Albion Park Quarry

Biodiversity Management Plan

Version 3.3

Issued – March 2024

CLEARY BROS

ACKNOWLEDGEMENT

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

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Document Control

Version	Date	Reason	Reviewed	Approved
1.0	21.11.23	First draft	Stephen Bloomfield (Niche)	Prue Bartlett (Niche)
2.0	29.11.23	Second draft	Prue Bartlett (Niche)	Mark Hammond (CB)
3.0	22.12.23	Draft for consultation with BCD	Prue Bartlett (Niche)	Mark Hammond (CB)
3.1	05.02.24	Updated following feedback from BCD. Also minor rearrangement of subsections to Section 5, and update of figures.	Biodiversity Conservation Division Mark Hammond (CB)	Prue Bartlett (Niche)
3.2	09.02.24	Minor formatting edits	Mark Hammond	Prue Bartlett (Niche)
3.3	13.03.24	Updated following comments from DPE	Mark Hammond	DPE

Glossary and list of abbreviations

Term or abbreviation	Definition
2020-8871	The approval for the Project under the EPBC Act to impact MNES
Approvals	Includes 2020-8871 and SSD 10369
BAM	Biodiversity Assessment Method
BC Act	NSW *Biodiversity Conservation Act 2016*
BC Reg	NSW *Biodiversity Conservation Regulation 2017*
BCS or BCD	NSW Department of Planning and Environment, division of Biodiversity, Conservation and Science
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
BOS	NSW Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DBH	Diameter at Breast Height
Disturbance Area	The area referred to as Stage 7 within which direct impacts from the amended Project would occur
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
ha	Hectare/s
ISR	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion
LGA	Local Government Area
Locality	The Project Area and surrounds, nominally a 10 km radius from the amended Project Area
MAS	*Melaleuca armillaris* tall shrubland in the Sydney Basin Bioregion
MNES	Matters of National Environmental Significance (from the EPBC Act)
Native ecosystem rehabilitation domain	The sections of the final landform which are to be rehabilitated to create an ecosystem comprising of local native species, in line with the Rehabilitation Strategy and Rehabilitation Management Plan
PCT	Plant Community Type
Planting Zone	Area adjoining the Stages 1-6 extraction area which has been revegetated under the former VMP
Project Area	The area within which direct impacts from the amended Project would occur, includes Stage 1-7
RDP	Rapid Data Point
Restoration Zone	Finger of previously cleared land to the south of the Stages 1-6 extraction which has been restored through weed control and natural recruitment under the former VMP
SSD 10369	The Development Consent for the Project under the EP&A Act
Study Area	The Project Area and surrounding avoidance areas
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan under the former Development Consent for the Stages 1-6 area

1. Introduction

1.1 Scope

Cleary Bros (Bombo) Pty Ltd (Cleary Bros) received State Significant Development consent (SSD) 10369 on 29 September 2023 to extend the current hard rock extraction area within the Albion Park Quarry (the Quarry). The Quarry is located in the local suburb of Croom, approximately 20 kilometres (km) south-southwest of Wollongong and approximately 4km west of Shellharbour (Figure 1).

The Quarry involves extraction of latite and agglomerate for the production of a range of high-quality aggregates, armour rock, and pavement products for use in the Illawarra-Shoalhaven and Greater Sydney Regions. The approved Quarry operations are fully described in the publicly available documents available on the Cleary Bros website. This Biodiversity Management Plan (BMP) has been prepared by Niche Environment and Heritage Pty Ltd (Niche), with assistance from R. W. Corkery & Co. Pty Ltd (RWC), on behalf of Cleary Bros in satisfaction of Condition B64 of SSD 10369. This BMP describes the following, where relevant.

- Objectives and outcomes related to management of biodiversity on Cleary Bros land surrounding the Extraction Area.
- Consultation undertaken during preparation of this BMP.
- Training requirements, and roles and responsibilities of key Cleary Bros personnel.
- Legal and other statutory requirements and commitments that apply to the Quarry.
- A description of the existing biodiversity surrounding the Extraction Area.
- A description of the activities approved under SSD 10369.
- Potential biodiversity impacts and risks.
- Biodiversity-related performance indicators and criteria.
- Key biodiversity-related management measures.
- An overview of biodiversity-related monitoring and reactive-management measures.
- A description of measures to manage biodiversity-related compliance matters.

This BMP does not address the following aspects of the Quarry.

- Management of on-site biodiversity offset areas.

  Cleary Bros will establish a Biodiversity Stewardship Agreement (BSA) over sections of land adjacent to the Extraction Area. Management of the land covered by that agreement would be the subject of a separate Biodiversity Stewardship Site Management Plan.

  Rehabilitation. A separate Rehabilitation Management Plan is required to be prepared and approved prior to the commencement of Stage 7. This BMP does not address matters relevant to rehabilitation of disturbed sections of the Quarry.

  Other matters. Aspects of the operation not relevant to biodiversity management, such as occupational health and safety, are beyond the scope of this document and are not addressed herein.

Quarrying activities will not commence until this BMP has been approved by the Planning Secretary, at which time the BMP will be implemented as approved.

As the previous consent for the Albion Park Quarry (10639 of 2005) is required to be surrendered within 12 months as part of the conditions of consent for SSD10369, the Vegetation Management Plan (VMP) required under the previous consent will shortly no longer apply. For this reason, the BMP has adopted the measures described in the VMP, where they are still appropriate and consistent with SSD10369. The VMP will continue to be implemented in parallel with the BMP (with the BMP taking precedence in line with Condition A16 of SSD10369 in the event of an inconsistencies) until such time as 10639 of 2005 is surrendered.

