be developed to include the works program and detail actions required to be undertaken at Doughboy Hollow Creek specifically during the following 5 year period.	To be approved by DPE prior to quarrying being undertaken in the Extension Area as identified in the Project Approval.
Establishment of Monitoring Program Baseline	Establishment of monitoring points and collection of baseline data as per Section 4.5 .	Following acceptance and endorsement of Doughboy Hollow Rehabilitation Strategy, but prior to commencement of rehabilitation works.
First Year Rehabilitation Strategy Components	As outlined in the Rehabilitation Strategy, first year components involve: • Control of weeds as per Section 4.4.3.1 • Removal of metal waste; and • Bank stabilisation works (if required).	Within one year following acceptance and endorsement of Doughboy Hollow Rehabilitation Strategy.
Medium Term		
Second Year Rehabilitation Strategy Components	As outlined in the Rehabilitation Strategy, second year components involve: • Control of weeds as per Section 4.4.3.1; and • Revegetation.	Within two years following acceptance and endorsement of Doughboy Hollow Rehabilitation Strategy.
Commencement of Monitoring Program	Commencement of monitoring program and comparison to baseline data where applicable, as per Section 4.5 .	Annually following commencement of rehabilitation works.

Task	Details of task	Due Date /Timing
Long Term		
Ongoing weed control and plantings	Ongoing weed control from years 3 – 5 as per Table 4.2 . Ongoing plantings if survivorship threshold is not met.	Within five years of commencement of rehabilitation works.
Ongoing monitoring	Annual monitoring for the first five years. Review against completion criteria to inform whether further monitoring or corrective action is required.	Annually for the first five years with review against completion criteria to inform whether further monitoring is required.

4.7 Completion Criteria

The completion criteria for the Doughboy Creek Rehabilitation Strategy are detailed in the **Table 4.5**.

Table 4.5 Doughboy Hollow Completion Criteria

Aspect	Performance and Completion Criteria	Trigger	Potential Corrective Action
Vegetation Establishment	Revegetation program is undertaken in Year 2/3 of the program. Species planting list follows that which is outlined in Section 4.4.3.4 .	<80% of the installed tubestock matches the planting list.	Rework or supplementary planting is undertaken.
	Following the implementation of the revegetation program, more than 80% of planted tube stock have survived in each of the planting areas.	Annual monitoring indicates that less than 80% of plants have survived within four years post planting.	Supplementary planting is undertaken.
Weed cover	Woody weed coverage is less than 5% within five years from the commencement of the strategy.	Woody weed and vine coverage is over 5%.	Further weed control works until this parameter is achieved.
	Exotic species cover in lower stratum.	Exotic species coverage is more than 50% in the lower stratum.	Further weed control until this parameter is achieved.
Erosion	Banks are stable and no active erosion occurring within the Study Area.	Active erosion observed within the Study Area.	Bank stabilisation works or application of ameliorative strategies such as jute mesh, rip rap or logs implemented.

5.0 Rehabilitation and Biodiversity Offset Management Plan

5.1 Rehabilitation Bond

To fulfill the requirements of the Project Approval, Daracon will lodge a Rehabilitation Bond with the Department to ensure that the rehabilitation of the Ardglun Quarry is implemented in accordance with the rehabilitation / closure objectives and criteria as defined in **Section 6**. The sum of the bond will be an amount agreed by the Planning Secretary and will be determined by:

- Calculating the cost of rehabilitating all disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and
- Employing a suitably qualified, independent and experienced person to verify the calculated costs.

The calculation of the rehabilitation bond will be submitted to the Department for approval at least two months prior to the lodgement of the bond in accordance with the Development Consent.

The Rehabilitation Bond will be reviewed and, if required, an updated bond will be lodged with the Department within 3 months of the following:

- Any update or revision to the Rehabilitation and Biodiversity Offset Management Plan;
- The completion of an Independent Environmental Audit in which recommendations relating to rehabilitation have been made; or
- In response to a request by the Planning Secretary.

Schedule 3 Conditions 32A and 32B note the process whereby the Department may either release or call in the Rehabilitation Bond.

The current rehabilitation bond for the site was approved by DPE in 2016.

5.2 Biodiversity Offset Management Strategy

This Biodiversity Offset Management Strategy has been prepared to meet the requirements of both the Project Approval and EPBC Approval 2007/3442. This section of the LMP applies to the three offset properties which have been established at the Quarry, refer to **Figure 1.3**. The Offset Areas at the Quarry include:

- Offset Area A – Lot 187 DP 751028 (6.8 ha)
- Offset Area B – Lot 39 DP 751028 (12.3 ha)
- Offset Area C – Lot 49 DP 751028 (15.8 ha).

A range of measures have already been undertaken by Daracon as part of ongoing management of the offset properties with these works largely related to land management including installation of fencing and weed control works. During 2019 and 2020, offset monitoring was undertaken to inform the status of the offset properties against the preliminary performance indicators. The completion of this offset monitoring has informed additional management measures which are recommended to be undertaken at the offset properties in 2021. These are required to be implemented with the results of the Offset Monitoring reported in the Annual Review. A copy of the annual offset monitoring will also be provided directly to BCS. The following sections detail the management measures, rehabilitation works, performance indicators and monitoring program to be implemented for the Ardglen Quarry Offset properties.

5.2.1 Offset Management Measures

5.2.1.1 Fencing and Stock Exclusion

Fencing has been established around all offset areas and fencing will be maintained over the life of the development, to the satisfaction of the Planning Secretary. In addition, fencing will be inspected on a 12 monthly basis as part of the annual offset area monitoring by Daracon, or by a contractor engaged by Daracon with fencing repairs made as required. All fencing has been constructed to a standard appropriate for excluding stock assess.

Any additional fencing construction will include the following:

- 4 or 5 strand wire of 3.5 mm size
- The top and bottom strands must be plain wire (not barbed wire) with the middle three strands being barbed wire
- The bottom strand is to be not less than 20 cm above ground level
- Wooden (or steel) posts are to be installed every 4 - 5 metres and
- Fence gates shall be constructed of Galvanised Steel with self-closing locks.

Fence condition is assessed as part of the Annual Offset Monitoring programme. Inspections undertaken as a part of 2020 monitoring indicated that all external fences to the BOA were functioning adequately with no breaches observed.

5.2.1.2 Weed Management

The three offset sites require ongoing management particularly for weeds as exotic perennial and annual grasses and broadleaves have the potential to spread once stock is excluded. Consistent with the Project Approval, an effective weed control program is implemented to limit the spread and colonisation of noxious and environmental weeds at the Quarry.

Weed management will be undertaken in accordance with most recent information available on the NSW WeedWise online resource (DPI, 2018). Actual control measures will be determined based upon the area in which activities are being undertaken (i.e., herbicides will be avoided where possible near water bodies) and the size of infestation present (mechanical removal may be more appropriate for small scale infestations). Where required, herbicide types and application rates will be informed by the control specifications from the NSW WeedWise recommendations (DPI, 2018). Herbicide application will be undertaken by suitably qualified personnel (Level 3 Chemical Accreditation). The annual offset area monitoring will also consider the potential for targeted stock grazing as a weed control technique.

The weed control works will also consider:

- Minimisation of vegetation disturbance by reducing the number of tracks
- Minimisation of clearing and other disturbance of vegetation associated with civil works
- Maintenance of topsoil stockpiles to eradicate weed infestation.

The annual offset area monitoring report (refer to **Section 0**) will be used to identify the weed control program for the following 12 month period with the weed control program to be detailed in the Annual Review.

5.2.1.3 Pest Management

Pest management will be conducted as required based on results of monitoring. Experienced pest control contractors will be engaged to perform any control programs required, including baiting, trapping, shooting etc. Pest management will be undertaken across both operational and rehabilitation areas.

Monitoring of pest species populations and the effectiveness of the control program will be undertaken and reported annually as part of offset monitoring. Recommendations and the proposed control program for subsequent year will also be included in the Annual Review.

The annual offset monitoring report (refer to **Section 0**) will be used to identify any pest control requirements for the following 12 month period with the pest control program to be detailed in the Annual Review.

5.2.1.4 Bushfire Management

Bushfire prevention is required under the *Rural Fires Act 1997*. The absence of fire will lead to a build-up of fire fuel and risk of high intensity bushfire. As the owner of the land, Daracon is required to take practicable steps to prevent the occurrence of bushfires on the land and minimise the spread of bushfire.

The primary management objective in relation to fire management is to protect lives, biodiversity values and infrastructure assets from the impacts of bushfires.

Key control measures will focus on:

- Documentation of access and water supply points for suppression activities
- Inspect and monitor firefighting equipment on site
- Communication of bushfire control measures and response procedures for provision to key stakeholders, including land managers, neighbours, consultants, contractors and employees.

In addition, an annual walkover assessment of the Offset Areas include an assessment of bushfire hazards, including fuels loads, fire events or impacts of fire management.

Any fuel hazard reduction burns will be planned in consideration of the requirements of the *Protection of the Environment (Clean Air) Regulation 2010 Part 3*. These events will also be planned in accordance with the *Bush Fire Environmental Assessment Code for New South Wales* (NSW Rural Fire Service, 2006a) and the guidelines contained in the *Threatened Species Hazard Reduction Lists for the Bush Fire Environmental Assessment Code* (NSW Rural Fire Service, 2006b). Burn intervals will consider the guidelines contained within the *Threatened Species Hazard Reduction Lists* as well as the OEH recommendations in the *Guidelines for Ecologically Sustainable Fire Management* (NPWS, 2004).

The annual offset monitoring report (refer to **Section 0**) will be used to identify any fire control works for the following 12 month period with the fire control program to be detailed in the Annual Review.

5.2.2 Offset Area Rehabilitation Methods

Rehabilitation of the offset sites will create habitat linkages with the surrounding woodland and grassland remnants via strategies detailed in the following sections.

5.2.2.1 Offset Rehabilitation Strategies

Natural Regeneration

All three Offset Areas contain areas of temperate derived grassland which support few trees and shrubs and are surrounded by grassy woodlands. Fencing and stock exclusion would be expected to facilitate natural native tree and shrub recruitment over time without the need for assisted revegetation (Orogen, 2010). The degree of overstorey recruitment was reviewed in 2019 as part of the offset monitoring program and did not meet the relevant performance criteria (>10-15% canopy cover in over 50% of Natural Regeneration monitoring plots) and so assisted revegetation was triggered. The location of offset area monitoring and corresponding vegetation at the monitoring locations are included in **Section 5.2.5**.

Assisted Revegetation

Assisted overstorey revegetation commenced within the Offset Areas in 2021 and involved the planting out of tree seedlings at a nominated density of 60 trees/ha within the derived grassland areas in order to re-establish a woodland tree stratum (refer to **Figure 5.1**). This nominated planting density would be expected to result, over time, in a mature tree density of 30 - 40 trees/ha based on natural attrition rates. Daracon engaged Umwelt to conduct ecological monitoring of the Ardglan Offset Areas during Spring 2019 and 2020 which identified locations in the Offset Areas to be targeted for planting in 2021. It is noted that the March 2021 planting has been undertaken by Daracon. Further detail regarding the planting undertaken will be included in the annual offset monitoring reports.

It is noted that prior to undertaking any works in the extension Area, Daracon will revise the Biodiversity Offset Strategy described in the EA and Response to Submissions to the satisfaction of the Planning Secretary. The revised strategy will be prepared in consultation with the BCS and include additional areas where Yellow Box White Box Blakely's Red Gum Woodland EEC would be actively re-established within the identified Biodiversity Offset Areas shown in **Appendix 3**.

The planting requirements for each offset are presented in **Table 5.1** below.

Table 5.1 Planting Requirements for the Ardglan Quarry Biodiversity Offset Areas

Biodiversity Offset Area (BOA)	Planting Schedule	Planting Area (ha)	Approximate No. trees to be planted
Offset A (Lot 187 DP 751028)	March 2021 (Planted)	1.61	97
	September 2021 (Planted)	1.76	106
Offset B (Lot 39 DP 751028)	March 2021 (Planted)	1.69	101
	September 2021 (Planted)	2.38	143
Total		7.44	447

Note: If monitoring shows evidence that natural recruitment is slowing, or has ceased, supplementary planting will be triggered in Offset Area C however current planting is focussed on Offset Area A and B (refer to **Section 5.2**).

Assisted revegetation will be undertaken to ensure the Offset Areas satisfy the Offset Area performance criteria, refer to **Table 5.2**. This assessment will be undertaken annually as part of the Offset Area monitoring. Planting to be undertaken in the Offset Areas will include species which are representative of Box Gum Woodland CEEC species, and species belonging to local Plant Community Types (PCTs) that are representative of this CEEC. It is noted that the below species list will also be used for rehabilitation planting as detailed in **Section 5.3.2.2** and **Figure 5.3**. The species list was revised following the 2019 offset monitoring program and is detailed below:

Trees

- white box (*Eucalyptus albens*)
- Blakely's red gum (*Eucalyptus blakelyi*)
- yellow box (*Eucalyptus melliodora*)
- rough-barked apple (*Angophora floribunda*)
- red stringybark (*Eucalyptus macrorhyncha*).

Small Trees/Shrubs

- box-leaf wattle (*Acacia buxifolia*)
- silver wattle (*Acacia dealbata*)
- hickory wattle (*Acacia implexa*)
- kangaroo thorn (*Acacia paradoxa*)
- western rosewood (*Alectryon oleifolius*)
- kurrajong (*Brachychiton populneus*)
- blackthorn (*Bursaria spinosa*)
- white cypress pine (*Callitris glaucophylla*)
- *Cassinia arcuata*
- *Cassinia quinquefaria*
- sticky hop-bush (*Dodonaea viscosa*)
- native cherry (*Exocarpos cupressiformis*)
- wilga (*Geijera parviflora*)
- native olive (*Notelaea microcarpa*)
- smooth darling-pea (*Swainsona galegifolia*)
- sticky daisy-bush (*Olearia elliptica*)
- peach heath (*Lissanthe strigosa*)
- urn-heath (*Melichrus urceolatus*).

Grasses/Groundcovers

- three-awn speargrass (*Aristida ramosa*)
- trailing woodruff (*Asperula conferta*)
- red grass (*Bothriochloa macra*)
- bristly cloak fern (*Cheilanthes distans*)
- plump windmill grass (*Chloris ventricosa*)
- yellow buttons (*Chrysocephalum apiculatum*)
- barbed wire grass (*Cymbopogon refractus*)
- wattle mat-rush (*Lomandra filiformis*)
- slender rice flower (*Pimelea curviflora*)
- grey tussock grass (*Poa sieberiana*)
- slender rats tail grass (*Sporobolus creber*)
- kangaroo grass (*Themeda triandra*).

The above species list is based on the species included within the NSW White Box-Yellow Box-Blakely's Red Gum Woodland final determination, species that have been recorded by the NSW Herbarium within 25 km of Ardglen and also based on expert knowledge.

Understorey Restoration

The derived grassland and grassy woodland understoreys on the three offset sites are highly degraded from clearing and heavy grazing activity which have resulted in a replacement of native perennial grasses (*Themeda australis* and *Poa sieberiana* and native forbs) with exotic perennial grasses, exotic broadleaf annuals and a few hardy native grasses. Derived grassland and grassy woodland understoreys are dominated by the exotic perennial *Paspalum dilatatum*, exotic broadleaf annuals (clovers, medics) and the grazing tolerant native red grass *Bothriochloa macra* (Orogen, 2010). During the period 2021 - 2026, understorey restoration will be undertaken via the utilisation of weed management to encourage understorey restoration. Weed management will be undertaken as required and is included in **Section 5.2.1.2**.

Offset monitoring undertaken in 2020 recommended that weed management works be undertaken in the offset areas and these works shall be undertaken in 2021. Future weed management works will be identified during future monitoring reports. The 2021 weed control works shall consist of:

- Prickly pear (*Opuntia stricta*) in Offset B and C
- St John's wort (*Hypericum perforatum*) and blackberry (*Rubus fruticosus* agg) in Offset A.

5.2.2.2 Nest Box Installation

Twenty-seven nest boxes were installed in Offset A during 2012. These boxes are to be monitored on an annual basis (content and condition) as part of the Offset Area monitoring program. Any further nest boxes or salvaged hollows installed in the Offset Areas will also require future annual monitoring as part of this program.

5.2.3 Location of Offset Area Rehabilitation Works

Offset monitoring will be utilised to determine whether assisted planting is required to be undertaken at the Quarry. The locations within the offset areas subject to assisted planting, which was completed in 2021, are shown on **Figure 5.1**.