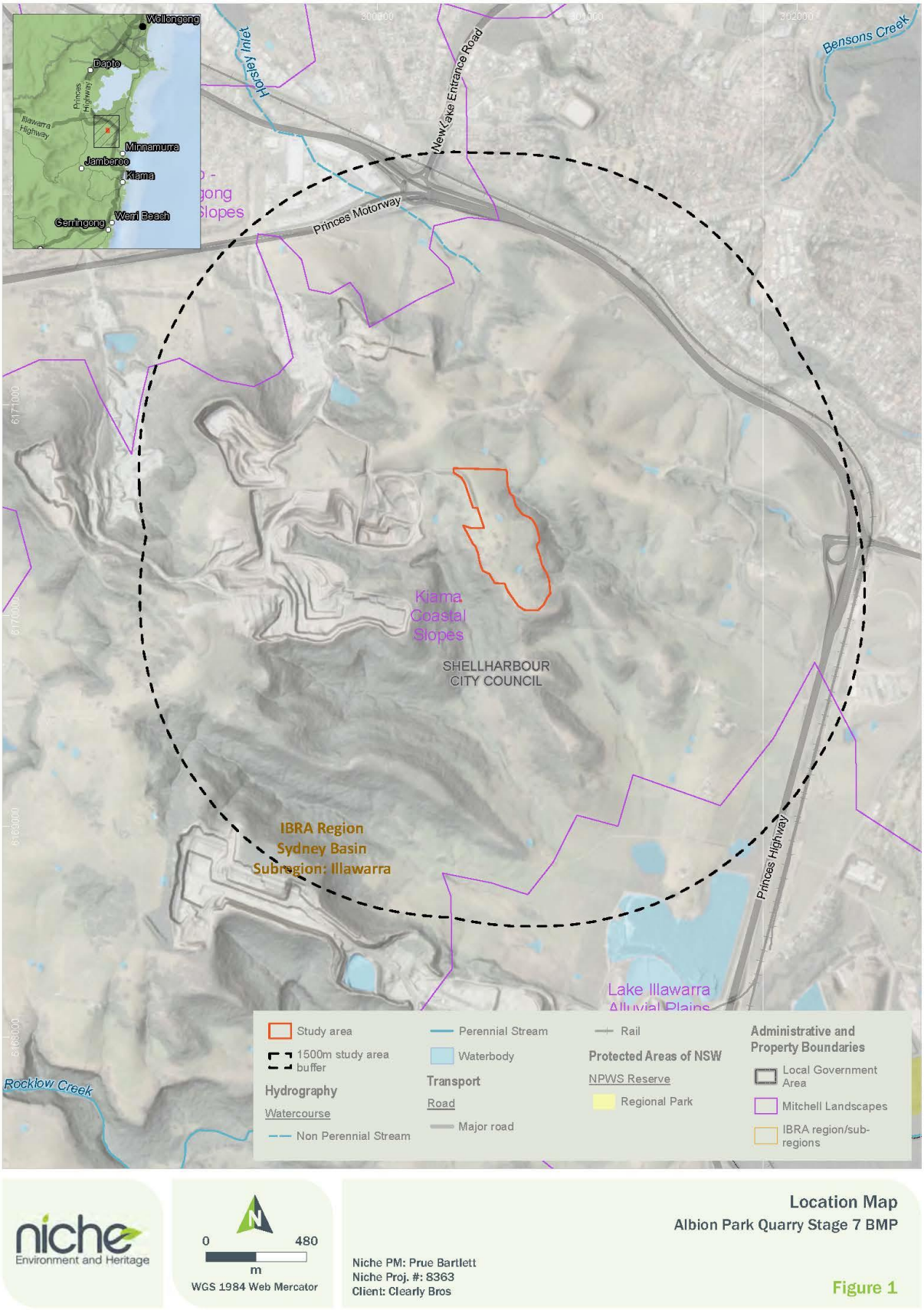

Figure 1 – Locality Plan

1.2 Albion Park Quarry Environmental Management System (HSEQ System)

The Albion Park Quarry operates within Cleary Bros Health, Safety, Environment, and Quality Management System, which sets out the framework for the management of environmental risks on Cleary Bros operations. The HSEQ System sets out Cleary Bros commitments to meet all legislative requirements, to be a valued corporate citizen in the communities in which we operate, and to minimise the impacts of our operations on the environment. The BMP forms part of the Environmental Management Strategy for the Albion Park Quarry, and details the activities required to meet the Quarry's obligation to maintain and improve biodiversity associated with the quarry development. The HSEQ System is certified to the international standard *ISO14001:2015 Environmental Management Systems*.

1.3 Objectives & Key Performance Outcomes

Table 1 presents the objectives and key performance outcomes for biodiversity management at the Quarry.

Table 1 - Objectives and Key Performance Outcomes

Objectives	Key Performance Outcomes
To ensure compliance with all relevant conditions of SSD 10369, stated commitments related to biodiversity management and reasonable community expectations.	Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with relevant government agencies.
To minimise and measure impacts to biodiversity.	Implementation of the biodiversity management and mitigation measures nominated in the BMP. Establishment of performance indicators and targets. Achievement of performance targets or implementation of corrective actions. Actively manage threats to biodiversity through innovative land and natural resource management practices.
To mitigate and offset residual impact to the following species and vegetation communities: – *Zieria granulata* (Illawarra Zieria) – PCT 1300 – Whalebone Tree – Native Quince dry subtropical rainforest – PCT 720 – *Melaleuca armillaris* Tall Shrubland.	Actively manage the BSA Area and revegetate to increase distribution of the *Melaleuca armillaris* Tall Shrubland community. The BSA Area is outside of the BMP scope.
To manage land in the Quarry outside of the Extraction Area to maintain the existing land use of agriculture and nature conservation.	Operations managed in a manner that does not result in off-site impacts and ensures that the existing land uses of agriculture and nature conservation are able to continue.
To implement corrective and preventative actions, if required.	Corrective and preventative actions implemented.
To implement an incident reporting program, if required.	Incidents reported in an appropriate manner.

1.4 Consultation

Table 2 presents a summary of consultation undertaken with relevant stakeholders regarding preparation of this BMP.

Table 2 - Summary of Consultation – Biodiversity Management Plan

Date	Agency Comments	Response	Where addressed in this Plan
Biodiversity and Conservation Division			
30.10.23	Ensure that mitigation measures and any adaptive management have regard to sections 4.4.6 and 4.4.7 of the Biodiversity Assessment Method 2020 Operational Manual – Stage 2.	Section 4.3 lists all the proposed mitigation actions	Section 4.3
	Identify the timing, frequency and responsibility for each mitigation measure as well as identifying which measures require ongoing maintenance and their respective timing, frequency, and responsibility.	Section 4.3 lists the timings while Table 3 lists the responsibilities under the Plan	Section 4.3 and Table 3
	Elaborate on any mitigation measures for which there is risk of failure, evaluate the risk and consequence of any impacts likely to remain after mitigation measures are applied and document any further proposed adaptive management strategies.	Table 11 lists the risks around the implementation of the Plan and the mitigation measures that are proposed.	Table 11
	The BMP should also include all mitigation measures identified in Table 15 of the Biodiversity Development Assessment Report (BDAR) dated July 2023 and address the following additional measures: The type of fencing for delineation of the site should be described in the BMP including how it will be wildlife friendly fencing.	Section 5 describes the mitigation measures, which have been adopted from the BDAR. Fencing is identified in Section 5.2.2.	Section 5 and Section 5.2.2
	Impacts on habitat (such as hollow bearing trees) should extend to other features that may be reproductive or roosting fauna habitat (for example nest in a tree or shrub). Associated clearing during certain seasons should avoid the breeding season for most of the hollow-dwelling fauna (spring) and avoid any relevant torpor season (typically cooler months for bats in tree hollows).	Section 5.2.3 extends pre-clearing inspections to all habitat features.	Section 5.2.3
	A procedure or protocol for clearing should be included in the BMP, including pre-clearing surveys, daily surveys, and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing events.	Section 5.2 describes the pre-clearing processes, including the identified considerations.	Section 5.2
	A detailed section for dam de-watering must be provided	Section 5.3.2 describes the processes for dam-dewatering	Section 5.3.2
	Procedure or protocol for management of injured or displaced fauna	Section 5.3.3 describes the processes for managing injured of displaced fauna.	Section 5.3.3
	Staff training is identified in Table 15 of the BDAR for the pre-construction stage. This should extend into the operation stage and specify frequency of refresher training or for new employees.	Training requirements are outlined in Section 5.4.1.	Section 5.4.1
	Salvaging of topsoil from the impact site for use in an appropriate location, ideally with long-term security.	Section 5.4.5 describes the management of topsoil. The	Section 5.4.5