Following the 2020 offset monitoring program completed in December 2020, it was found that Offset Area C is generally well vegetated, while Offset Area A and Offset Area B have substantial areas of Derived Native Grassland that would benefit from assisted planting. It is proposed that Offset A and Offset B are planted with native tubestock, and Offset Area C is continued to be monitored for natural recruitment for a period of 2 – 3 years. If natural recruitment does not occur, or is considered too slow, then supplementary planting will be required in Offset Area C. This will be considered as part of the annual offset monitoring.

The proposed planting schedule is shown on **Figure 5.1**. Offset Area planting commenced in March 2021 and was completed in October 2021.

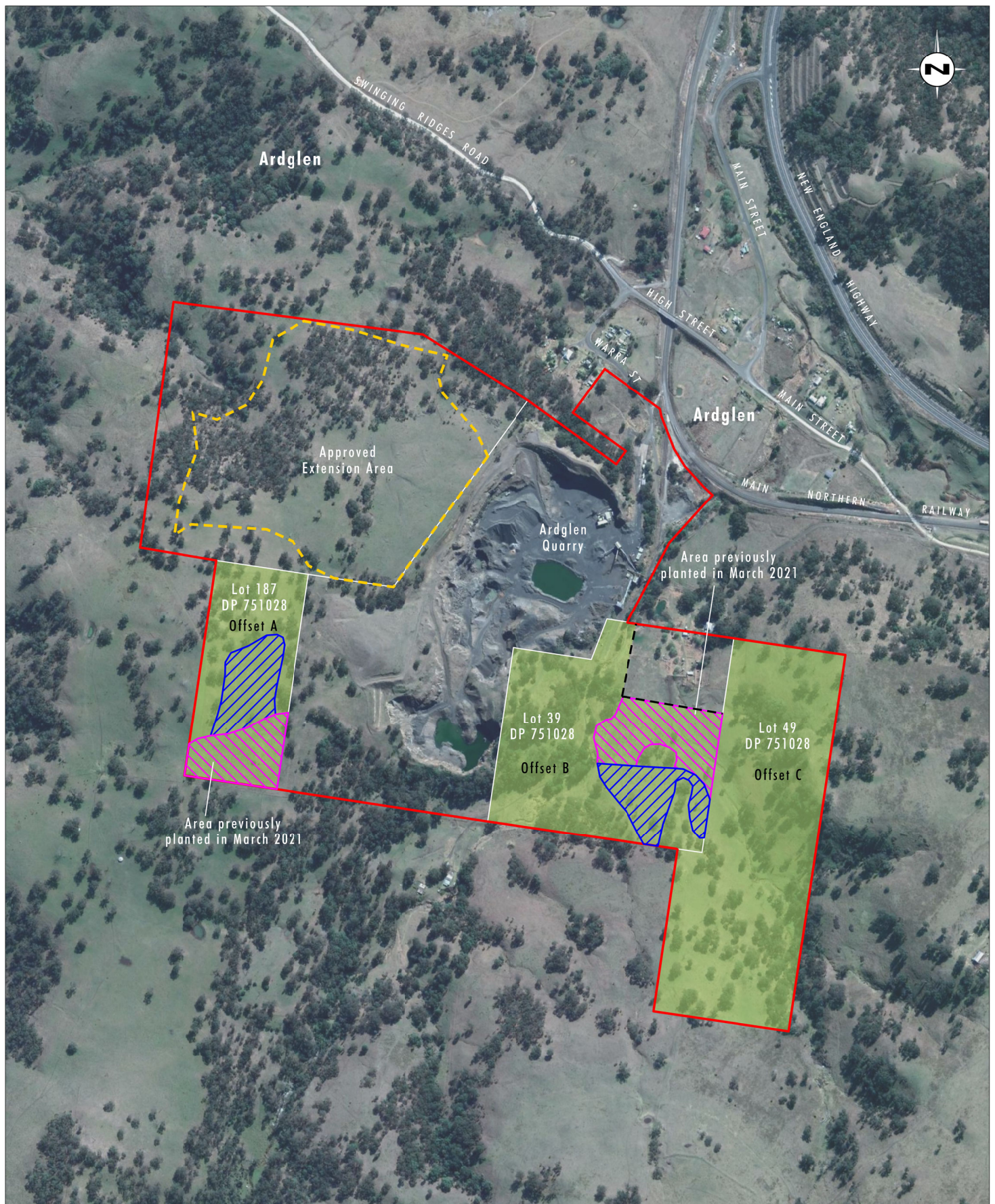


Image Source: Google Earth (Aug 2017)
 Data Source: Daracon (2019), Orogen (2010)
 Note: Lot boundaries digitised from existing figures. Extent of extension area lot boundary to be confirmed in field survey

0 100 250 500m
 1:10 000

Legend

- Site Boundary
- Approved Extension Area
- Offset Site
- Post and Wire Fence to be Installed
- Derived Grassland Areas Planted October 2021
- Derived Grassland Areas Planted March 2021

FIGURE 5.1

Potential Offset Area Planting

5.2.4 Offset Area Performance Indicators and Completion Criteria

The offset area performance indicators and completion criteria for the Ardglen Quarry Offset Areas are detailed in **Table 5.2** below. These performance and completion criteria have been refined following the completion of the offset area monitoring program. The performance of the Offset Areas is assessed against the performance and completion criteria on an annual basis with the results of the monitoring and required corrective actions reported in the Annual Review and the annual offset monitoring report.

Table 5.2 Offset Areas – Performance Criteria and Triggers for Corrective Actions

Feature	Aspect	Performance/Completion Criteria	Corrective Action
Landscape Condition	Weed infestation	Weeds do not comprise more than 15% cover in any stratum. There are no significant weed infestations.	Weed densities reviewed as part of annual Offset monitoring. If weeds make up more than 15% cover in any stratum, weed control works are to be undertaken as recommended in the annual monitoring report. Significant weed infestations are to be controlled, guided by the recommendations in the monitoring report.
	Rubbish removal	Offset Areas free of rubbish	Any areas of rubbish identified in the annual Offset monitoring program are removed within the next annual reporting period.
Natural Regeneration	Short term - Grazing exclusion	Fencing has been established around all offset areas and is maintained	Quarterly/Annual Monitoring identifies fence repairs are required to be undertaken. Fence repairs are to be completed.
	Medium term - Quality and cover of existing overstorey within Offset Area C	A stem count of >30 stems/ha is achieved via natural recruitment in over 75% of the Natural Regeneration monitoring plots by 2023.	If completion criteria are not met by 2023, areas to be targeted within this Offset Area for planting will be identified. Commencement of assisted planting program to be implemented at a rate of 60 stems/ha as per Section 5.2.1.2 and Figure 5.1 .
	Long term - Recruitment and rehabilitation of overstorey	More than 15% cover of mid-storey and overstorey species is achieved in over half of the Natural Regeneration monitoring plots by 2030.	If completion criteria are not met by 2030, supplementary planting, or alternative strategy (such as a watering protocol) is to be undertaken as recommended in the annual offset monitoring report.

Feature	Aspect	Performance/Completion Criteria	Corrective Action
Assisted Regeneration	Short term - Vegetation establishment	Assisted planting program as outlined in Section 0 is commenced in 2020. Species planting list follows that which is outlined in this Section.	Assisted planting program to commence as soon as practicable. If planted species do not broadly follow the species planting list, rework is required.
Assisted Regeneration	Medium term - Seedling survivability	Following the implementation of the assisted planting program, more than 70% of planted seedlings have survived in each of the offset rehabilitation monitoring plots. Seedlings must have a survival rate of >70% in each planting area for at least three years post-planting before monitoring this parameter can cease.	If annual monitoring indicates that <70% of plants have survived within three years post-planting, supplementary planting is required at a rate recommended in the annual offset monitoring report.
	Long term - Overstorey restoration	A density of >30 mature stems/ha is achieved in more than 75% of the offset rehabilitation monitoring plots ten years after the initial planting year. A mature stem is a tree (overstorey species) with a diameter at breast height (dbh) greater than 10 cm.	If annual monitoring indicates that stem density is <30 mature stems/ha, supplementary planting, or alternative strategy (such as a watering protocol) is to be undertaken as recommended in the annual offset monitoring report.
	Long term - Vegetation community	Long term monitoring indicates that planted vegetation is recognisable as a vegetation community consistent with the NSW determination for White Box Yellow Box Blakely's Red Gum Woodland CEEC at the end of the Quarry life.	Actions will vary depending on the severity of divergence from recognisable vegetation community. Advice to be given in the annual offset monitoring report as required. Actions may include, but are not limited to; weed control, supplementary planting, replacement planting, or complete rework.
Habitat Material	All salvageable hollows shall be re-erected within 12 weeks from completion of staged clearing operations	Hollows are installed as required and monitored annually (condition and content) for the life of the Quarry.	If annual monitoring indicates hollows have been damaged and are no longer usable, nest boxes to be installed at a 1:1 ratio as required. If any installed salvaged hollows or nest boxes are found to be in poor condition during annual monitoring, these are to be repaired or replaced as necessary.
Long Term Security of Offset Site	Security of Offset	Offset security mechanism as detailed in Section 5.2.6 established and implemented.	Implementation of alternate offset security mechanism if mechanism in Section 5.2.6 cannot be resolved with DPIE.

5.2.5 Offset Monitoring

Monitoring of offset areas is to be undertaken on an annual basis. The objectives of the Annual Offset Monitoring program are to:

- Locate and describe any areas of concern within the Offset Areas
- Track the trajectory of biodiversity values and ecosystem function within the Offset Areas
- Provide recommendations to guide the improvement of biodiversity values and ecosystem function.

Monitoring will be undertaken within each Offset Area and will include a General Offset Area Monitoring component, a Rehabilitation Monitoring component once rehabilitation commences, and, once a Conservation Agreement secures the Offset Areas, a Conservation Agreement Monitoring component. The methods to complete these are outlined below. The location of the monitoring plots is shown on **Figure 1.3**.

General Offset Area Monitoring

- Walkover assessment to inspect:
 - condition of perimeter fencing around offset properties to exclude livestock
 - weed composition within Offset Areas including the need for any works to control weeds during the following 12 month period.
- Nest box monitoring of condition and content of salvaged hollows and/or nest boxes which have been placed in the Offset Areas.
- Assessment of cover and stem count of saplings (dbh <10 cm) within twelve 50 m x 20 m Natural Regeneration Monitoring plots.

Offset Rehabilitation Monitoring

Rehabilitation Monitoring Plots (20 m x 50 m) have been established at a rate of two plots per rehabilitation area and monitored annually post rehabilitation using floristic and biometric data collection methods in accordance with the BioBanking Assessment Methodology (BBAM) (OEH 2014). This is used to determine species diversity, appropriateness, and cover. In addition, the proportion of seedling survivability is to be monitored for at least three years following assisted regeneration. This will be calculated by counting the number of stems within each Rehabilitation Monitoring plot and assessing their survivability status (dead, alive, senescent etc.) over time.

The locations of the natural regeneration monitoring plots are included in **Table 5.3** and **Figure 1.3**.

Table 5.3 Natural Regeneration Monitoring Results

Offset	Plot Name	Easting	Northing
A	A1	289077	6486201
A	A2	289062	6486145
A	A3	289060	6486090
A	A4	289150	6485973
B	B1	289822	6486108
B	B2	289821	6486014
B	B3	289945	6485915
B	B4	289854	6485906
C	C1	290061	6486188
C	C2	290034	6485967
C	C3	289953	6485745
C	C4	289943	6485582

Conservation Agreement Monitoring

Following the establishment of the four permanent monitoring plots in each of the four PCTs present in the Offset Areas, the following methodology is to be completed annually once the Conservation Agreement for the offset properties is established. The locations of the offset monitoring plots are included in **Table 5.4** and **Figure 1.3**.

- Photo monitoring at each of the permanent plot markers, facing the four cardinal directions.
- Collection of floristic and biometric data, in accordance with the BBAM (OEH 2014) and described in detail in the 2019 Annual Biodiversity Offset Monitoring Report (Umwelt 2020).
- Walkover assessment of the Offset Areas, making observations of:
 - fire events or impacts of fire management
 - weeds (including compilation of list of exotic species and recording new weed infestations including location and extent)
 - pest animals (species and location must be recorded, including evidence of pest animals such as burrows, scats or disturbance)
 - visitor impact and vehicle access (including evidence of any recent usage, and the presence of any new access trails or tracks)
 - rubbish dumping
 - natural regeneration of previously disturbed areas
 - sightings of threatened species.

This monitoring (all components) is conducted annually with the results of the monitoring program utilised to determine whether any remediation/corrective actions are required to be implemented. Remediation measures required to be implemented following Offset Area monitoring will be detailed in the Annual Review. The 2019 offset monitoring included the establishment of four permanent monitoring plots for baseline Conservation Agreement Monitoring. In securing the offset properties the Conservation Agreement Monitoring is required to be undertaken annually at these locations. The offset monitoring locations are detailed in **Table 5.4** below and shown on **Figure 1.3**.

Table 5.4 Vegetation Zones and Corresponding PCT and Plot Information

Plot Name	Easting	Northing	Zone	Vegetation Zone (Orogen 2010)	PCT Name
Q01	290019	6485647	56	Blakelys Red Gum (+/- Yellow Box) Dry Sclerophyll Grassy Woodlands/Open Woodland	PCT 496 - Yellow Box - White Box - Silvertop Stringybark - Blakely's Red Gum grass shrub woodland mainly on the Liverpool Range, Brigalow Belt South Bioregion
Q02	289747	6486167	56	River Oak (<i>Casuarina cunninghamiana</i>) Dry Sclerophyll Woodland	PCT 485 - River Oak riparian grassy tall woodland of the western Hunter Valley (Brigalow Belt South Bioregion and Sydney Basin Bioregion)
Q03	289761	6485921	56	White Box (<i>Eucalyptus albens</i>) and Rough barked Apple (<i>Angophora floribunda</i>) Dry Sclerophyll Grassy Woodland	PCT 433 - White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, Brigalow Belt South Bioregion
Q04	289144	6486073	56	Derived Native Grassland	PCT 796 - Derived grassland of the NSW South Western Slopes

5.2.6 Security of Offset Areas

In consultation with the BCT, Daracon has determined that a Conservation Agreement under the *Biodiversity Conservation Act 2016* is the most appropriate mechanism for securing the offset properties. Daracon are pursuing this mechanism with the direction of the BCT. A draft Conservation Agreement (No CA0363) has been received from the BCT. Daracon will continue to liaise with BCT in regard to the finalisation of the security of the Offset Areas and will notify the DPE of the outcome.

No works will be undertaken in the Extension Area until Daracon have secured the long-term security of the Offset Areas.

5.2.7 Short, Medium and Long Term Management Measures

The short, medium and long term management measures to be employed to facilitate the implementation of the Biodiversity Offset Management Strategy are presented in **Table 5.5**. Details of each measure are provided in the previous sections. The Offset Area works will include obtaining security of the Offset Areas as a priority and the continuation of the Annual Offset Monitoring program and rehabilitation of the Offset Areas.

Table 5.5 Offset Property Actions to be implemented 2023 - 2027

Task	Details of task	Due Date
Offset Area Rehabilitation	The planting program and species list for rehabilitation of the Offset Areas is detailed in Section 5.2.1.2 . Areas where planting will be undertaken are shown on Figure 5.1 with planting commenced in 2021. The planting program will also be included in the Annual Review.	Rehabilitation program detailed in Section 5.2.1.2 Planting commenced in 2021.
Offset Monitoring	Monitoring of offset properties will be undertaken annually in accordance with Section 0 . Results of the offset monitoring program will then be used to develop actions required to be implemented to facilitate the offset properties are trending toward meeting performance indicators and completion criteria e.g., fencing has been installed, cover criteria are met etc. Results of the Offset Area monitoring, and any corrective actions, are to be reported in the Annual Review.	Monitoring undertaken annually and reported in Annual Review
Security of Offset Areas	Daracon to secure offset properties in accordance with the requirements in Section 5.2.6 . The status of security of the Offset Areas will be reported in the Annual Review with Daracon to establish relevant regulatory sign off on a Conservation Agreement prior to undertaking any works in the Extension Area.	Prior to undertaking any works in the Extension Area.

5.3 Rehabilitation Management Strategy

As noted in **Section 1.2**, this LMP identifies the biodiversity and rehabilitation management and monitoring measures that will be implemented for the Quarry. The biodiversity management measures and associated monitoring programs relevant to the extraction areas and remnant vegetation within the Quarry are detailed in the following sections. **Section 5.0** of this document relates to the Extraction Area only with the controls and management measures relevant to Offset Areas detailed in **Section 5.0**.

5.3.1 Extraction Area Biodiversity Management Controls

During the next 5 years (2021 – 2026), the primary activities within the Quarry will involve ongoing control of weed and feral species. In the event that vegetation clearing is required to be undertaken within the existing Quarry Pit or Approved Extension Area the following controls will be implemented:

- Definition of clearing limits to mark the extent of extraction (**Section 5.3.1.5**)
- Pre-clearance surveys ahead of vegetation clearing in accordance with **Section 5.3.1.6**. Based on the outcomes of these inspections, undertake the following where required:
 - specific tree felling procedures as outlined in **Section 5.3.1.7**, in order to minimise the impacts to flora and fauna from clearing
 - collect seed and regenerative material for use in rehabilitation, as per **Section 5.3.1.4**
 - salvage of habitat features as outlined in **Section 5.3.1.3**
 - salvage soil resources for use in rehabilitation as outlined in **Section 5.3.1.2**
- Undertake feral animal and weed monitoring works as required (**Section 5.3.3**)
- Undertake rehabilitation activities (**Section 5.3.2**)
- Undertake rehabilitation monitoring activities (**Section 5.3.3**).

It is noted that controls for fencing, weed management and bushfire management within the Extraction Areas and remnant vegetation are consistent with these methods as detailed within **Section 5.2.1** and have therefore not been repeated in this section.

5.3.1.1 Management of Remnant Vegetation, Habitat and Impacts on Fauna

Due to the Quarry being currently in a state of 'care and maintenance', where no active extraction is occurring, there is no risk to remnant vegetation, habitat or impacts to fauna from operations.

A qualified ecologist currently undertakes annual inspections of the site, which includes inspection to vegetation, habitat and fauna.

This LMP will be revised to include management and mitigation measures relating to the protection of remnant vegetation, habitat and fauna as required.

5.3.1.2 Topsoil Management

The key method of rehabilitation involves the transfer of topsoil material obtained directly from cleared areas prior to their excavation. This material will be utilised in rehabilitation as:

- A seed source
- Mulch
- Erosion control
- Habitat for small fauna.

Topsoil extracted during the operation of the Quarry will be managed in accordance with the topsoil management measures outlined below in order to protect topsoil quality and enhance rehabilitation outcomes:

- The topsoil stripped will be between 100 - 400 mm in depth (dependent on the soil type present)
- Where practical, topsoil will be direct-returned to reshaped areas within the existing Quarry which are available for revegetation
- Topsoil stockpiles are to be located away from quarrying, traffic areas and watercourses and positioned within the perimeter of the closed water management system
- Topsoil stockpiles will be located within the Quarry disturbance area and not within the Quarry Offset Areas adjacent to the Quarry
- Erosion controls will be established at the base of stockpiles to prevent soil loss to the surrounding area
- Stockpiles will be generally less than 3 m high and will be set out in windrows to maximise surface exposure and biological activity
- Stockpiles to be kept longer than 3 months (i.e., approximately how long it will take to establish a stable vegetative cover) will be sown with a suitable cover crop to minimise soil erosion and invasion of weed species
- Weed growth will be monitored and controlled either by removing by hand or spraying if large areas (i.e., >40 m²) are observed
- Prior to re-spreading, weed growth will be scalped from the top of the stockpiles to minimise the transport of weeds into rehabilitated areas.

5.3.1.3 Salvage of Habitat Features

Salvage and Re-use of Hollows

Pre-clearance surveys will be undertaken prior to clearing to identify any hollow bearing trees requiring removal in the Quarry expansion area. The total number of hollow bearing trees removed as a result of tree clearing activities will be recorded as part of the pre-clearance inspection process.

During clearing operations, hollows shall be assessed for suitability by an ecologist. Salvaged hollows will be stockpiled on for later use in rehabilitation efforts. Damaged hollows are to be repaired (where possible) or replaced with artificial nest boxes (refer **Section 5.2.2.2**). The erection of salvaged hollows would be expected to provide roosting, denning and nesting habitat for a range of fauna including threatened microbats and arboreal species. All salvaged and installed hollows will be included in the annual ecological monitoring program.

Salvage of Terrestrial Habitat Structures

It is proposed to relocate logs and other suitable ground debris salvaged from the clearing operations (including unsalvageable hollows) within the offset areas. Habitat structures would be stockpiled in a nominated area. Cleared trees supporting trunk hollows that are impractical to salvage for re-erection (> 30 cm diameter hollows) would similarly be salvaged for relocation as these would provide suitable den sites for quolls.

5.3.1.4 Seed Collection and Propagation

The primary seed source utilised for quarry rehabilitation will be the direct transfer of topsoil from cleared areas during their excavation. The Quarry will implement a seed collection and propagation procedure in order to use local provenance species in rehabilitation. Seed from the site will be collected prior to or during clearing or from within adjacent buffer zones and biodiversity offset areas (in order to facilitate the protection of biodiversity values of the offset areas). Opportunities for seed collection will be assessed during pre-clearance surveys.

Locally sourced seed will be used in rehabilitation on site, where possible. When local seed cannot be sourced due to environmental conditions, seed sources which are not of local provenance will be utilised.

5.3.1.5 Vegetation Clearing Management

Site Survey and Exclusion Fencing

The clearing of vegetation on the site will be undertaken in a staged manner as the Approved Extension area will be cleared progressively as required. The extent of clearing for each stage will be delineated in the field prior to the commencement of any clearing activities. Plastic mesh fencing or star pickets and flagging tape shall be installed along the extraction area boundary for use as exclusion fencing. The fencing would function as a clearly marked 'exclusion' boundary for the machinery operators during clearing operations to ensure that no clearing occurs outside the individual extraction area. The extent of clearing will be communicated to contractors undertaking the works prior to the commencement of clearing activities.

5.3.1.6 Pre-Clearance Surveys

Pre-clearance surveys will be conducted no more than 2 weeks prior to clearing operations as per the tree felling procedure in **Section 5.3.1.7**. Surveys will be completed for each staged extraction area. These surveys will target threatened species known or potentially occurring in the locality and will attempt to identify critical habitat sites for these species. If critical habitat sites are located, appropriate impact mitigation measures (including capture and release in retained bushland habitats) will be undertaken according to the type of habitat feature (e.g., nest and den sites) and species concerned.

5.3.1.7 Tree Felling Procedure

A tree felling procedure will be implemented at the Quarry to minimise the potential for impacts on native fauna species (including threatened species) as a result of the clearing of hollow-bearing trees. The tree felling procedure is designed to minimise impacts to hollow-dependent fauna. The procedure includes the following:

- Comprehensive pre-clearing surveys by a suitably qualified ecologist, no more than 2 weeks prior to felling
- Removal of non-hollow-bearing trees/vegetation on the day or as close to the date of clearing as possible (in order to discourage fauna usage of the area). Removal of vegetation identified as not providing tree-hollows during pre-clearing surveys encourages hollow-dependent fauna to vacate clearing areas prior to the clearing of habitat trees, reducing the likelihood of mortality during clearing. A visual canopy inspection of all trees (including non-hollow bearing trees) to be removed on the day of clearing will be performed by a suitably experienced and licensed person so that fauna is not injured during tree felling operations. Where necessary, this can be undertaken by the Environmental Officer with instruction by a suitably experienced and licensed person off site
- Detailed hollow-bearing tree felling procedures, including (but not limited to):
 - supervision of all hollow-bearing tree felling works by a suitably experienced and licensed person
 - visual canopy inspection on the day of the felling of hollow-bearing trees for fauna species and active nests
 - shaking of hollow-bearing tree (with heavy machinery) for at least 30 seconds to encourage resident fauna to abandon tree, prior to felling.
 - in the event that threatened fauna are located within hollow-bearing trees during pre-clearance surveys or tree felling, no works will be undertaken within 5 m of the identified tree until the species is captured and relocated or moves from within the clearing area of its own volition. The decision to proceed will be determined by the suitably experienced and licensed person
 - lowering of hollow-bearing trees as gently as possible with heavy machinery
 - trees would be felled away from the retained bushland on the subject site back into the extraction areas
 - inspection of all hollows in felled trees
 - capture of any displaced/injured fauna. Any injured fauna will be taken to a wildlife carer or vet
 - release of unharmed fauna into nearby secure habitats
 - felled trees to be rolled so that the number of hollows blocked against the ground are minimised
 - all felled trees to remain in place overnight to allow any unidentified fauna to escape

- Any injured fauna will be captured where possible and taken to the local wildlife carer. Once rehabilitation has been achieved (if possible), the individual will be released into habitats adjoining the capture site, and if required, into shelter sites appropriate for that species (i.e., Nestboxes) and
- salvage of suitable hollows (i.e., hollows of appropriate size and structural integrity and that can be salvaged safely) for treatment and installation within rehabilitation and revegetation areas as compensatory habitat.

All personnel conducting clearing, earth works or construction activities within the subject site must be informed of the restrictions to the clearing of vegetation outside the 'exclusion fencing'. No storage of materials, vehicle parking or other disturbance would be undertaken outside the exclusion fencing. Personnel would be supplied with an appropriate map delineating the clearing restrictions prior to the commencement of clearing activities.

5.3.2 Rehabilitation Strategy and Timing

This LMP identifies areas where rehabilitation of exposed areas which will no longer be required for operational purposes will be undertaken, refer to **Section 5.3.2.2** and **Figure 5.2** which details these locations.

The commencement of rehabilitation of quarry benches and the final landform at the Quarry is largely contingent upon the construction of the final landform. The conceptual final landform and land use for the Quarry is included on **Figure 5.2** which has been directly reproduced from **Appendix 2** of the Project Approval (Mod 2). Future revisions of this LMP will include further detail on the timing of proposed disturbance within the approved extension area as well as the opportunities for progressive rehabilitation in addition to the rehabilitation identified in **Section 5.3.2.2**.

The nature of rehabilitation undertaken at the site will also depend on the post quarry landuse for the site, which will be confirmed as part of the Detailed Quarry Closure Plan. There are however a range of areas that have been identified by Daracon on the edge of existing quarry operations which will be considered for rehabilitation during the period 2021 - 2026 (refer to **Section 5.3.2.2**).

5.3.2.1 Rehabilitation Strategy

The method for the completion of rehabilitation works undertaken on quarry benches and in areas to be rehabilitated on **Figure 5.3** will include:

- Respreading of overburden (clay soils) onto the previously quarried areas (bare rock) to a depth that allows planting of tree species to occur. The overburden would subsequently be overlain with topsoil stripped from the Quarry expansion area to a depth of approximately 100 mm
- A seed mix (refer to **Section 5.3.1.4**) would then either be hand casted onto the respread topsoil and lightly raked into the topsoil bed or, if access is difficult, hydromulched with a native seed slurry onto the topsoil. The sown seed in addition to the native soil seedbank present would be expected to establish an adequate native cover on the Quarry benches over time.

The Quarry 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. The key parameters to be recorded during each component of rehabilitation include:

- Landform design
- Drainage design
- Substrate material utilised

- Site preparation techniques such as topsoil preparation
- Revegetation methodologies such as cover crop and rate, seed viability
- Weather conditions
- Photographic records and
- Initial follow-up care and maintenance works.

5.3.2.2 Rehabilitation Locations

The rehabilitation opportunities for the period 2021 - 2026 as detailed below and shown on **Figure 5.2** are focussed on the edge of the Quarry where additional disturbance is unlikely. The potential rehabilitation areas have also focused on areas in proximity to existing offset sites or in locations where rehabilitation will assist in improving visual amenity. The rehabilitation planting schedule will be reviewed as part of the Annual Review to ensure that progressive rehabilitation is undertaken as required.