Date	Agency Comments	Response	Where addressed in this Plan
	The BMP should provide details on the topsoil collection proposal.	specific use of topsoil is further described in the Rehabilitation Management Plan.	
	Restoration and revegetation: include details on the goals, locations, timing and stages, materials, and maintenance.	Section 6.1 describes the goals associated with the Plan	Section 6.1
	Monitoring and reporting: identify the method/s proposed to document the BMP actions implemented, how these will be recorded, their performance indicators, how they will be monitored and reviewed and how they will be reported.	Section 6 describes the monitoring associated with the Plan	Section 6
17.1.24	We note in your "Engagement Notes" on the Major Projects Portal and in section 6.1 of the BMP, your intention that the BMP is to replace the existing Vegetation Management Plan for the quarry. We do not see any mention in the SSD 10369 Development Consent authorising such replacement of previous conditions.	Section 1.1 has been updated to clarify the relationship between the Revegetation Management Plan of the former Consent and the current BMP.	Section 1.1
	Update the BMP to clarify how the pre-clearing inspections and clearing protocol will relate to the different stages identified in Table 7 of the Conditions of Consent.	Section 5.2.2 updated to clarify the credit retirement requirements, and how they will be included in the pre-clearing process.	Section 5.2.2
	Ensure stage 2 of section 5.2.4 [now 5.3.1] of the BMP provides guidance to avoid or minimise impacts on habitat for native fauna roosting or breeding within all vegetation including within shrubs.	Section 5.3.1 updated to clarify clearing protocols apply to all habitat structures, not just hollow-bearing trees.	Section 5.3.1
	Review the intention of the measures in section 5.2.6 [now 5.3.3] of the BMP and amend if required.	Error corrected in Section 5.3.3 in line with comments.	Section 5.3.3
	Provide more details within the BMP of how any footwear, equipment or vehicles from offsite will be cleaned prior to use onsite. This would include excavator buckets or equipment tracks that might not cross through the existing wheel wash.	Section 5.4.3 updated to better align with existing protocols and clarify processes for all equipment including attachments	Section 5.4.3
	We previously commented that the BMP should provide details on the topsoil collection proposal. We note that section 5.2.12 [now 5.4.5] of the BMP states that many of these details will be included in the Rehabilitation [Strategy] Plan, but this is unavailable at the time of this feedback.	Draft Rehabilitation Management Plan to be provided to BCD prior to finalisation of BMP, which provides greater detail on this aspect. Section 5.4.5 has been adjusted to include some basic detail but also provide the linkage to the Rehabilitation Management Plan.	Section 5.4.5

Date	Agency Comments	Response	Where addressed in this Plan
	We previously commented that the BMP should include measures for restoration and revegetation (including details on the goals, locations, timing and stages, materials, maintenance). We could not find details that address these measures.	Draft Rehabilitation Strategy and Rehabilitation Management Plan to be provided to BCD prior to finalisation of BMP. Also refer to Section 5.5 for additional detail on this matter and linking to external plans.	Section 5.5
	It is unclear as to the use of terms "Native Ecosystem rehabilitation domain" (section 5.2.12 [now 5.4.5] of the BMP) and "Revegetation Areas" (6.4 of the BMP) and where these areas occur.	Definitions of these terms (and others) added to the Glossary. Other minor changes to terminology and figures. New figure added of rehabilitation domains.	Glossary, Sections 5.4.5 & 6.4, Figure 6

1.5 Environmental Management Training & Responsibilities

All Cleary Bros personnel, contractors and their employees shall undergo biodiversity management awareness training as part of the site induction and re-induction program. The following areas shall be covered in the induction process and information shall be available to all personnel, such as signs and regularly updated operational maps, procedures, company guidelines and fact sheets:

- Awareness of defined areas to be cleared for operational activities and procedures required to be implemented prior to disturbing vegetation.
- Pre-survey vegetation clearance requirements.
- Requirement to preserve cleared vegetation for the purpose of rehabilitation and biodiversity enhancement activities.
- Biodiversity management and monitoring requirements.
- Biodiversity outcomes to be achieved.
- Information on relevant native vegetation communities (Illawarra Subtropical Rainforest and the *Melaleuca armillaris* Tall Shrubland) and threatened species (*Zieria granulata* [Illawarra Zieria]).

Table 3 presents the roles and responsibilities of personnel with reference to biodiversity management.

Table 3 - Roles and Responsibilities

Roles	Responsibilities
Chief Executive Officer	Independently review indicators of environmental performance, confirm compliance with environmental objectives and approvals.
Quarry Manager	Accountable for the overall environmental performance of the Quarry, including the outcomes of the BMP. Ensure the implementation of the BMP, including reporting of non-compliances with the trigger values, and subsequent implementation of the relevant action plan. Ensure environmental controls within the Quarry are operated and maintained in a proper and efficient manner. Respond to all incidents and complaints. Ensure adequate resources are available to enable implementation of the BMP. Ensure employees are competent through training and awareness programs.

Roles	Responsibilities
Environmental Officer	Facilitate a process of managing overall compliance with regulatory requirements and undertake external reporting for legislative non-compliances as required. Ensure monitoring is undertaken in accordance with the BMP. Undertake/organise, review and analyse all monitoring data. Develop, implement, and update the BMP as required. Ensure all internal and external reporting requirements are met. Liaise with relevant government authorities in relation to regulatory conditions and compliance issue. Liaise with the community as required and as per the Stakeholder Engagement Strategy, including facilitation of Community Consultative Committee meetings. Secure biodiversity offsets as required to satisfy credit requirements. Prepare the Annual Review and other reporting requirements under the approvals.
Operational Staff and Contractors	Operate in a manner that minimises risks of incidents to themselves, fellow workers and biodiversity values of the Quarry. Ensure operations are undertaken in accordance with instructions. Ensure appropriate notification and response in the event of an environmental incident. Show due care not to cause environmental harm. Follow direction provided by the Quarry Manager and Environmental Officer. Notify Quarry Manager of any environmental non-compliance.
Ecologist	Undertake and report on ecological surveys of vegetation monitoring zones. Undertake pre-clearance surveys prior to vegetation clearing activities. Provide specialist advice to Cleary Bros personnel on matters relating to biodiversity.

1.6 Preparation of this Biodiversity Management Plan

This BMP has been prepared by Niche Environment & Heritage Pty Ltd (Niche) on behalf of Cleary Bros.