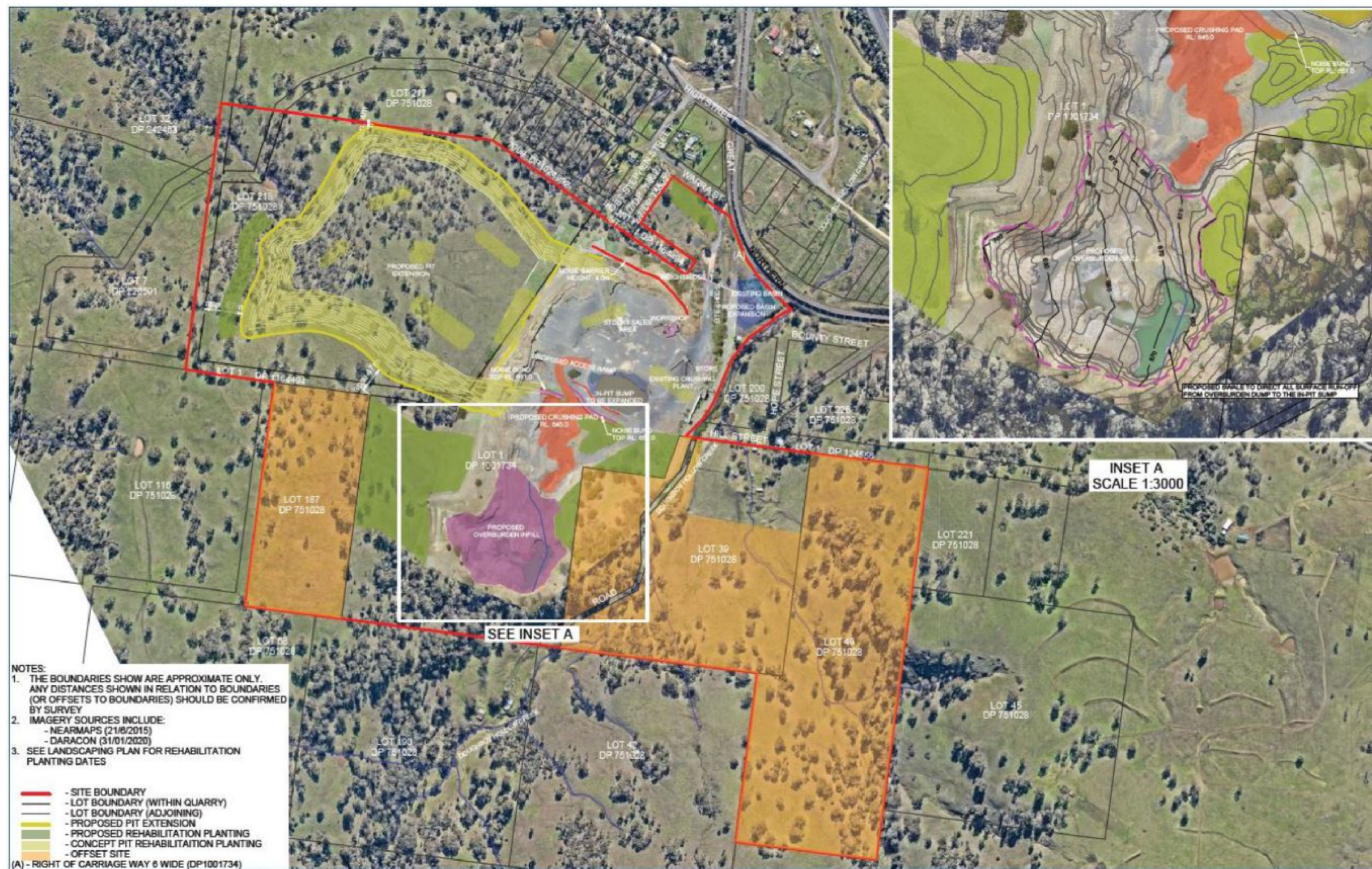


FIGURE 5.2
Conceptual Rehabilitation Plan

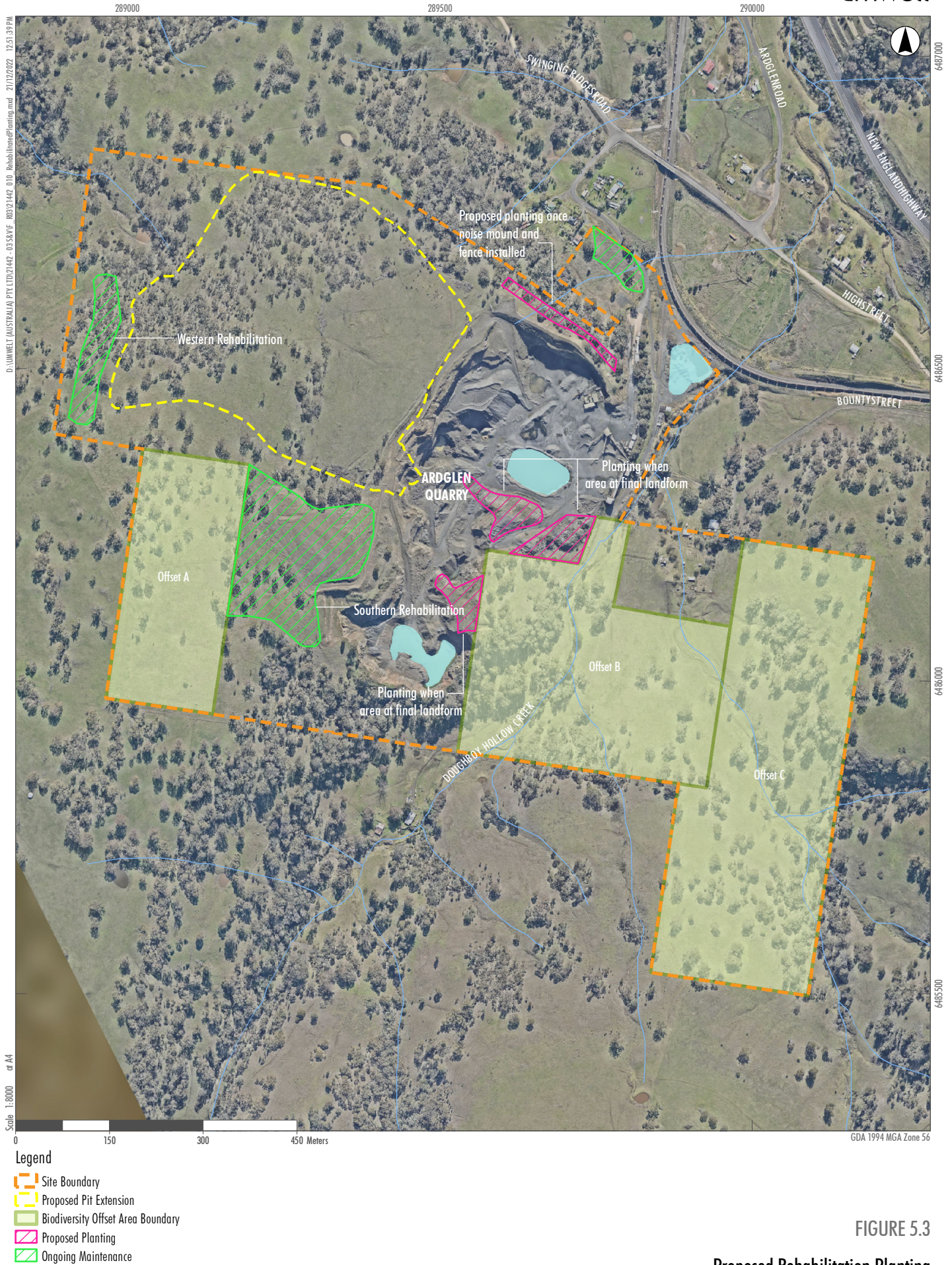


FIGURE 5.3

Proposed Rehabilitation Planting

Revegetation activities for the period 2023 – 2027 will be undertaken in the following areas, also noted on **Figure 5.3**:

- 2023 to 2027:
 - planting on noise bund once constructed to reduce visual impact, suggested seed planting mix using cover crop of sterile pasture grass and native species mix of shrubs
 - maintenance to occur, where required, on plantings on the ridgeline of western edge of Extension Area
 - maintenance to occur, where required, on plantings in the southwestern corner of the Quarry
 - planting north of the proposed noise bund, once it has been constructed
 - three areas adjacent to (north and west of) Offset B, when at final landform.

Rehabilitation works, which include revegetation and regeneration works, including establishment of canopy, sub-canopy and understorey and ground strata, where appropriate, will be undertaken primarily during the autumn and spring months. Rehabilitation works commenced at the Quarry in September 2019 with a focus on the western edge of the approved extension Area and the southwest corner of the Quarry (refer to **Figure 5.3**). At the time of writing this plan, all areas available for rehabilitation have had rehabilitation works undertaken. Further rehabilitation works will be completed progressively across the remaining areas identified in **Figure 5.3** as they become available and it is estimated that when this occurs, rehabilitation works will be undertaken over a period of approximately five years. The program for the progressive rehabilitation will be refined in subsequent revisions of the LMP.

It is noted that Daracon was approved in November 2021 by the DPE to submit this LMP in a staged approach (Refer to Appendix 3), therefore future revisions of the LMP will outline further detail regarding future rehabilitation works.

5.3.2.3 Rehabilitation Criteria/Corrective Actions for Extraction Area

Table 5.1 provides a summary of the preliminary performance and completion criteria for the rehabilitation works to be undertaken within the Extraction Area at the Quarry. The preliminary performance and completion criteria will be reviewed and revised throughout the life of the Quarry based on the results of the annual rehabilitation monitoring (refer to **Section 5.3.3**) and also during the development of the Detailed Quarry Closure Plan (refer to **Section 6.1.3**).

Table 5.6 Quarry Extraction Areas - Preliminary Rehabilitation Performance Criteria and Triggers for Corrective Actions

Aspect	Preliminary Rehabilitation Performance and Completion Criteria	Trigger	Potential Corrective Action
Decommissioning	All surface infrastructure and services not required to support the final land use will be decommissioned and removed.	Infrastructure not required as being retained in the final land use as detailed in the Quarry Closure Plan not removed from site.	Remove infrastructure and services.
Landform	Rehabilitated benches are stable and rehabilitated landform has been assessed by a qualified geotechnical engineer to validate that it is stable and does not pose a safety risk, following completion of landform works.	Geotechnical assessment determines that further works are needed.	Stabilise benches via erosion control or earthworks.
	No significant erosion is present that would constitute a safety hazard or compromise the capability of supporting the end land use.	Erosion causing a safety issue or impacting final land use. Contour banks are stable and there is no evidence of overtopping or significant scouring as a result of runoff.	Adapt erosion control strategy to stabilise landform.
	Surface layer is free of any hazardous materials.	Hazardous material present on surface. Any contamination will be appropriately remediated so that appropriate guidelines for land use are met in accordance with the requirements of the <i>Contaminated Land Management Act 1997</i> and underlying guidelines.	Remove hazardous material in accordance with legislative requirements.
Vegetation Establishment	Assisted planting program as outlined in Figure 5.3 commenced in 2019. Species planting list follows that which is outlined in Section 5.2.1.2 .	More than 50% of recorded species in rehabilitated areas are not on the species planting list.	Rework or supplementary planting is undertaken.
	Following the implementation of the assisted planting program, more than 70% of planted seedlings have survived in each of the Rehabilitation Monitoring plots. Seedlings must have a survival rate of >70% in each planting area for at least three years post-planting before monitoring this parameter can cease.	Annual rehabilitation monitoring indicates that less than 70% of plants have survived within three years post-planting.	Supplementary planting to be undertaken.
	A density of >30 mature stems/ha is achieved in more than 75% of the rehabilitation monitoring plots ten years after the initial planting year. A mature stem is a tree (overstorey species) with a diameter at breast height (dbh) greater than 10 cm.	Annual monitoring indicates that stem density is less than 30 mature stems/ha.	Supplementary planting, or alternative strategy (such as a watering protocol) to be undertaken.
	Long term monitoring indicates that planted vegetation is recognisable as a vegetation community consistent with the NSW determination for White Box Yellow Box Blakely's Red Gum Woodland CEEC at the end of the Quarry life.	Vegetation community does not match the description in the NSW determination for White Box Yellow Box Blakely's Red Gum Woodland CEEC.	Actions will vary depending on the severity of divergence from recognisable vegetation community. Actions may include, but are not limited to; weed control, supplementary planting, replacement planting, or complete rework.
Final Land Use	Rehabilitated land is compatible with proposed land use as demonstrated by soil assessment. Topsoil or a suitable alternative has been spread uniformly over the rehabilitation surface.	Topsoil or a suitable alternative not spread uniformly across site.	Implement remediation actions as identified by soil assessment.
Water	Runoff water quality from the site does not pose a threat to downstream water quality.	Water released from the site is in accordance with the requirements of the site Environmental Protection Licence/consistent with baseline water monitoring locations.	Review water quality results and determine activities/site locations contributing to water quality. Modify erosion control/water treatment measures as required.
Weed and Pests	There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.	Evidence of significant feral animal damage to rehabilitation area.	Adapt/modify feral animal control strategy. Undertake weed and feral animal control as necessary.
Bushfire Hazard	Appropriate bushfire hazard controls have been implemented.	Increased bushfire hazards identified.	Liaise with RFS and adapt bushfire control measures.
Ongoing Public Safety	Appropriate mechanisms are established to control access and manage public safety post-closure.	Evidence of unauthorised access.	Review site security and re-secure site access points where possible. Repair site fencing.

5.3.3 Rehabilitation Monitoring

Visual inspections of rehabilitated areas within the Extraction Area will be undertaken as part of the general observational quarterly environmental site inspection. These will be complemented with annual rehabilitation monitoring that will be undertaken over the life of the quarrying operations to assess the rehabilitated landscape in more quantifiable terms.

The results of the annual rehabilitation monitoring will also be compared with the rehabilitation objectives and performance indicators and will be reported in the Annual Review (refer to **Section 7.1**). Monitoring components are outlined further below.

Quarterly Rehabilitation Inspections

These inspections will be generic in nature and be undertaken by Daracon personnel across rehabilitated areas. Daracon will assess the

- Potential of any significant erosion or stability issues
- Function and condition of drainage and sediment control structures
- Presence of any hazardous materials present on the surface layer
- General observations relating to rehabilitation including evidence of:
 - poor plant health;
 - weed abundance; and
 - feral animals.

Annual Rehabilitation Monitoring

This will comprise the following methods:

- Rehabilitation monitoring plots (20 m x 50 m) are to be established and monitored annually post rehabilitation using floristic and biometric data collection methods in accordance with the BioBanking Assessment Methodology (BBAM) (OEH 2014). A minimum of one rehabilitation plot is to be established per planting period in order to capture any differences in weather conditions or methods of planting. A minimum of four rehabilitation plots must be established across all planting areas shown in **Figure 5.3**. The plot results will be used to determine species diversity, appropriateness, and cover
- The proportion of seedling survivability is to be monitored in each of the rehabilitation monitoring plots for at least three years following rehabilitation. This will be calculated by counting the number of stems within each rehabilitation monitoring plot and assessing their survivability status (dead, alive, senescent etc.) over time
- Soil testing must occur at each of the rehabilitation monitoring sites during the first monitoring event, and every three years thereafter. Soil testing parameters must include, but are not limited to, pH, electrical conductivity (EC), nitrogen and phosphorus
- A minimum of one reference (analogue) site must be established for soil monitoring, with soil tested at the same frequency, and with the same parameters as above.

The rehabilitation monitoring program will be continued as required until it can be demonstrated that the rehabilitation of the Quarry has satisfied the performance and completion criteria. The monitoring strategy for the Extraction Areas is summarised in **Table 5.7** below.

Table 5.7 Rehabilitation Monitoring Regime

Monitoring Type	Location	Parameters Monitored	Frequency of Monitoring	Monitoring Method	Responsibility
Rehabilitation Inspections	Rehabilitated Areas	Landform stability, hazards, plant health, weed and pest presence	Quarterly	Observation	Environmental Officer or Delegate
Rehabilitation Monitoring	Rehabilitated Areas	Floristic and biometric data, cover and seedling survivability	Annually	Field Survey	Environmental Officer or Delegate
Rehabilitation Monitoring	Rehabilitated Areas	Soil testing	As required to inform planting	Soil sampling	Environmental Officer or Delegate
Rehabilitation Monitoring	Reference (Analogue) Site/s	Soil testing	As required	Soil sampling	Environmental Officer or Delegate

5.3.4 Short, Medium and Long Term Management Measures

The short, medium and long term management measures to be employed to facilitate the implementation of the strategy are presented in **Table 5.8**.

Table 5.8 Rehabilitation Actions to be implemented 2023 - 2027

Task	Details of task	Due Date
Rehabilitation of Disturbed Areas	Rehabilitation of Quarry Areas is detailed in Section 5.3.2 . The status of progression against rehabilitation undertaken will be reported in the Annual Review.	Rehabilitation program detailed in Section 5.3.2
Rehabilitation Inspections	Quarterly inspections of rehabilitated areas are to be conducted in accordance with Section 5.3.3 .	Inspections to be undertaken quarterly and results reported in the Annual Review.
Rehabilitation Monitoring	Annual monitoring of rehabilitation (including soil testing) undertaken will be undertaken in accordance with Section 5.3.3 .	Monitoring undertaken annually once rehabilitation has been undertaken. Results of annual rehabilitation monitoring reported in Annual Review.
Salvage and placement of habitat material.	In the event that vegetation is cleared from Extraction Areas, the controls in Section 5.3.1 will be implemented and habitat material etc will be placed into Offset Areas as required.	Details of any vegetation clearance undertaken will be reported in the Annual Review.

6.0 Conceptual Quarry Closure Plan

In accordance with Schedule 3, Condition 30 of the Project Approval the Quarry Closure Plan is required to:

- l) Define the objectives and criteria for quarry closure
- m) Investigate options for the future use of the site, including any final void(s)
- n) Describe the measures that would be implemented to minimise/manage the ongoing environmental effects of the development
- o) Describe how the performance of these measures would be monitored over time.

The staging for the development of the Conceptual and subsequently Detailed Quarry Closure Plan is discussed in further detail in **Section 1.4**.

6.1.1 Closure Objectives/Criteria

The conceptual closure objectives and criteria for the Quarry are detailed below with these criteria aligning to the Offset Area and rehabilitation criteria detailed in **Section 5.2.4** and **Section 5.3.2.3** respectively. Rehabilitation objectives for the Quarry as defined by Schedule 3, Condition 24 of the Project Approval include:

Table 6.1 Rehabilitation objectives

Feature	Objective
All areas of the site affected by the development	Safe
	Hydraulically and geotechnically stable
	Non-polluting
	Fit for the intended post quarrying operations land use(s)
	Final landform is 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 otherwise agreed by the Planning Secretary
Quarry benches and pit floor	Landscaped and vegetated using native tree and understorey species representative of Yellow Box White Box Blakely's Red Gum Woodland EEC
Overburden infill area	Backfilled areas integrated with surrounding natural landforms as far as is reasonable and feasible
	Emplacement areas integrated with the site water management system
	Establish grassland to support sustainable agricultural activities
	Use species found in the local area that are suitable for pasture production

These rehabilitation objectives will be refined into detailed closure criteria in future revision of this plan and as part of the development of the Detailed Quarry Closure Plan.

6.1.2 Conceptual Final Landform and Future Land Use

As identified in Project Approval, a portion of the site includes an overburden infill area in the location of the existing southern water storage area. The timing of the overburden infill program is being developed by Daracon and will be included in subsequent updates of this LMP (refer to **Section 1.4**). Permanent water storage will also be retained within Lot 1 DP 1001734 in an expanded in-pit sump east of the proposed extension area. The rehabilitation areas provide an opportunity to link rehabilitation with existing remnant vegetation to the east and west. The conceptual final landform and landuse for the site is presented in **Figure 5.2** which has been directly reproduced from **Appendix 2** of the Project Approval (Mod 2).

Final land use options for voids are ever evolving and the final land use for the void will be considered in further detail in the Detailed Quarry Closure Plan, refer to **Section 1.4**.

6.1.3 Detailed Quarry Closure Plan

The Detailed Quarry Closure Plan will also include an assessment of a range of post closure considerations including environmental/social management, ongoing land use management and geotechnical considerations. The Detailed Quarry Closure Plan will also provide detailed closure criteria and the environmental monitoring requirements to be undertaken during and post the rehabilitation and quarry closure phase. During the development of the Detailed Quarry Closure Plan, Daracon will consult with relevant stakeholders and consider environmental, social and economic factors in determining a post quarrying land use option for the void.

7.0 Review, Revision and Reporting

7.1 Annual Review

By the end of March in each year, a summary of offset and rehabilitation monitoring results are provided to DPE in the Annual Review. The Annual Review will be prepared and submitted to the Secretary, in accordance with Schedule 5, Condition 4 of the Project Approval and will:

- 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 financial/calendar year;
- Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year
- Identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- Evaluate and report on the effectiveness of the noise and air quality management systems; and compliance with the performance measures, criteria, and operating conditions of this consent;
- Identify any trends in the monitoring data over the life of the development;
- Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- Describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.

The Annual Review will be made available to the public through the Community Consultative Committee (CCC) and the Quarry web site <http://www.daraconquarries.com.au>.

7.2 Incident and non-compliance reporting

Environmental incidents and non-compliances will be managed in accordance with the Quarry's Pollution Incident Response Management Plan (PIRMP). Incidents that have caused or threaten to cause material harm to the environment will be reported to the Secretary, EPA and relevant stakeholders immediately once the Quarry becomes aware of the incident.

Schedule 5, Condition 3 of the Project Approval requires the Quarry to report any incident to DPE immediately. A written notification of the incident will be provided to DPE through the Department's Major Projects Website. The notification for any incident will identify the development (including the development application number and name) and set out the location and nature of the incident. Submission of the incident notification shall be the responsibility of the Quarry Manager or delegate.

Schedule 5, Condition 3A of the Project Approval requires the Quarry to report any non-compliance to DPE within seven days of becoming aware of the non-compliance. A written notification will be submitted to DPE through the Department's Major Projects Website and will contain:

- Identification of the development (including the development application number and time);
- The condition of the consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known); and
- What actions have been and/or will be undertaken to address the non-compliance.

Submission of the non-compliance notification shall be the responsibility of the Quarry Manager or delegate.

7.3 Independent Environmental Audit

The Quarry Manager will initiate scheduled audits of the project activities in accordance with the requirements of the Project Approval.

Corrective actions identified in the audit will be approved by the Quarry Manager and will be implemented in a timely manner. Follow up actions will be undertaken to verify implementation of approved corrective actions and its effectiveness in preventing recurrence. All corrective action requests whether in process or completed, will be reviewed during Project Management Reviews.

Schedule 5, Condition 5 of PA 06_0264 requires the Quarry to undertake an independent environmental audit every five years. The audit must:

- Be led by a suitably qualified, experienced, and independent auditor whose appointment has been endorsed by the Planning Secretary;
- Be conducted by a suitably qualified, experienced and independent team of experts (including any expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the Planning Secretary;
- Be carried out in consultation with the relevant agencies and the CCC;
- Assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, water licences and mining leases for the development (including any assessment, strategy, plan or program required under these approvals);
- Review the adequacy of any approved strategy, plan or program required under the abovementioned approvals and this consent;
- Recommend appropriate measures or actions to improve the environmental performance of the development and any assessment, strategy, plan or program required under the abovementioned approvals and this consent; and
- Be conducted and reported to the satisfaction of the Planning Secretary.

Within 12 weeks of commencing this audit, or as otherwise agreed by the Planning Secretary, the Quarry will submit a copy of the audit report to the Secretary, and any other NSW agency that requests it, with a response to any recommendations contained in the audit report.

7.4 Independent Review

In the event that a landowner considers that the operations of the Quarry are exceeding the impact assessment criteria in Schedule 3 then they may ask the Planning Secretary in writing for an independent review of the impacts of the development on their land.

If the Planning Secretary is satisfied that an independent review is warranted, within 12 weeks, or as otherwise agreed by the Planning Secretary and the landowner, of the Planning Secretary's decision, an independent review will be conducted in accordance with the procedure described in Schedule 4 Condition 4 of the Project Approval.

A copy of the independent review will be provided to the Planning Secretary and the landowner.

Daracon note that Schedule 3 of the Project Approval however, does not outline specific impact assessment criteria that relates to rehabilitation or offset management.

7.5 Document Review

In accordance with Condition 15 of Schedule 2 of the Project Approval, within three months of:

- (a) the submission of an incident report under condition 3 of Schedule 5;*
- (b) the submission of an Annual Review under condition 4 of Schedule 5;*
- (c) the submission of an Independent Environmental Audit under condition 5 of Schedule 5;*
- (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise)*

The suitability of the existing strategies, plans and programs required under this consent must be reviewed by the Applicant.

The Site Environmental Officer, or their delegate, will be responsible for undertaking the review of the LMP in accordance with the requirements listed above.

7.6 Access to Information

In accordance with Schedule 5, Condition 8 of the Project Approval, within 12 weeks of the approval of any management plan, or the completion of audits or annual reviews require under this project approval, the Quarry will ensure copies are provided to relevant agencies and the CCC, as well as uploading copies to their website.

In addition, a full summary of regularly updated monitoring results and a copy of PA 06_0264 will be available on the Quarry website.

8.0 Responsibilities

Environmental management at the Quarry will be the responsibility of all employees and contractors, with the Quarry Manager having overall responsibility for environmental management of the operation. Environmental roles and responsibilities related to rehabilitation and biodiversity management are outlined in **Table 8.1**.

Table 8.1 Roles and Responsibilities

Role	Accountabilities for this document
Daracon Divisional Manager – Construction Materials	Provide sufficient resources for the implementation of this plan.
Daracon Quarries Manager	- Oversee the implementation of this plan. - Have working knowledge of this plan. - Be aware of the environmental legislative requirements associated with the quarry and take measures to ensure compliance. - Ensure employees are competent through training and awareness programs. - Schedule rehabilitation activities as per this plan.
Environmental Officer/ Systems Manager	- Coordinate the biodiversity and rehabilitation monitoring requirements of this plan. - Review of this plan as required by the Project Approval and Section 7.5 of the LMP. - Implementation of the long-term security requirements for the Offset Areas. - Confirm that the personnel involved in carrying out and monitoring of the activities required under this plan are suitably qualified, licensed and experienced to undertake the task. - Confirm all internal and external biodiversity and rehabilitation reporting requirements are met. - Periodically review monitoring results and progress against targets and performance indicators in accordance with the requirements of this plan. - Assess the effectiveness of the management strategies and implement corrective actions as required. - Coordinate biodiversity and rehabilitation related incident investigations and reporting as required by legislation and internal standards and guidelines.
All employees and contractors	- Comply with all requirements in this Plan. - Report all potential environmental incidents to the Quarry Manager immediately.

9.0 Definitions

The terminology utilised within this LMP is defined in **Table 9.1** below.

Table 9.1 Definitions

Term	Definition
LMP	Landscape Management Plan
CCC	Community Consultative Committee
Project Approval	PA 06_0264
EP&A Act	<i>NSW Environmental Planning and Assessment Act 1979</i>
EA	Environmental Assessment
DPE	Department of Planning and Environment
Incident	Occurrence of an incident that causes (or may cause harm) to the environment.
OEH	Office of Environment and Heritage
Secretary	The Secretary of the NSW Department of Planning and Environment, including any authorised delegate or nominee.

10.0 References

Daracon Quarries, 2021, *Ardglen Quarry 2020 Annual Environmental Management Report (AEMR)*

Department Planning, Industry and Environment (DPIE), November 2021; *Letter regarding approval for staged submission of the LMP*

Environmental Resource Management, 2007. *Ardglen Quarry Environmental Assessment*.

Office of Environment and Heritage (OEH) 2014. *BioBanking Assessment Methodology*, September 2014.

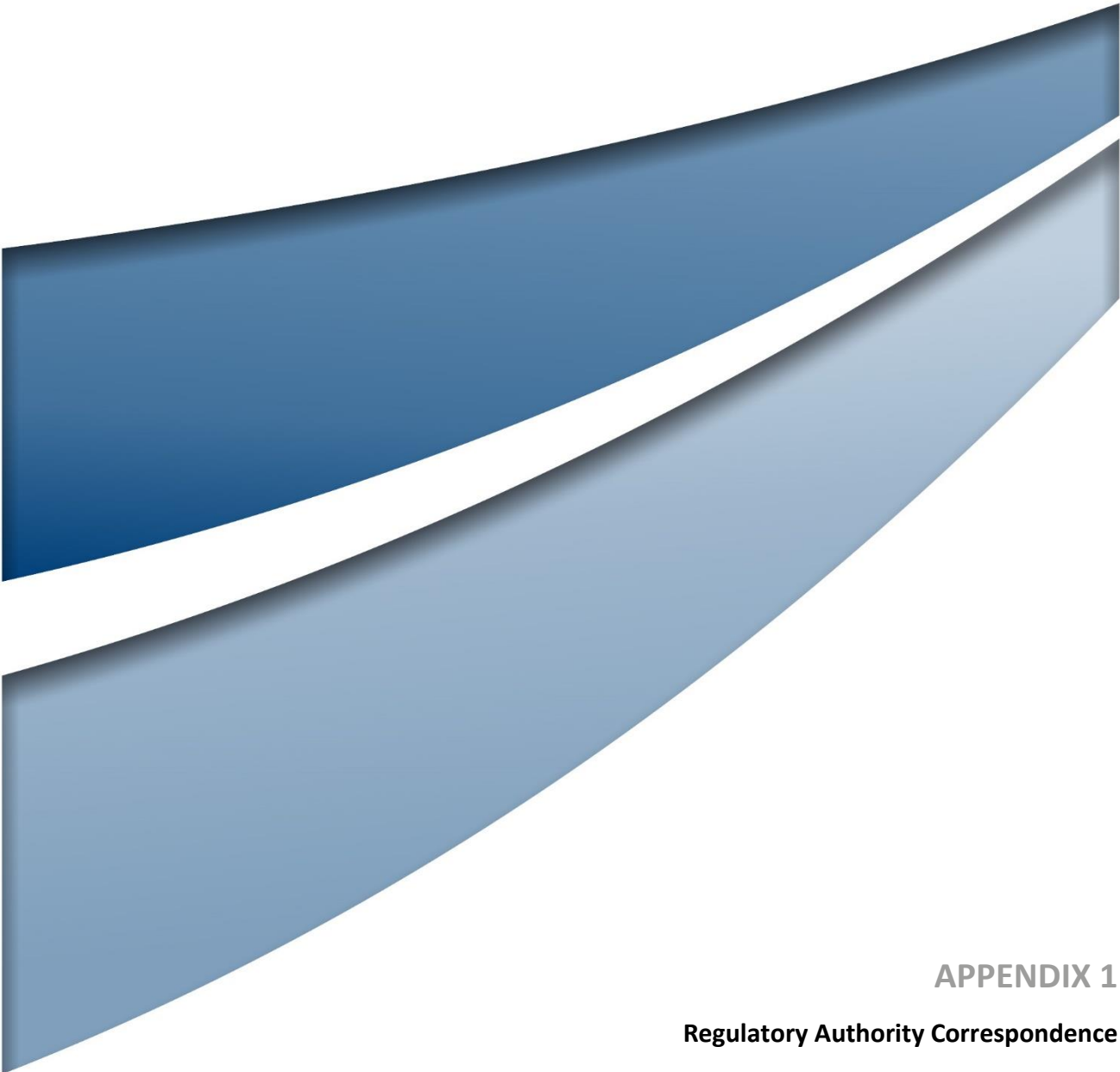
Orogen Pty Ltd, 2010. *Landscape Management Plan Version 1: Ardglen Quarry Extension Major Project 06/0264*

NSW Department of Primary Industries (DPI), 2018. NSW WeedWise web page.
<http://weeds.dpi.nsw.gov.au/>

NSW Rural Fire Service, 2006. *Bush Fire Environmental Assessment Code for New South Wales*

Umwelt, 2020. *2019 Ardglen Quarry Annual Biodiversity Offset Monitoring*, prepared for Daracon Quarries, February 2020.

Umwelt, 2021. *2020 Ardglen Quarry Annual Biodiversity Offset Monitoring*, prepared for Daracon Quarries, February 2021.



APPENDIX 1

Regulatory Authority Correspondence

Theresa Telfer

Subject: FW: Ardglan Revised Biodiversity Offset Strategy

Importance: High

From: Isaac Mamott [mailto:imamott@orogen.com.au]

Sent: Tuesday, 24 August 2010 12:18 PM

To: 'Theresa Telfer'

Subject: FW: Ardglan Revised Biodiversity Offset Strategy

Importance: High

Reduce waste.....print out only what is necessary.

Isaac Mamott

Senior Botanist

Orogen Pty Ltd

Suite 4, 11 Manning Street

Tuncurry NSW 2428

Ph: 02 65553577

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From: Isaac Mamott [mailto:imamott@orogen.com.au]

Sent: Wednesday, 23 June 2010 12:25 PM

To: 'Stephen ODonoghue'

Cc: 'tfish@orogen.com.au'; 'Chris Pike'

Subject: RE: Ardglen Revised Biodiversity Offset Strategy

Importance: High

Hi Stephen

Just confirming our discussions today regarding the Ardglen Quarry project, in particular DECCW's comments on the Draft Biodiversity Offset Strategy:

1. DECCW have reviewed Orogen's response (dated 8/6/2010) to DECCW's comments on the Offset Strategy and are **in agreement** that outplanting for canopy establishment (in the event natural regeneration does not take place to a sufficient degree) would be by manual augering at planting locations rather than by direct seeding along rip lines, due to the sites' physical limitations (ie. extent of outcropping). As detailed in the Draft Landscape Management Plan, a planting density of 60 trees/ha was reached using a 30-40 tree/ha tree density prescribed in the literature for box gum woodlands (see Prober and Brown 1994; McIntyre, McIver and Heard 2002 – pg 88) and doubling that to account for natural attrition. Planting design would also be as per that outlined in the literature (see McIntyre, McIver and Heard 2002 – pg 88; Benson and Redpath 1997) for box gum woodlands;
2. DECCW acknowledge the literature cited by Orogen which demonstrates that large scale grassy woodland understorey restoration is not yet available and thus is not proposed at present on the Ardglen offset sites. We emphasise that the Draft Landscape Management Plan commits Daracon to undertaking large scale understorey restoration works should it become feasible during the life of the quarry. Our approach of canopy establishment coupled with a burning regime detailed in the LMP should assist in gradually restoring the understorey to some extent. I understand from our discussions today that DECCW is **in agreement** with this approach and commitment by Daracon.

With these two main issues resolved, we will address DECCW's comments regarding long term security and bushfire (EPA approval - clean air) and finalise the Offset Strategy and Landscape Management Plan.

regards

Reduce waste....print out only what is necessary.

Isaac Mamott

Senior Botanist

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From: Stephen ODonoghue [mailto:Stephen.ODonoghue@environment.nsw.gov.au]

Sent: Monday, 7 June 2010 10:32 AM

To: Isaac Mamott

Cc: Colin Phillips; Robert Taylor; Lindsay Fulloon

Subject: Ardglen Revised Biodiversity Offset Strategy

Isaac,

I have had some feedback from DECCW Environment and Conservation Programs Group in Dubbo regarding the revised offset strategy. The key comments are:

- Overall proposed offset takes a very minimalist approach ie focus is on natural regeneration and no rehab in the ground layer. Natural regeneration is only going to occur in a small radius (less than 40m) around a tree. Given there are large areas that are mostly treeless this will not achieve re-generation throughout for a long period. However, it is noted that assisted regeneration is proposed to be undertaken after 3 years depending upon success of natural recruitment.
- It is proposed ploughing and planting trees in rows if natural regeneration doesn't work. This should **not** be carried out. A better strategy would be to burn (which is part of the proposed strategy), but not when very young regenerating trees are present, and/or spray and then sow seed after good rainfall at a time of year when seed would be naturally available. It is proposed to burn in evening/ night time periods – this is likely to cause greater air impacts due to potential inversion conditions – should be timed, that is when there is good dispersion during day time period and wind away from sensitive receptors to avoid impacts on the Ardglen township and highway. Any proposed burning to manage biodiversity will also need to consider the requirements under the Protection of the Environment (Clean Air) Regulation 2002 Part 2A "Control of Burning" – an approval to burn may be required.
- The understorey should be spot sprayed to get rid of competition before the seed is spread. Trees in lines should be avoided. The Greening Australia "whole of paddock rehabilitation" approach (**without** the grazing being reimposed after tree establishment and without trees in lines) could be looked at for details (and staff approached to get advice). This includes use of shrubs that die out later but help prepare the soil for understorey plants. For the understorey the **minimum** that should be undertaken is sowing of native grass seed mixes after burning or spot spraying.
- It is proposed to use grazing for weed control. This management practice should not be undertaken. Weeds would be best eliminated by spot spraying and leaving the site alone – i.e. allowing the natural processes to operate after cessation of grazing.
- Relevant references to consult are papers by Windsor on pages 271-285 and 298-317 in *Temperate Eucalypt Woodlands in Australia: Biology, Conservation, Management and Restoration*. Eds. R. J. Hobbs and C. J. Yates. Surrey Beatty and Sons, Chipping Norton.
- There are also no details on how the site will be secured for conservation. Security of the offset and incorporation of formal ongoing management/ monitoring requirements should be progressed in accordance with condition 26 of approval, noting that approval date was Dec 2008. 26. Within 3 years of this approval, the Proponent shall make suitable arrangements to provide appropriate long term security for the offset areas to the satisfaction of the Director-General.

If you have any queries please contact me, however, I may need to refer you to Dr Robert Taylor in our Dubbo office if you need to discuss technical aspects of the comments in relation to successful management techniques or otherwise for restoration of box woodland ecosystems.

Regards

Steve

Stephen O'Donoghue
Senior Regional Operations Officer
Environment Protection and Regulation Group
North West Branch - Armidale Region
Department of Environment, Climate Change and Water
ph 6773 7000

 Please consider the environment before printing this e-mail.

From: Isaac Mamott [mailto:imamott@orogen.com.au]
Sent: Friday, 7 May 2010 1:23 PM
To: ODonoghue Stephen
Cc: 'Mat Radnidge'
Subject: ardglen
Importance: High

Hi Stephen

Further to my email yesterday regarding Ardglen, I just wanted to clarify a point regarding the understorey restoration in the offset sites.