Authors Prue Bartlett (Experienced Environmental Consultant) and Stephen Bloomfield (Principal – Ecology) have been endorsed by DPE as suitably qualified and experienced to prepare the BMP.

Mr Mark Hammond (BenvSc (hons)), Quality and Environment Manager with Cleary Bros, provided a range of information presented in this document, as well as reviewing the draft and approving the final version for release.

1.7 Key Environmental Documents

This BMP has been prepared based on the contents of the following environmental documents:

1. Albion Park Quarry – Extraction Area Stage 7 Extension: Biodiversity Development Assessment Report (Niche, 2023).
2. Albion Park Quarry Annual Monitoring Report (Good Bush Pty Ltd, 2023).
3. Albion Park Quarry Stage 7 Extension: Development Consent (Final Determination) (NSW Government Department of Planning & Environment, 2023).
4. Albion Park Quarry Expansion: Provide advice to Proponent Biodiversity Management Plan (NSW Department of Planning & Environment, 2023).
5. Albion Park Quarry Vegetation Management Plan (2018).
6. Albion Park Quarry Rehabilitation Management Plan (2017).

2. Environmental Management

2.1 Legal & Other Requirements

2.1.1 Development Consent

Table 4 identifies the conditional requirements of SSD 10369 relevant to this BMP and the section where they are addressed.

Table 4 - Development Conditions of Consent (SSD 10369) – Biodiversity

<table>
<tr><th>Cond No.</th><th>Requirement</th><th>Section of BMP</th></tr>
<tr><td colspan="3">Identification of Approved Extraction Area</td></tr>
<tr><td>A5</td><td>One month before the commencement of quarrying operations, or other timeframe agreed by the Planning Secretary:
(a) a registered surveyor must be engaged to mark out the boundaries of the approved disturbance area and the Stage 7 extraction areas within the site (stages 7a to 7e as shown on Figure 3 [Appendix 2]);
(b) the Planning Secretary must be provided with a survey plan of such boundaries and their GPS coordinates.</td><td>5</td></tr>
<tr><td>A6</td><td>The boundaries of the approved disturbance area and the Stage 7 extraction stage being actively quarried within the site must be clearly marked in a manner that allows them to be easily identified at all times during the carrying out of quarrying operations.</td><td>5</td></tr>
<tr><td colspan="3">Biodiversity Credits Required</td></tr>
<tr><td>B58</td><td>The Applicant must retire the biodiversity credits, as specified in Table 7 and Table 8 of the Development Consent (SSD 10369) (provided below), in accordance with the Biodiversity Offsets Scheme of the NSW Biodiversity Conservation Act 2016 (BC Act), including the application of any ancillary rules published under clause 6.5 of the Biodiversity Conservation Regulation 2017.
<table>
<tr><td>Credit Type</td><td colspan="10">Credits Required</td></tr>
<tr><td>Ecosystem credits</td><td colspan="2">Total</td><td colspan="2">Stage 1</td><td colspan="2">Stage 2</td><td colspan="2">Stage 3</td><td colspan="2">Stage 4</td></tr>
<tr><td></td><td>Area (ha)</td><td>Credits</td><td>Area (ha)</td><td>Credits</td><td>Area (ha)</td><td>Credits</td><td>Area (ha)</td><td>Credits</td><td>Area (ha)</td><td>Credits</td></tr>
<tr><td>1300-Whalebone Tree – Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion</td><td>3.18</td><td>53</td><td>0.78</td><td>8</td><td>0</td><td>0</td><td>2.4</td><td>44</td><td>0.005</td><td>1</td></tr>
<tr><td>720-Bracelet Honey-myrtle – Australian Indigo dry shrubland on volcanics, southern Sydney Basin Bioregion</td><td>1.19</td><td>9</td><td>0</td><td>0</td><td>1.19</td><td>9</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Species Credits</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Zieria granulata</td><td></td><td></td><td></td><td></td><td></td><td>2074</td><td></td><td></td><td></td><td></td></tr>
</table>
</td><td>5.2.2 & 7</td></tr>
</table>

Cond No.	Requirement	Section of BMP
Staged retirement of biodiversity credits		
B59	Prior to undertaking activities that would impact on biodiversity values within the: a) Stage 1 impact area (as shown on Figure 3, the Applicant must retire the Stage 1 biodiversity credits as specified in condition B58 b) Stage 2 impact area (as shown on Figure 3), the Applicant must retire the Stage 2 biodiversity credits as specified in condition B58 c) Stage 3 impact area (as shown on Figure 3), the Applicant must retire the Stage 3 biodiversity credits as specified in condition B58 d) Stage 4 impact area (as shown on Figure 3), the Applicant must retire the Stage 4 biodiversity credits as specified in condition B58.	7
B60	The Applicant must provide the Planning Secretary with evidence that confirms that the correct number and class of credits has been retired prior to impacting the biodiversity values associated with each stage identified in Figure 3.	7
Biodiversity Stewardship Agreement		
B61	Within two years of the commencement of quarrying operations within the Stage 7 extraction area, the Applicant must establish a BSA with a minimum area of 8.4 ha on Lot 7 DP3709.	7
B62	Prior to any clearing of 720-Bracelet Honey-myrtle – Australian Indigo dry shrubland on volcanics, southern Sydney Basin Bioregion associated with the development, the Applicant must retire the credits generated by the BSA established under condition B61.	7
B63	Within six months of the BSA being established in accordance with condition B61, the Applicant must pay the Total Fund Deposit in full.	7
Biodiversity Management Plan		
B64	The Applicant must prepare a BMP for the development. The BMP must: (a) be prepared: (i) By a suitably qualified and experienced person/s (ii) In consultation with BCS (iii) In accordance with the Biodiversity Assessment Method and be consistent with the avoid and minimise commitments in the Biodiversity Development Assessment Report for the development (dated July 2023) (iv) With reference to any relevant BMP guidance material provided by BCS. (b) Include a description of the measures and timeframes that would be implemented for: (i) Minimising clearing and avoiding unnecessary disturbance of vegetation by the development (ii) Minimising the impacts to flora and fauna on site and implementing fauna recovery and management protocols (iii) Maximising the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement of rehabilitation of the site (iv) Controlling weeds, feral pests and pathogens. (c) Include a program to monitor and report on the effectiveness of avoid, minimisation and mitigation measures (d) Include an incidental threatened species finds protocol to identify the avoid and/or minimise and/or offset options to be implemented if additional threatened species are discovered on site	All sections

Cond No.	Requirement	Section of BMP
	(e) Include details of who would be responsible for monitoring, reviewing, and implementing the BMP.	
B65	Prior to the commencement of quarrying operations within the Stage 7 extraction area, the Applicant must submit the BMP to the Planning Secretary for approval.	7
B66	The Applicant must not commence quarrying operations within the Stage 7 extraction area until the BMP is approved by the Planning Secretary.	7
B67	The Applicant must implement the BMP approved by the Planning Secretary.	7

2.1.1 EPBC Approval

Table 5 identifies the conditional requirements of 2020-8871 and the section where they are addressed.

Table 5 – EPBC Approval (2020-8871)

Cond No.	Requirement	Section of BMP
Identification of Approved Extraction Area		
A5	One month before the commencement of quarrying operations, or other timeframe agreed by the Planning Secretary: (a) a registered surveyor must be engaged to mark out the boundaries of the approved disturbance area and the Stage 7 extraction areas within the site (stages 7a to 7e as shown on Figure 3 [Appendix 2]); (b) the Planning Secretary must be provided with a survey plan of such boundaries and their GPS coordinates.	5.2.2
A6	The boundaries of the approved disturbance area and the Stage 7 extraction stage being actively quarried within the site must be clearly marked in a manner that allows them to be easily identified at all times during the carrying out of quarrying operations.	5.2.2

2.1.2 Statement of Commitments

Table 6 identifies Cleary Bros commitments relevant to this BMP and where they are addressed. In accordance with Condition A4 of SSD 10369, the conditions of the consent prevail over Cleary Bros' prior commitments. As a result, where the commitments presented in Table 5 have been amended to ensure consistency with SSD 10369, the amended text is presented as <u>underlined text.</u>

Table 6 – Statement of Commitments for Biodiversity

Desired Outcome	Measure	Timing	Document Reference
Successful implementation of the BMP	4.1 Prepare and implement a Biodiversity Management Plan detailing the biodiversity mitigation and management measures required at the Quarry. The BMP should include procedures for the monitoring of rehabilitation outcomes and describe the implementation of the proposed staged biodiversity offsets (see Section 3.13.4 of the EIS).	Prior to the commencement of Stage 7	This BMP

Desired Outcome	Measure	Timing	Document Reference
Disturbance limited to approved areas	4.2 Delineate the boundaries of the proposed Stage 7 Extraction Area with clearly visible markers.	One month prior to the commencement of Stage 7	5
	4.3 Establish fencing around areas of native vegetation adjacent to the proposed disturbance areas and maintain fencing throughout the Project life.	Ongoing	5
Topsoil available for rehabilitation works	4.4 Ensure that topsoil resources stripped from the surface of proposed Extraction Area are retained for use in rehabilitation activities	Ongoing	Rehabilitation Management Plan
Air quality targets achieved	4.5 Implement adaptive dust management and monitoring programs to manage air quality in accordance with existing protocols for the Quarry.	Ongoing	Environmental Management Strategy
Staff aware of environmental procedures relating to threatened flora and vegetation communities	4.6 Communicate environmental features and requirements to protect threatened flora through staff inductions, training sessions and briefings.	Ongoing	5
Minimise erosion and impacts to surface water	4.7 Establish and regularly maintain erosion and sediment controls until rehabilitation works have achieved vegetated final landforms.	Ongoing	Water Management Plan
Impacts to native fauna minimised/ avoided	4.8 Avoid clearing of hollow-bearing trees during the breeding season for the majority of hollow-dwelling fauna (i.e. spring).	Ongoing	5
Impacts to native fauna minimised/avoided	4.9 Undertake pre-clearing inspections of hollow-bearing trees to confirm the absence of roosting/breeding threatened species and manage any vertebrate fauna identified during inspections to minimise the risk of mortality or injury.	Immediately prior to vegetation clearing	5
Vegetation cleared in line with best practice principles	4.10 Undertake vegetation clearance and mulching in accordance with best practice principles.	Ongoing	5
Correct waste management and disposal	4.11 Ensure that all waste is managed appropriately.	Ongoing	5
Source: RWC (2023) – modified from Table A3.1			

2.2 Existing Vegetation

The majority of the Extraction Area is cleared or has been historically cleared for agriculture or other uses, and now supports exotic vegetation (11.21 ha) or regrowth vegetation (both recent and advanced) with some large remnant trees (e.g. fig trees) having been retained. The native Plant Community Types (PCTs) mapped by Niche (2023) that requiring clearing (Figure 2), are:

- PCT 1300 Whalebone Tree – Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion (total area is 3.18 ha).
    - PCT 1300 is part of the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (ISR; Endangered – Biodiversity Conservation Act 2016 (BC Act), Critically Endangered - Environmental Protection and Biodiversity Conservation Act 1999 (BC Act) Threatened Ecological Community (TEC).
- PCT 720 Bracelet Honey-myrtle - Australian Indigo dry shrubland on volcanics, southern Sydney Basin Bioregion (total area is 1.9 ha).
    - PCT 720 is part of the *Melaleuca armillaris* Tall Shrubland in the Sydney Basin Bioregion (MAS; CE – BC Act, n/a EPBC Act) TEC.

PCT 1300 is highly variable in condition having areas of good condition separated by significant areas of Lantana (*Lantana camara*) infestation due to previous agricultural clearing activities. The area of PCT 1300 being impacted constitutes five condition classes:

- High (0.0025 ha).
- Low (2.13 ha).
- Poor (0.36 ha).
- Poor planted (0.24 ha).
- Very degraded (isolated small patches).

PCT 720 is present in various conditions within the Extraction Area. The area of PCT 1300 being impacted constitutes four condition classes:

- Poor (0.35 ha).
- Low (regenerating midstorey – no canopy) (0.37 ha).
- Low (dense Lantana) (0.28 ha).
- Moderate – High (0.19 ha).
- An additional area of 0.52 ha of revegetation (including native species) occurs within the Extraction Area (Figure 2) and will be cleared as part of the Project. This area constitutes planted vegetation which were revegetated in 2008 as part of previous extraction operations.

A total of 164 flora species were recorded by Niche (2023) across the site.

2.3 Existing Threatened Flora

A total of eight threatened flora species may occur at the site based on the location, geology and habitats present. Only one species has been formally recorded and was found by Niche (2023) within the proposed Extraction Area as part of the BDAR – *Zieria granulata* (Illawarra Zieria) (E – BC Act and E – EPBC Act). The density of plants across the Extraction Area was mapped and refined over several surveys until a thorough representation of population density was achieved. The following parameters were assessed for *Zieria granulata* within targeted systematic surveys for the species:

- Counts of plants within quadrats.
- Approximate height of each plant.
- Stem diameter at base – typically the widest point (measured with callipers).
- Reproductive status as per the following classes: signs of imminent flowering (e.g. buds), some flowers present, many flowers present, some spent flowers, many spent flowers, some fruit/seed present, many fruit/seed present and other.

The location and density of threatened flora identified in the Study Area is shown in Figure 3.