The point is that to restore a grassy woodland understorey, one needs to re-establish themeda swards – whilst some field trials have been done, no large scale (> 1 ha) restoration trials have been done – even the small scale trials are still largely hit or miss.

So, until large scale themeda re-establishment is proven and is financially feasible, none will be proposed for the Ardglen sites at the present time. We will still recommend management measures such as safe winter burns and slashing to keep weeds at bay and encourage native understorey recruitment until such time as restoration is possible.

cheers

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Isaac Mamott
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Ann Hagerthy
Senior Compliance Officer
Planning Services
Suite 14, Level 1, 1 Civic Ave
PO Box 3145
Singleton NSW 2330

November 2nd 2018

To Ann,

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RE: Buttai Gravel, Ardglen Quarry update to Landscape and Rehabilitation Management Plan – Nomination of suitably qualified expert

Further to our correspondence dated 12th October 2018 regarding the Ardglen Quarry Independent Environmental Audit (IEA), we now wish to propose a consultant to facilitate the updated Landscape and Rehabilitation Management Plan as detailed within the IEA action plan.

Accordingly and in accordance with Condition 27, Schedule 3 of the Project Approval 06_0264, Buttai Gravel Pty Limited (Daracon Quarries) seeks the approval of Mr Luke Bettridge (Umwelt Environmental and Social Consultants – NSW Operational Support Manager) to act as the suitably qualified person to undertake an update to the Ardglen Quarry Extension Landscape Management Plan, incorporating the:

- Doughboy Hollow Creek Rehabilitation Strategy;
- Rehabilitation and Biodiversity Offset Management Plan;
- Quarry Closure Plan;

The revisions to the Landscape Management Plan will largely focus on revisions to the progressive rehabilitation of the Quarry operations as well as the development of performance indicators and completion criteria for rehabilitation and offset works proposed to be undertaken on the site.

Luke Bettridge has prepared a number of Rehabilitation, Biodiversity and Offset Management Plans for a range of extractive industry developments in NSW, please see attached CV. Luke Bettridge will also liaise with Umwelt's NSW Ecology Manager (Alison Riley) as required in regards to the establishment of performance indicators related to the Ardglen offset properties.

Should you have any further queries, please don't hesitate to contact the undersigned.

Yours sincerely



Luke Robinson
Systems Manager – Construction Materials
Buttai Gravel Pty Ltd (Daracon Quarries)
0417 481 785

Allison Riley

NSW Ecology Manager



Allison has extensive experience in biodiversity survey, assessment and management. She has particular experience in assessing and managing impacts on threatened species and ecological communities on small scale site developments through to very large major projects. Allison's background is in terrestrial fauna survey and assessment, and through the development of strong skills in this area, she has for much of her 19 year career been a project manager of major, complex ecological impact assessments.

Allison is an accredited BioBanking, BioCertification and FBA Assessor under the NSW Threatened Species Conservation Act 1995 and an Accredited BAM Assessor in NSW under the Biodiversity Conservation Act 2016. Allison has prepared a range of EPBC Referrals and preliminary documentation assessments for major projects in NSW including for coal mines, quarries and infrastructure projects.

Qualifications: Bachelor of Science

Accreditation as a BAM Assessor under the *Biodiversity Conservation Act 2016*

Accreditation as a BioBanking Assessor under the *Threatened Species Conservation Act 1995*

Yrs Experience: 19

Expertise:

Terrestrial and aquatic ecological survey and assessment

Strategic impact assessment and biodiversity offsetting assessment

EPBC Referrals

Project management and strategic direction

Relevant Project Experience

Mangoola Continued Operations Project Biodiversity Assessment and EPBC Referral | Glencore | 2015-2018 | Project Director | Mangoola NSW. Allison is the project director (in prep) for the ecological components of the Mangoola Continued Operations Project impact assessment. This involves the preparation of comprehensive Ecological Assessment in accordance with the Framework for Biodiversity Assessment (FBA) of the open cut coal mine impacts, including impact assessment and detailed impact mitigation and offsetting strategy. Key ecological impacts considered included loss of woodland habitats on the Hunter Valley floor, impacts on threatened species including *prasophyllum petilum*. The preparation of the Biodiversity Assessment also involved the preparation of an EPBC Act Referral to address the key impacts on Matters of National Environmental Significance (MNES) which included detailed correspondence with DoEE.

Inland Rail Project Biodiversity Assessments and EPBC Referrals | ARTC | 2016-2018 | Project Director | Parkes to Narramine and Narrabri to North Star NSW.

Allison was the project manager for the detailed Biodiversity Assessment Reports (BARs) and ecological assessment for the EPBC Referrals for two sections of rail for the Inland Rail Project assessment. These projects were complex and occurred over multiple local government areas, catchment management areas and IBRA subregions. The preparation of these reports required extensive knowledge of the ecological features of the project areas that spanned up to 280 kilometres across inland NSW.

EPBC Act Approval Compliance Audits | BHP Billiton | Project Manager | 2011-2018 | Kooragang Island NSW.

Allison was part of an audit team which undertook a comprehensive environmental compliance audit against the conditions of an EPBC Controlled Activity Approval for a Waste Emplacement Facility. Key issues included construction management, biodiversity offsets, and threatened species management, particularly the green and golden bell frog.

Bli Bli Quarry Project EPBC Referral | Holcim | 2014 | Project Director | Bli Bli Qld. Allison was the project director in the preparation of an EPBC Referral for the Bli Bli Quarry Project in Qld. The preparation of this report involved detailed reviews of ecological reports and environmental documents previously approved under State legislation. Impacts on EPBC Act-listed threatened fauna species and an ecological community required specific impact assessments and advice on potential mitigation and offsetting requirements. The Project was found to be a non-Controlled Action by the Commonwealth Department of the Environment (DoE).

Green and Golden Bell Frog Monitoring for Ravensworth Offsets | Ravensworth Operations Pty Limited | Project Manager | 2009 - 2010 | Ravensworth NSW. Monitoring of the green and golden bell frog within the Ravensworth North Mine Biodiversity Offset Areas is required as part of the Offset and Green and Golden Bell Frog Management Plan (prepared by Umwelt). The aim being to protect and enhance the extent and condition of threatened species habitat values within the BOAs. The work undertaken included targeted searches for the green and golden bell frog as well as call playback, habitat assessment and Passive Integrated Transponder tagging.

Terminal Four Project | Port Waratah Coal Services | Project Manager | 2011-2014 | Kooragang Island NSW. Allison was the project manager and co-author for the comprehensive Ecological Assessment and Biodiversity Offset Strategy for this project. The Project required substantial ecological survey effort across multiple seasons and years targeting a range of important ecological features of Kooragang Island including Coastal Saltmarsh endangered ecological community (EEC), Freshwater Wetlands EEC, green and golden bell frog (*Litoria aurea*), Australasian bittern (*Botaurus poiciloptilus*), threatened micro-bats and migratory shorebirds listed under international conventions. The Project required analysis of complex ecological interactions and threatened species issues and the development of a range of best practice impact mitigation and offsetting measures that has received positive feedback from government authorities including the NSW Office of Environment and Heritage (OEH).

Mt Owen Continued Operations Project Ecological Assessment and EPBC Referral | Glencore | 2012-2015 | Project Manager | Mt Owen NSW. Allison was the project manager and technical reviewer for the ecological components of the Mt Owen Continued Operations Project impact assessment. This involved the preparation of comprehensive Ecological Assessment of the open cut coal mine impacts, including impact assessment and detailed impact mitigation and offsetting strategy. Key ecological impacts considered included loss of woodland habitats on the Hunter Valley floor, impacts on threatened species including spotted-tailed quoll (*Dasyurus maculatus*), squirrel glider (*Petaurus norfolcensis*) and impacts on the potential local population of green and golden bell frog (*Litoria aurea*). The preparation of the Ecological Assessment also involved the preparation of an EPBC Act Referral to address the key impacts on Matters of National Environmental Significance (MNES) which included detailed correspondence with DoEE.

Tomago Offset Site Restoration Project | Port Waratah Coal Services | Project Manager | 2013 | Tomago NSW. Allison was the project manager and technical reviewer of the Ecological Assessment and relevant Biodiversity Offset Strategy for the proposed strategy to restore estuarine wetland habitats at a 238 hectare site at Tomago, NSW for the Terminal Four (T4) Project. The habitats proposed to be created at the site have been designed to meet the requirements of a number of different shorebird species including the creation of mud flats, saltmarsh and lagoons. The Project is expected to provide a gain in saltmarsh communities associated with the north arm of the Hunter River in the Lower Hunter Estuary. The report provided recommendations for the ongoing management and monitoring program that would be implemented on site following the restoration works.

Lynwood Quarry Granite Pit Project EPBC Referral | Holcim | 2014-2016 | Project Director | Marulan NSW. Allison was the project director for the ecological components of the Lynwood Quarry Granite Pit Project impact assessment and EPBC Referral. This has involved the preparation of comprehensive Ecological Assessment with the inclusion of a Biodiversity Assessment Report and a BioBanking assessment under the Framework for Biodiversity Assessment (FBA) for Major Projects. Key ecological impacts considered included loss of woodland habitats on threatened species such as micro-bats and arboreal mammals. The preparation of the Ecological Assessment involved the preparation of an EPBC Act Referral to address the key impacts on Matters of National Environmental Significance (MNES).

Expansion of Tinda Creek Sand Quarry | Ecological Assessment | Aus-10 Rhyolite Pty Ltd | Ecology Project Manager | Putty Road, NSW | 2011-2016 | Ecological Assessment and substantial biodiversity offset strategy including assessment under both state and Commonwealth environmental offset policies. The Project considered impacts and developed mitigation and management measures for the adjacent Blue Mountains World Heritage Area and National Heritage Place and Wollemi and Yengo National Parks. The Project also included application of the EPBC Act offset calculator to determine offsets for Commonwealth listed flora and fauna species, particularly *Grevillea parviflora* subsp. *parviflora*.

Preparing Lake Macquarie Wetlands for Retreat | Lake Macquarie City Council | Project Manager | 2014-2015 | Lake Macquarie NSW. Allison was the project manager for a strategic planning document for LMCC prepared to inform planning decisions by identifying the priority wetland retreat locations and the barriers to retreat within four priority wetland areas and formulating strategies to best manage the retreat of these wetland in a land-use planning and management context. The study and report identified likely retreat and buffer areas around Lake Macquarie under a 2100 and 1 metre sea level rise scenario and provided recommendations for strategic actions which present a beneficial framework for addressing constraints, reducing risks and enhancing the resilience of key wetlands to long-term, sea level rise driven changes to hydrology. Coastal saltmarsh, in particular, was identified as being highly vulnerable to loss due to sea level rise. Specific recommendations were provided on the active management and further studies for saltmarsh communities in the locality.

Luke Bettridge

Principal Environmental Consultant – NSW Operational Support Manager

Luke Bettridge is a Principal Environmental Consultant with over 14 years of experience in environmental assessment and management, particularly in the mining and quarrying sector. Luke has a Bachelor of Environmental Science with a major in Environmental Management. Luke also has accredited qualifications in regard to risk management and auditing. During the past fourteen years as an environmental consultant with Umwelt (Australia) Pty Limited, Luke has acted in site based environment and community positions at various construction and mining operations. In these roles Luke has been responsible for environmental management and rehabilitation of underground coal mining operations, open cut coal mines, quarries as well as being an environment and community coordinator at Glencore Coal's Bulga Optimisation construction project in the Hunter Valley during 2015. During Luke's onsite roles Luke has managed both extensive land clearing and annual ecological monitoring programs for both remnant vegetation and offset properties.

Luke has an excellent understanding of the environmental risks associated with major construction projects, mining and quarrying operations and the biodiversity and rehabilitation management associated with these projects. Luke has provided advice to quarrying operations regarding rehabilitation planning and implementation, including the development of a number of Rehabilitation Management Plans in consultation with regulatory authorities. This work has included the development of rehabilitation and completion criteria for a number of mining and quarrying operations with Luke also completing numerous coal mining rehabilitation audits in NSW and Qld. Luke has also completed a number of due diligence assessments of mine closure rehabilitation risks and liabilities for ongoing operations and acquisitions.

Luke has developed conceptual closure plans for mines and quarries within New South Wales, which has included detailed scoping of closure activities and associated cost estimates. Luke has also completed Constraints and Opportunities Analysis for a number of quarries and mines to identify potential future post-mining land use constraints and options for final land use. Luke has extensive management plan experience having acted as Project Director for in excess of 15 sets of state significant development environmental management plans incorporating water management, biodiversity offset and rehabilitation management plans for a range of extractive industries, these operations are listed below.

Qualifications: Bachelor of Environmental Science
RABQSA Associate Environmental Auditor
MNCG1002A – Implement and Apply Risk Management Processes (G2)
MNCG1003 – Establish and Maintain the Risk Management System (G3)

Yrs in Industry: 14

Expertise: Closure Planning and Rehabilitation
Environmental Management Systems and Plans
Environmental Operational Support
Strategic Direction of Environmental Technical Studies
Environmental Auditing

Relevant Project Experience

Environmental Management Plans and Supplementary Approvals | Various Operations | 2004 - 2017 | Project Director. Luke has acted as the Project Manager / Project Director for a range of extractive industries. Luke has prepared management plans for state significant extractive developments for submission to Department of Planning and Environment as well as local councils. Luke has acted as the Project Director responsible for the development of Landscape / Rehabilitation and Biodiversity management plans for in excess of 15 extractive industry facilities. Luke has undertaken these works for facilities including but not limited to: Oberon Quarry, Haerses Road Quarry, Lynwood Quarry, Cooma Road Quarry, Ravensworth North Open Cut Coal Mine, West Wallsend Underground Coal Mine, Haerses Road Quarry, Lynwood Quarry, Cooma Road Quarry, Invincible Colliery,

Mangoola Open Cut Coal Mine, West Wallsend Underground Mine, Cullen Valley Mine.

Corporate Client | Rehabilitation Benchmark Audits | NSW and Qld | 2011. Luke was responsible for the preparation of a rehabilitation benchmark review for coal mining operations in the NSW Hunter Valley and QLD's Bowen Basin. The project involved the assessment of the progression of the sites rehabilitation towards the completion criteria which had been developed for the site, with remediation actions developed to address any rehabilitation which was not progressing in accordance with site requirements.

Mid-term Strategic Review of Progress of Former Snowy Scheme Rehabilitation | NSW National Parks and Wildlife Service | 2016. During 2016, Umwelt were engaged by the NSW Government to complete a strategic review of the progress of the rehabilitation of works which have been undertaken by the NSW Government. The review undertaken by Umwelt critically reviewed the programs budget status, the process for identifying planning and implementing the rehabilitation works, a review of the risk management framework utilised to priorities rehabilitation works, as well as an assessment of the rehabilitation performance against the program criteria agreed to at the commencement of the project. The project included field inspections to review rehabilitation performance across a range of sites which Luke attended as the projects rehabilitation specialist.

NSW Government Department| Guidelines for Mitigation of Impacts to Biodiversity | 2014. Luke was involved in the development of guidelines to be implemented in NSW to provide guidance to coal mining operations on the range of controls to be implemented to mitigate impacts to biodiversity in NSW. The guidelines prescribed a range of controls required to be implemented at mining operations to mitigate impacts on biodiversity and consider the diverse array of risks to biodiversity in NSW.

Annual Rehabilitation Walkover Inspection | OCAL – Westside Mine (Open Cut Mine) | Project Director | 2013 - 2014 | As per Glencore standards, rehabilitated areas are to be inspected annually to determine their adequacy against specific criteria. These inspections compliment ecological monitoring of rehabilitation sites and involve rapid assessment of rehabilitation areas to identify potential threats to achieving closure criteria. The Rehabilitation Walkover Inspection report identifies potential issues (e.g. weed infestations, erosion, lack of key native species) and recommends actions to be implemented in order to rectify these issues.

Cement Australia – Carwell Creek Mines, Kandos NSW. Closure Planning and Landform Design. Project Director. In 2013 and 2014, Umwelt undertook Quarry Closure Planning and landform design for Carwell Creek Mines, located in Kandos NSW. Umwelt's involvement in the project included:

- Development of a planned closure RCE and MOP;
- Development of potential landform design options for the site, with a range of options developed in consultation with regulatory authorities and local land holders;
- Review of specialist assessments undertaken for the project including contamination, geotechnical and groundwater assessments.

Closure Cost Assessments | Completed for Various Companies for Mines and Quarries | 2013 – 2016 | Various Locations NSW. During 2013 - 2018, Luke has acted as the Project Director for in excess of 17 rehabilitation cost estimates (RCEs) for mining and quarrying operations. These RCEs have included the completion of imminent "close now" cost calculations for submission to the NSW Department of Trade and Investment – Division of Resources and Energy (DRE) as security costs for mining leases, as well as planned cost calculations for use by quarrying and mining companies.