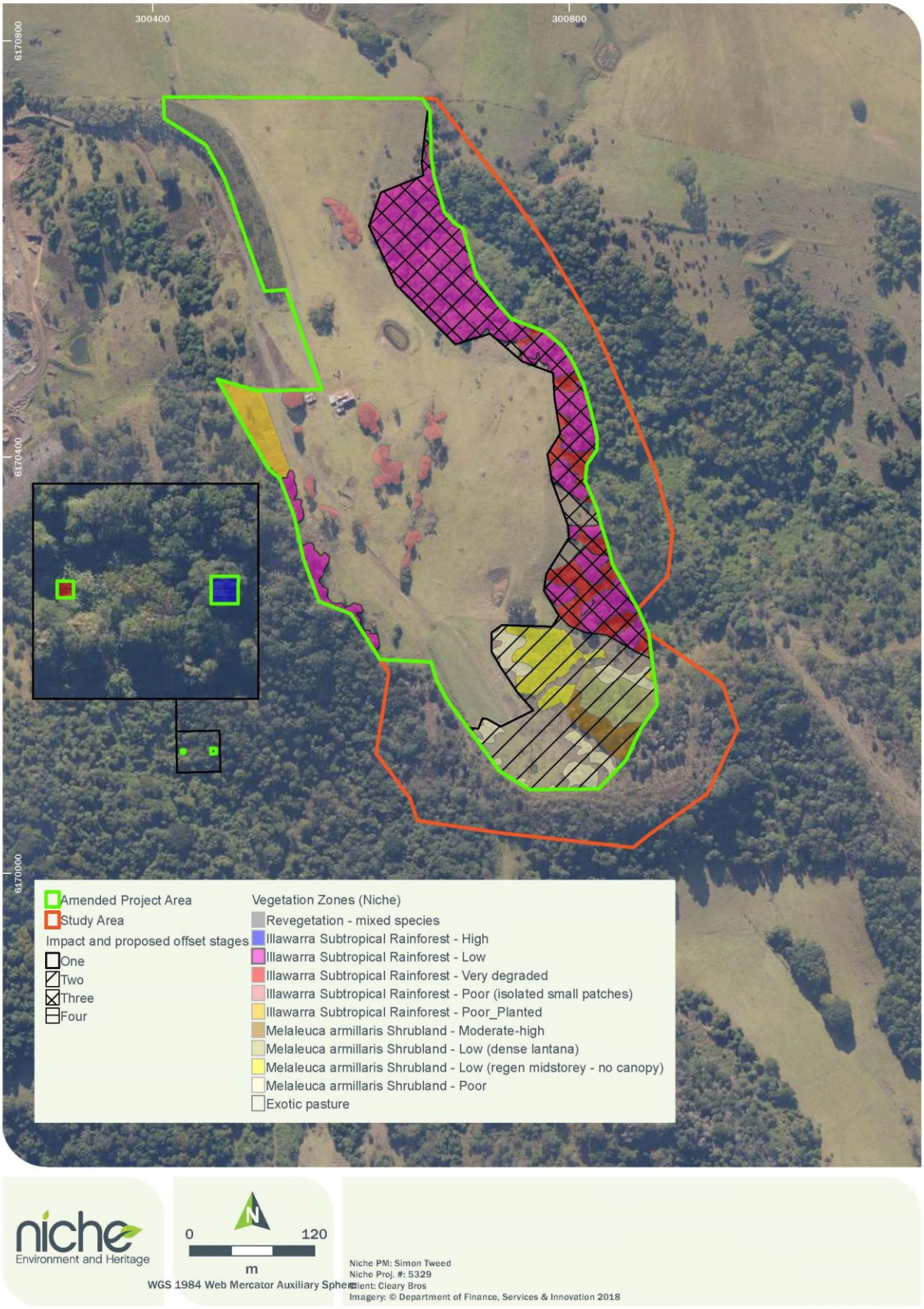

Figure 2 – Vegetation Zones and Biodiversity Offset Staging

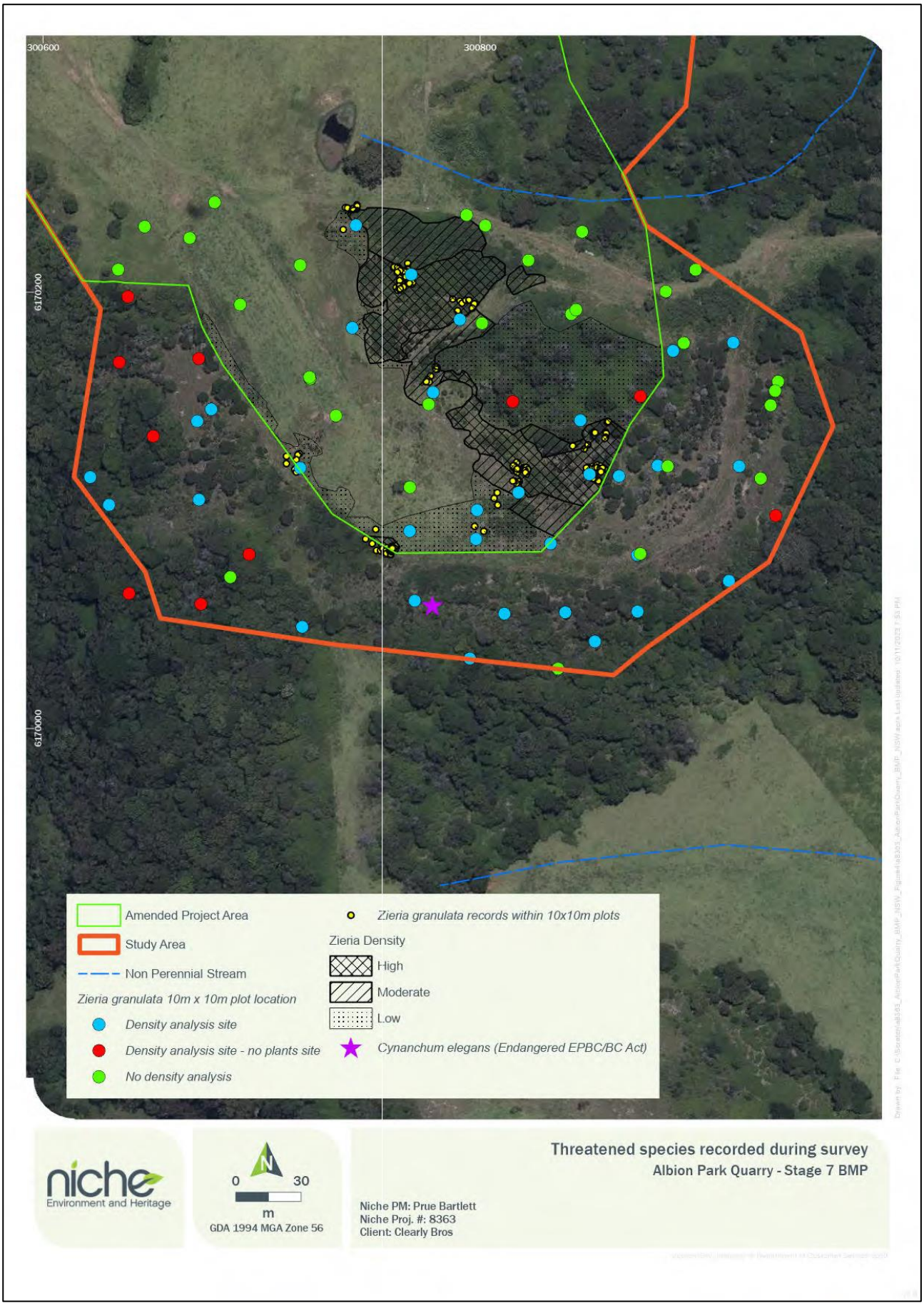

Figure 3 – Location of Threatened Species including *Zieria granulata* density

The area of high, moderate and low density *Zieria granulata* within the site is estimated at 1.33 ha. From the flora surveys, stem size was found to be highly correlated with maturity (i.e. flowering status) and on this basis it was determined that a mature plant was any individual with a stem diameter greater than 13 mm. The total number of plants within the site was calculated at 3,045, of which 1,037 (34%) were classed as mature plants.

2.4 Existing Fauna Habitats & Threatened Fauna Species

Habitat condition within the Extraction Area has been influenced by previous clearing of native vegetation for agriculture, as evidenced by the generally poor quality of vegetation within the site. Better condition vegetation and fauna habitat is present within the southern portion of the Quarry and beyond within land owned by Cleary Bros.

The Extraction Area and adjoining vegetation on Cleary Bros' land provides foraging habitat for numerous mobile species including within areas of rainforest which may be a locally important food source for some species. Such resources are concentrated within the better-quality vegetation of the Quarry (e.g. good condition rainforest) which was the focus of avoidance measures. Resident native fauna are generally those that are tolerant of disturbed areas and isolated patches of vegetation. As the Quarry has varied vegetation types and structural elements, a good diversity of bird species was recorded, predominantly from better quality remnants, however also within patches of regenerating vegetation and Lantana. Small mammal and frog assemblages are likely to be limited to commonly occurring species. A variety of bats were recorded foraging within better condition areas of the site and these species are also expected to use habitats across the broader area.

Eight hollows from five hollow bearing trees were recorded within the Extraction Area. All hollows were 20 cm in diameter or less. A single hollow stag was also recorded.

Aquatic habitat present within the Extraction Area is considered degraded. Two farm dams are present, providing low to poor quality habitat for aquatic or water dependent fauna species. Frequent cattle access to dams was evident and there was limited growth of aquatic macrophytes (water-plants). One of the farm dams is at the head of an ephemeral stream which has limited ephemeral aquatic habitat (i.e. stream bed is typically dry).

Watercourses from the Extraction Area and surrounds are described in detail within the Soil and Water Assessment (SEEC 2021). The watercourses present flow east and south ultimately into the Rocklow Creek catchment of the Minnamurra River catchment. Sections of unnamed watercourses, located approximately 1.5 km to the southeast of the Quarry, contain or are associated with dam and ephemeral wetland habitat formed from the former dredge ponds of the Dunmore Sand and Soil sand extraction operation, west of the Princes Highway. These wetlands are not mapped under the Resilience and Hazards State Environmental Planning Policy (SEPP) 2021 or are identified as important wetlands, such as RAMSAR wetlands. Ephemeral wetland habitat may however experience visitation from avian fauna including threatened species. Potential impacts to these areas are considered minimal or negligible, however, and therefore these wetland habitats were not investigated further as part of field survey. No records of threatened fauna from wetland habitats west of the Princes Highway were present in the NSW BioNet Atlas.

Three frogs species, 34 bird species, 17 mammal species and one reptile were recorded as part of the BDAR. Four of those animals recorded are listed as threatened species - Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), Little Bentwing Bat (*Miniopterus australis*) and Yellow-bellied Sheath-tailed Bat *(Saccolaimus flaviventris)* (all Vulnerable under the BC Act – not listed under the EPBC Act). The Grey-headed Flying-fox (*Pteropus poliocephalus*) (vulnerable under the BC Act and EPBC Act), being a wide-ranging species which forages on fruit and blossom within the local area (e.g. DECCW 2011), is also known to use the site.

2.5 Habitat Connectivity

Patches of intact vegetation within and adjacent to the Extraction Area provide the main connectivity pathways to and around the Quarry (Figure 4). Vegetation within the site is partly connected to larger patches of vegetation to the south-west via a corridor of vegetation at the southern portion of the Extraction Area. Connectivity south of the Extraction Area would remain, however the width of the vegetated corridor would be slightly reduced (from approximately 130 m to 120 m at its narrowest point).

2.6 Planted Native Vegetation

The amenity barrier planting within the north-western portion of the Extraction Area is around 0.52 ha in size and consists of planted Forest Red Gum (*Eucalyptus tereticornis*) above planted Acacia species (*A. binervata* and *Acacia implexa*) as well as the exotic Lantana. The groundcover is dominated by Mat Rush (*Lomandra longifolia*) and the exotic Kikuyu Grass (*Cenchrus clandestinus*). Lantana and Kikuyu Grass dominate the area. This vegetation has all been planted as part of the landscaping of the Quarry for aesthetic purposes.

Given their relatively young age, none of the trees present contain hollows; nor do any exhibit signs of occupation (i.e. nests). No other key habitat features were noted (i.e. rock outcrops, fallen timber of significant size, aquatic environments).

The amenity barrier planting is part of a small linear strip of vegetation that lines the top of the open Quarry, however it is highly modified and is essentially fragmented and isolated from other areas of significant habitat.

The habitats present are not considered suitable for use by any threatened species credit species (flora or fauna) that have been previously recorded, or are considered to have habitat, in the locality. In addition, no incidental sightings or evidence (e.g. scats, stick nests) of threatened species credit species (fauna) using, inhabiting or being part of the planted native vegetation was recorded.

2.7 Weeds

The BDAR identified 13 weed species within and/or adjacent to the Extraction Area: *Acetosa sagittata*, *Araujia sericifera*, *Cardiospermum grandiflorum*, *Delairea odorata*, *Lantana camara, Ligustrum lucidum, Olea europaea, Paspalum dilatatum, Pyracantha angustifolia* and *Rubus fruticosus* (Niche 2023).

Of those weeds recorded, the high threat and priority weeds are *Acetosa sagittata*, *Araujia sericifera*, *Cardiospermum grandiflorum*, *Delairea odorata*, *Lantana camara, Ligustrum lucidum, Olea europaea, Paspalum, Pyracantha angustifolia, Rubus fruticosus* and *Senecio madagascariensis*. These weeds are considered to continue to occur in the areas of native vegetation that occur adjacent to the Extraction Area.

2.8 Aquatic Habitats

As previously mentioned, there are two farm dams within the site which provide low quality aquatic habitat with no known species (Figure 4). Eels, frogs and macroinvertebrates are expected to use the dams.