DPE Conservation Bonds | Liddell Coal Mine, Bulga Coal Complex, Mangoola Mine, Mackas Sand, Oberon Quarry | 2016 - 2018. Luke has acted as the Project Manager / Project Director for the preparation of the DP&E Conservation Bonds required to be prepared for the above operations.

Mine Closure Workshops / Risk Assessment Facilitation | NSW. Luke has facilitated risk assessment workshops to identify constraints and opportunities related to the closure of mining operations in NSW. The risk assessments are undertaken to inform the detailed mine closure process.

Tasman Underground Coal Mine – Closure Planning, Landform Design and Rehabilitation Project | Yancoal Australia | 2014 | NSW. In 2013 and 2014, Umwelt completed a detailed multi-disciplinary project for the closure and rehabilitation of the Yancoal Australia Ltd Tasman Underground Mine, located 20 km west of Newcastle, NSW. Luke acted as the Project Manager for the project. Umwelt's involvement in the project included:

- Completion of a planned RCE for the site, including sub-contractor, demolition and earthworks fees;
- Development of potential landform design options for the site;
- Completion of an analysis of the potential landform design options and closure / rehabilitation process;
- Consultation with government agencies and the community regarding the closure process and the proposed rehabilitation strategy;
- Facilitation and completion of a Mine Closure Risk Assessment. The Mine Closure Risk Assessment identified the constraints and options for closure (including an analysis of landform design options) and the controls for the management of potential risks to closure;
- Management of Sub-consultants to undertake Contamination and Geotechnical Assessments for the site;
- Completion of a MOP for closure which was completed in accordance with the relevant DRE MOP guidelines. The MOP submitted to government agencies and approved. The MOP contained detailed information on the rehabilitation implementation and monitoring works to be undertaken;
- Completion of a series of final 'Issued for Construction' design drawings for the rehabilitation works; and
- Completion of a technical specifications document for the chosen landform design option for issue to the construction contractor.

ATTACHMENT A
Ardglen Quarry Extension (MP 06_0264) – Post Approval Landscape Management Plan

Relevant Condition	Compliance (Yes/No)	Comment	Action Required	Daracon Comment / Changes made in revised Plan
25. Prior to undertaking any works in the Extension Area , the Proponent shall revise the Biodiversity Offset Strategy described in the EA and Response to Submissions (shown conceptually in Appendix 3), to the satisfaction of the Director-General. The revised strategy must be prepared in consultation with the DECCW , and include additional areas where Yellow Box White Box Blakely's Red Gum Woodland EEC would be actively re-established within the identified biodiversity offset areas shown in Appendix 3.	Partial	Section 5.2.1.2 provides that assisted revegetation may be undertaken if required. There is no clear commitment to undertake active revegetation, and there is no commitment to use Box Gum Woodland EEC species, as required under condition 25. The Department also refers Daracon to Appendix 3 of the development consent, which indicates that 'planting of EEC trees' will occur on Lots 39 and 187. The LMP should identify the areas where natural regeneration is unlikely to be sufficient and provide a clear commitment to undertake active Box Gum Woodland revegetation in those areas (including a timeframe for doing so). The Department also understands that OEH consultation is ongoing. Please provide copies of any OEH correspondence, and an explanation as to how OEH comments have been considered/addressed in the final version of the document.	Note the comments and amend the Biodiversity Offset Strategy accordingly	The Landscape Management plan has been revised to include a clear commitment that planting of Box Gum Woodland EEC species will be undertaken within Offset Areas. The indicative species list to be used for EEC tree planting in Offset Areas is included in Section 5.2.1.2 of the LMP and will be refined following the completion of Offset Area Monitoring to be undertaken in Offset Areas in Spring 2019. The planting schedule for the Offset Areas will be updated in the revised LMP to be submitted to the Department of Planning, Industry and Environment (DPIE) in April 2020. Planting of EEC Trees in Offset Areas will commence at Ardglen Quarry in 2020. The draft LMP was submitted to OEH however there has not been a response from OEH at this stage. Daracon will continue to follow up with OEH to obtain comment on the draft LMP and will advise DPIE when comments are received.
26. Within 3 years of this approval, the Proponent shall make suitable arrangements to provide appropriate long term security for the offset areas to the satisfaction of the Director-General.	No	The Department understands that Daracon is consulting with the Biodiversity Conservation Trust (BCT) regarding the long-term security of the offset areas. However, there is no clear timeframe provided.	Include a commitment in the LMP to provide a more detailed Biodiversity Offset Strategy following further consultation with the BCT, and by no later than 31 December 2019	Section 5.6 of the Landscape Management Plan has been updated to include a commitment to provide a revised biodiversity offset strategy to DPIE by 31 December 2019.
27. The Proponent shall prepare and implement a detailed Landscape Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared by suitably qualified expert/s whose appointment/s have been approved by the Director-General; (b) submitted to the Director-General for approval prior to undertaking any works in the Extension Area ; and (c) include a: - Doughboy Hollow Creek Rehabilitation Strategy; - Rehabilitation and Biodiversity Offset Management Plan; and - Quarry Closure Plan. <i>Note: The Department accepts that the initial Landscape Management Plan may not include the detailed Quarry Closure Plan. However, if this occurs, the Proponent will be required to seek approval from the Director-General for an alternative timetable for the completion and approval of the Quarry Closure Plan.</i>	Partial	Please provide details of the author(s) relevant qualifications and experience.	Note the comments and amend the plan accordingly	Daracon sought approval for Luke Bettridge (Umwelt Operational Support Manager NSW) to be approved by DPIE as the suitably qualified expert to prepare the plan. DPIE advised on 2 November 2018 that DPIE does not typically approve consultants for the purpose of updating management plans. A copy of the correspondence from DPIE and the Daracon seeking approval of the suitably qualified consultant is attached.
28. The Doughboy Hollow Creek and Rehabilitation Strategy must: (a) be prepared in consultation with the I&I NSW and NOW ; (b) describe the measures that would be implemented to: - remove the weir from Doughboy Hollow Creek; - rehabilitate the creek; and - rehabilitate and/or re-establish riparian vegetation.	Yes	See Section 4 LMP only commits to review and update the plan by 31 December 2020, or prior to any works in the Extension Area. However, this is consistent with the modified conditions of consent.	N/A	No changes required to the Plan to address this requirement.

ATTACHMENT A
Ardglen Quarry Extension (MP 06_0264) – Post Approval Landscape Management Plan

Relevant Condition	Compliance (Yes/No)	Comment	Action Required	Daracon Comment / Changes made in revised Plan
29. The Rehabilitation and Biodiversity Offset Management Plan must: (a) be prepared by suitably qualified expert/s whose appointment/s have been approved by the Director-General;	Partial	(a) Please provide details of the author(s) relevant qualifications and experience	Note the comments and amend the plan accordingly	Daracon sought approval for Luke Bettridge (Umwelt Operational Support Manager NSW) to be approved by DPIE as the suitably qualified expert to prepare the plan. DPIE advised on 2 November 2018 that DPIE does not typically approve consultants for the purpose of updating management plans. A copy of the correspondence from DPIE and the Daracon seeking approval of the suitably qualified consultant is attached.
(b) describe in general the short, medium, and long term measures that would be implemented to: - rehabilitate the site; - implement the Biodiversity Offset Strategy and - Doughboy Hollow Creek Rehabilitation Strategy; - manage the remnant vegetation and habitat on the site;	Partial	(b) Further details are required regarding the medium and long-term rehabilitation of the site. Few details have been provided in relation to the final landform, particularly within the southern portion of the original quarry pit. The Department notes that this area was omitted from the Conceptual Rehabilitation Plan in Appendix 2, on the basis that this area would be rehabilitated under a separate Council consent. However, as the Council consent has now been surrendered, the LMP will need to address this area.	Note the comments and amend the plan accordingly	The final landform for the site is included in Section 7.1.2 of the LMP. The conceptual final landform and land use is presented as per Appendix 2 of the Project Approval. As this item is currently being discussed between Daracon and DPIE as part of the Environmental Assessment process for the Ardglen Quarry MOD 2 assessment, information retained within the LMP is consistent with the Project Approval with this LMP to be amended to reflect the outcomes of Daracon’s consultation with DPIE in regards to the final landform as a result of the MOD 2 consultation.
(c) include a detailed description of what measures would be implemented over the next 3 years to implement the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy;	Partial	(c) Further details required with respect to the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation, when available. See comments regarding condition 26 and 28 above.	Note the comments and amend the plan accordingly	Section 5.7 of the LMP includes information regarding the short, medium and long terms measures to be implemented for the Offset Area. Measures included in Table 5.3 of the LMP are related to offset monitoring, rehabilitation of the offset areas and the security of the offset property. Key actions to be undertaken include: - Offset Area Monitoring – to be undertaken Spring 2019 to review existing coverage and vegetation within Offset Areas and to confirm species to be used in Offset Area Planting species list and the schedule for planting. - Offset Area Planting – the planting schedule for the Offset Areas will be updated in the revised LMP (see below). Planting of EEC trees in Offset Areas will commence in 2020. - Update to LMP – The LMP will be updated in April 2020 to include a specific schedule for Offset Area planting and the refined EEC species list to be utilised for the planting. - Security of Offset Areas – Daracon to update DPIE by 31 December 2019 regrading the implementation of the Offset area security.
(d) include a detailed description of what measures would be implemented over the next 5 years to rehabilitate the site, including the procedures to be implemented for: - progressively rehabilitating areas disturbed by quarrying; - implementing revegetation and regeneration within the disturbance areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata; - managing the remnant vegetation and habitat on site; - managing impacts on fauna; - reducing the visual impacts of the project; - landscaping the site to minimise visual impacts; - protecting areas outside the disturbance areas; - conserving and reusing topsoil; - collecting and propagating seeds for rehabilitation works; - salvaging and reusing material from the site for habitat enhancement; - controlling weeds and feral pests; - controlling access; and	Partial	(d) Generally satisfied – see Section 6. However, the Department has concerns regarding the adequacy of progressive rehabilitation. In particular: - The LMP only provides a clear commitment to undertaken ‘rehabilitation planting’ adjacent to the Extension Area in September 2019. As the Department understands that this area is undisturbed, it is unclear how this constitutes ‘rehabilitation’ (notwithstanding the recommendations of the IEA). - The LMP identifies a ‘Conceptual Planting Area’ for 2020, however, no clear commitments are provided. The LMP indicates that this planting will be confirmed in the Annual Review – this is not sufficient. - Section 6.2 indicates that planting will be undertaken on the proposed noise bund, once constructed. The Department notes that this bund forms part of Modification 2, which has not been determined. - No details are provided regarding the proposed species.	Note the comments and amend the plan accordingly	Section 6.2.2 and Figure 6.2 of the of the LMP has been revised to include clear commitment for timing in regard to the completion of rehabilitation planting. The timing for the planting of the noise bund has been clarified within the text of the LMP. The proposed species for the rehabilitation planting on site are consistent with the species to be used for the Offset Area assisted planting program and are included in Section 5.2.1.2 of the LMP.

ATTACHMENT A
Ardglen Quarry Extension (MP 06_0264) – Post Approval Landscape Management Plan

Relevant Condition	Compliance (Yes/No)	Comment	Action Required	Daracon Comment / Changes made in revised Plan
(e) detailed performance and completion criteria for the rehabilitation of the site and implementation of the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy;	Partial	(e) Detailed criteria for Doughboy Hollow Creek Rehabilitation Strategy not provided – will need to be included in subsequent updates to the LMP. The preliminary rehabilitation performance criteria in Table 6.1 require further refinement. For example, what is ‘an adequate native cover on quarry benches’ or ‘poor quality runoff’? Please provide clear, quantifiable targets, particularly with respect to vegetation cover, weed control, water quality, slope of quarry benches etc and avoid using vague language such as ‘appropriate’ or ‘adequate’.	Note the comments and amend the plan accordingly	It is noted that detailed criteria will be required for Doughboy Creek in subsequent updates to the Plan. The rehabilitation performance criteria in Table 6.1 of the LMP has been refined to include rehabilitation performance criteria to reflect quantifiable targets. It is noted that the detailed rehabilitation criteria will be refined in subsequent revision of the LMP as further data becomes available and the detailed rehabilitation performance criteria will be included in the Quarry Closure Plan. Rehabilitation of selected disturbed areas will commence in 2019 however rehabilitation of quarry benches can not be undertaken until all product quarry material has been removed from the quarry.
(f) a detailed description of how the performance of the rehabilitation of the site and implementation of the Biodiversity Offset Strategy and Doughboy Hollow Creek Rehabilitation Strategy would be monitored over time to achieve the relevant objectives and completion criteria;	Yes	(f) Satisfied – Section 6.3	No further action required.	No changes to LMP
(g) a description of the potential risks to successful revegetation and/or rehabilitation in the offset areas and project area, and a description of the contingency measures that would be implemented to mitigate these risks; and	Yes	(g) Satisfied – Section 6.2.3	No further action required.	No changes to LMP
(h) details of who is responsible for monitoring, reviewing and implementing the plan.	Yes	(h) Satisfied – Section 9 and 10.		No changes to LMP
30. The Quarry Closure Plan must: (a) define the objectives and criteria for quarry closure; (b) investigate options for the future use of the site, including any final void(s); (c) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the development; and (d) describe how the performance of these measures would be monitored over time.	Yes	Satisfied – more detailed plan to be provided closer to quarry closure.	No further action required.	No changes to LMP

Attachment A

BCD review of Ardglen Quarry LMP

1. Doughboy Hollow Creek Rehabilitation Strategy

Approval Condition 28 b) states that the rehabilitation strategy describe the measures that would be implemented to:

- remove the weir from Doughboy Hollow Creek;
- rehabilitate the creek; and
- rehabilitate and/or re-establish riparian vegetation.

BCD notes that the strategy does not fulfil the first dot point although it indicates that a review of its removal will be carried out. This review is scheduled to be completed by 31 December 2020.

It is further noted that the proponent has assumed that the Project Approval condition relating to the rehabilitation of Doughboy Hollow Creek applies only to the section of the creek contained within Lot 39. Rehabilitation is not proposed for those upstream and downstream sections of the creek that fall outside the three offset areas.

Confirmation is required from the Planning and Assessment Group (PAG) of the Department of Planning, Industry and Environment as to the intent of the approval conditions. BCD suggests that the creek rehabilitation is to mitigate impacts of the quarry and therefore should apply to the entire length of creek-line within the project site.

Recommendations

- 1.1 A strategy for the removal of the weir be developed and incorporated into the Doughboy Hollow Creek Rehabilitation Strategy.
- 1.2 Confirmation is obtained from PAG as to the intention of the approval conditions relating to the rehabilitation of Doughboy Hollow Creek.

2. Targets should be clear and quantifiable

The targets outlined in the Biodiversity Offset Management Strategy are very general in nature. Short, medium- and long-term objectives and targets should be described for each of the broad management measures. In the case of long-term targets, the strategy should include some interim targets that can be reviewed and amended as required.

Successful management plans include tailored, quantitative performance measures and targets, completion criteria monitoring and trigger points for corrective action which adhere to the SMART principles (specific, measurable, achievable, realistic, timely). Management targets are required for weed, feral animal and erosion control as well as habitat restoration. These targets should adhere to the SMART principles and must be measurable and expressed in a manner that assists in the evaluation of progress toward the strategic goals that define the completion criteria.

Examples of these could be:

Weed Management

Objective 1: Noxious and environmental weeds are identified and mapped.

Year 1: Undertake a detailed inspection of the quarry area and offset areas and accurately map (GIS) noxious and environmental weeds.

Years 2 & 3: Undertake quarterly weed inspections, update GIS database with necessary changes.

Objective 2: A risk-based weed management plan is developed for the quarry and offset areas.

Year 1: Develop a risk-based weed management program

Years 2 & 3: Implement weed management program, undertake quarterly weed inspections and schedule and undertake necessary weed treatment.

Objective 3: Reduce presence of noxious and environmental weeds.

Year 1: Implement management actions for high risk areas identified in the detailed weed inspection. Develop specific actions e.g. Targeted spraying of (insert weed) in (insert area)

Years 2 & 3: Implement weed management program. List specific actions.

Completion and performance criteria should reflect the objectives and must be quantifiable. Examples for weed management may include the “the complete removal of all (insert noxious weed)” and that “non-native groundcover not exceed 10%”.

Similar detail is required for other management actions such as animal pests, bushfire management, erosion control and rehabilitation.

Recommendations

- 2.1 Short, medium- and long-term objectives and targets, where appropriate, be developed for each of the broad management measures.
- 2.2 Quantitative performance measures and targets and trigger points for corrective action be developed.

3. Monitoring methodology is to be clear with definable triggers for management actions

Monitoring is required across the entire quarry and offset sites to determine the effectiveness of management actions.

The offset monitoring plan presented in Section 5.5 is inadequate. For example, it is stated that monitoring will include weed composition within offset areas. This will inform the need for any works to control weeds during the following 12-month period. No details, such as the timing of the monitoring or the monitoring methodologies, are provided. In addition, no triggers have been proposed that will guide the need for weed control or when additional measures may be required.

A Trigger Action Response Plan (TARP) that addresses all management actions on the site should be developed.

Recommendations

- 3.1 A detailed monitoring plan to track performance towards completion criteria be developed.
- 3.2 A TARP be developed to ensure that a timely response to unforeseen circumstances are implemented.

APPENDIX 1
Ardglen Quarry Extension (MP 06_0264) – Response to OEH (BCD) comments on Landscape Management Plan

DPIE – BCD comment 13 August 2019	Daracon Comment / Changes proposed in revised Plan to DPIE 18 September 2019	March 2020 Updates undertaken to LMP
1.1 A strategy for the removal of the weir be developed and incorporated into the Doughboy Hollow Creek Rehabilitation Strategy.	As detailed in Section 4.1.1 (Causeway Removal) of the LMP, it is proposed that the causeway remain in situ until such time as a review of its removal is completed. As noted in Section 4.3 of the LMP, during 2019 – 2020, Daracon will review the scope of works required to be undertaken within Doughboy Creek in consultation with the Natural Resource Access Regulator (NRAR) and DPIE and include a revised works program within the LMP prior to 30 December 2020. Similarly to the causeway (refer to Section 4.1.1), it is proposed that the rock weir would remain in place until such time as a review of its removal is completed. The works required to be undertaken for the rehabilitation of Doughboy Creek will be reviewed prior to 31 December 2020 or prior to undertaking any works in the Extension Area, whichever occurs first. The review of rehabilitation works required will include: • Site inspection of the Doughboy Hollow Creek by suitably qualified consultant to review status of vegetation and erosion within Doughboy Hollow Creek as an update of the baseline inspection undertaken in 2010; • Determination of works required to be undertaken, if any, in regards to the erosion within the creek; • Development of a detailed methodology for removal of causeway and weir, as well as methodology for planting/ rehabilitation of the Doughboy Hollow Creek banks; • Development of an appropriate monitoring program and associated performance and completion criteria for works required to be undertaken as part of the Doughboy Hollow Creek Rehabilitation review; • Consultation with DPIE (PAG and BCD) and the Natural Resource Access Regulator (NRAR) regarding proposed rehabilitation works, performance criteria, monitoring program, any approval requirements; • Following consultation with DPI Water and DPIE, revision and update of this LMP to include the works program and detail actions required to be undertaken during the following 5 years period; • Daracon commits to this occurring prior to the 31st December 2020;	Section 4.1.1 and Section 4.1.2 has been revised to note that works will be planned prior to commencement of works within the Extension Area as identified in the Development Consent.
1.2 Confirmation is obtained from DPIE – Planning and Assessment Group (PAG) as to the intention of the approval conditions relating to the rehabilitation of Doughboy Hollow Creek.	Daracon will liaise with DPIE during 2020 as part of the scope of works detailed in Section 4.1.1 which details planning works to be undertaken for Doughboy Hollow Creek rehabilitation. This 2019 LMP update is consistent with the 2010 LMP in that rehabilitation in Doughboy Hollow Creek has been proposed within Lot 39 and rehabilitation is not proposed for those upstream and downstream sections of the creek that fall outside the three (3) offset lots. During 2020, Daracon will liaise with DPIE to confirm the extent of rehabilitation required with the proposed rehabilitation works to be prepared in consultation with DPIE and NRAR.	Section 4.1.1 and Section 4.1.2 has been revised to note that works will be planned prior to commencement of works within the Extension Area as identified in the Development Consent.
2.1 Short, medium- and long-term objectives and targets, where appropriate, be developed for each of the broad management measures.	The August 2019 LMP includes details of the short, medium and long-term measures, refer to Section 5.7 of the LMP. The Offset Area Performance Indicators and Completion Criteria are detailed in Table 5.2 of the LMP. Key to the refinement of not only the works required to be undertaken in the Offset Areas, but also the refinement of the Offset Area Indicators and completion criteria is the completion of the Annual Offset Monitoring to be conducted in Spring 2019. As noted in the LMP, the monitoring is to be conducted annually with the results of the monitoring program utilised to refine the performance indicators and completion criteria as well as detailing whether any remediation/corrective actions are required to be implemented. The results of the 2019 monitoring will be utilised to revise the LMP with a revised LMP to be submitted by Daracon to DPIE in April 2020. The results of the monitoring will be utilised to develop an action plan for implementation at each of the Offset properties. BCD are seeking further detailed in regard to the criteria for the management of the Offset Properties, which Daracon are proposing to provide following the completion of the 2019 monitoring.	The short, medium and long terms measures for the Offset Area detailed in Section 5.7 of the LMP have been reviewed and updated to detail the revised planting program and species list. These measures have been revised based on the outcomes of the 2019 offset monitoring program. Corrective actions to be implemented for each offset area have been included in Table 5.2.
2.2 Quantitative performance measures and targets and trigger points for corrective action be developed.	Similar to item 2.1 above, the LMP details the processes to be implemented to enable the refinement of the Offset Area Preliminary Performance Criteria and triggers for corrective actions, these are already included in Table 5.2 of the LMP. Table 5.2 will be updated following the completion of the 2019 Annual Offset Area monitoring.	Table 5.2 has been updated to include a revised list of Offset Area performance indicators and completion criteria have been refined to include short, medium and long term measures that are both measurable and time-bound. These measures also include triggers and corrective actions.
3.1 A detailed monitoring plan to track performance towards completion criteria be developed.	A monitoring program for the Offset Areas is included in Section 5.5 of the LMP. The results of the 2019 monitoring will be utilised to revise the LMP with a revised LMP to be submitted by Daracon to DPIE in April 2020. Annual monitoring is to be undertaken and the scope of the monitoring is included in Section 5.5 of the LMP.	The Offset Area monitoring program has been updated, refer to Section 5.5. The monitoring program speaks directly to the performance and completion criteria, and will track the progress of biodiversity values in the offsets against these. An offset rehabilitation monitoring scope has been defined to monitor the success of offset area plantings. This expands slightly on the existing monitoring program and is based upon outcomes from the results of the 2019 monitoring.
3.2 A TARP be developed to ensure that a timely response to unforeseen circumstances are implemented.	The corrective actions proposed to be undertaken in response to monitoring events are included in Section 5.4 and Table 5.2 of the LMP. The corrective actions in Table 5.2 will be revised to align with any refinements to the performance indicators and completion criteria in the April 2020.	Refer to item 2.2 above.

Mr Luke Robinson
Systems Manager
Buttai Gravel Pty Ltd
20 Kullara Close
Beresfield, STATE, Postcode

17/06/2021

Dear Mr Robinson,

**Ardglen Quarry Extension (MP06_0264)
Landscape Management Plan**

I refer to your request (MP06_0264-PA-10) for the Planning Secretary's approval of suitably qualified persons to prepare the Landscape Management Plan for the Ardglen Quarry Extension (MP06_0264).

The Department has reviewed the nominations and information you have provided and is satisfied that this expert is suitably qualified and experienced. Consequently, I can advise that the Planning Secretary approves the appointment of Mr Luke Bettridge to prepare the Landscape Management Plan.

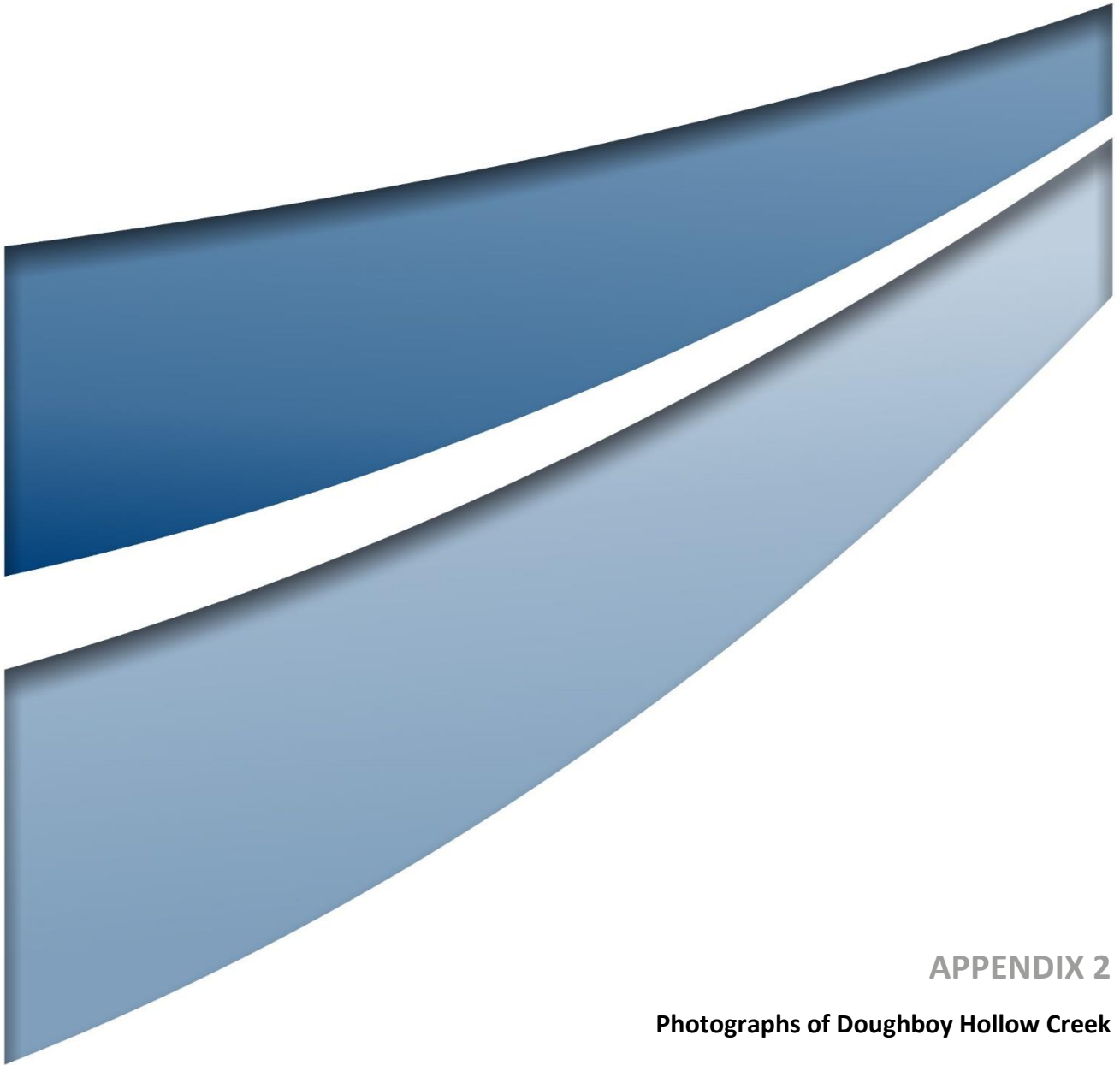
If you wish to discuss the matter further, please contact Callum Firth at callum.firth@dpie.nsw.gov.au.

Yours sincerely



Matthew Sprott
Director
Resource Assessments (Coal & Quarries)

As nominee of the Planning Secretary



APPENDIX 2

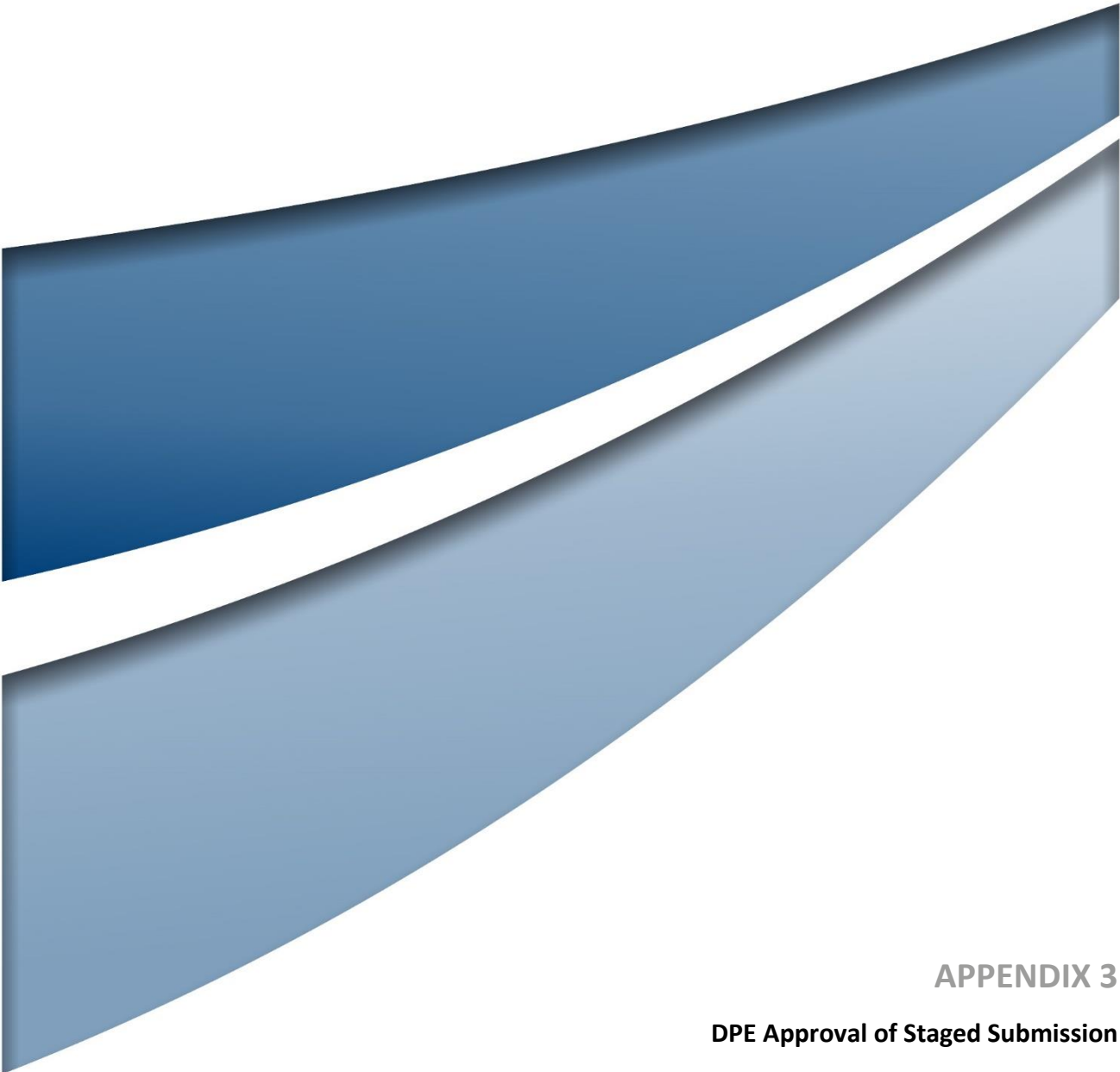
Photographs of Doughboy Hollow Creek



Doughboy Hollow Creek Causeway



**Kikuyu Dominated Section of Doughboy Hollow Creek Proposed for Rehabilitation
(refer to Section 4.0)**



APPENDIX 3

DPE Approval of Staged Submission

Mr Luke Robinson
Systems Manager
Buttai Gravel Pty Ltd
20 Kullara Close
Beresfield, NSW, 2322

8 November 2021

Dear Mr Robinson

**Ardglen Quarry (MP 06_0264)
Staged submission of Landscape Management Plan**

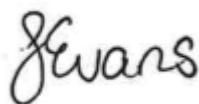
I refer to your request to submit the revised Landscape Management Plan on a progressive basis in accordance with condition 10 of Schedule 2 of the conditions of consent for Ardglen Quarry (MP 06_0264).

The Department has reviewed the request and is satisfied that the Landscape Management Plan can be submitted on a progressive basis. Consequently, I can advise that the Planning Secretary approves the request.

Please ensure that the revised Landscape Management Plan clearly articulates that the plan will be staged, and that further consultation will be undertaken with relevant agencies as part of any future staged revisions to the plan.

If you have any questions, please contact James McDonough on 02 9585 6313 or james.mcdonough@dpie.nsw.gov.au.

Yours sincerely,



as delegate for the Planning Secretary