West and east of the Extraction Area there are two watercourses that will be impacted by the Project. The western watercourse occurs within PCT 1300. Niche reviewed the condition of the vegetation and rated it as high condition with 50% native canopy cover, 20% native shrub cover and 15% native grass, herbs and fern cover. No aquatic vegetation was observed in the creek and small pools were observed with one unknown fish species. The creek line has minimal disturbance, including no active erosion headcuts or presence of weeds. A discharge outlet is proposed to be established along the western watercourse. As this watercourse is mapped as 'Key Fish Habitat', the discharge outlet will require approval before installation.

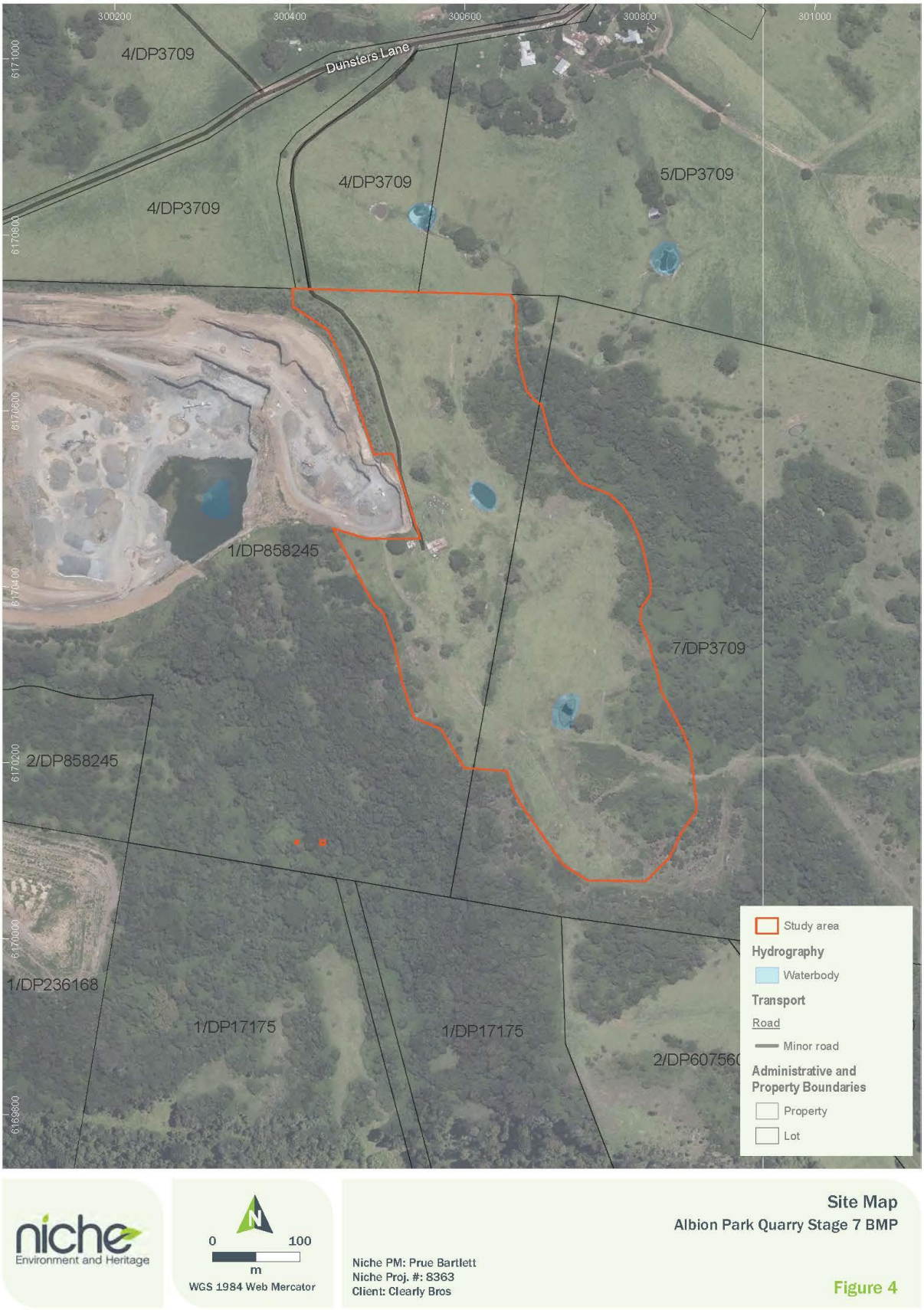

Figure 4 – Habitat Connectivity and Aquatic Habitats

The main creek to the east was not surveyed by Niche. Based on aerial imagery, the riparian vegetation is continuous and likely to be associated with PCT 1300. The quality of the creek in terms of bed stability, density of weeds or presence of aquatic habitats is unknown.

3. Approved Activities

The approved activities (Figure 5) include the following:

- Extension of the current Stage 1 to 6 Extraction Area to include the Stage 7 Extraction Area.
- Continued staged extraction of latite, agglomerate and overburden material using free dig and drill, and blast extraction methods at a maximum rate of 900,000 tonnes per annum (tpa) of material exported from the Project Area. 21.5Mt of hard rock resource will be extracted over the Quarry life.
- Continued primary, and on occasion secondary, processing operations within the Extraction Area.
- Continued transportation of extracted and processed material to Cleary Bros fixed processing plant for further processing.
- Continued operation of the Quarry between:
  - 7:00am and 6:00pm Monday to Friday.
  - 7:00am to 1:00pm on Saturdays (maximum of 16 Saturdays per calendar year within Stage 7).
  - at no time on Sundays or Public Holidays.
- Operation of the Quarry until 2053.
- Rehabilitation of the final landform suitable for agriculture and nature conservation, including establishment and revegetation of:
  - Quarry extraction benches, including reduced height (7m high) of faces on the upper western and northern highwalls of the Stage 7 Extraction Area.
  - the floor of the Extraction Area.
  - two Quarry sumps, including a pipeline to ensure the southern sump is free draining.

Approved activities relevant to this BMP include disturbance of the following (Figure 2).

- Approximately 3.18 ha of PCT 1300 - Whalebone Tree - Native Quince dry subtropical rainforest.
- Approximately 1.19 ha of PCT 720 - Bracelet Honey-myrtle – Australian Indigo dry shrubland on volcanics, southern Sydney Basin Bioregion (*Melaleuca armillaris* Shrubland).
- Approximately 1,037 mature *Zieria granulata* individuals.

In order to offset the approved disturbance, Cleary Bros will retire the biodiversity credits specified in Table 7 in accordance with the Biodiversity Offsets Scheme of the *Biodiversity Conservation Act 2016.* The biodiversity offsets will be undertaken in a staged manner as identified on Figure 2.

Table 7 - Approved Biodiversity Credit Requirements

	Total		Stage 1		Stage 2		Stage 3		Stage 4	
	Area (ha)	**Credits**	**Area (ha)**	**Credits**	**Area (ha)**	**Credits**	**Area (ha)**	**Credits**	**Area (ha)**	**Credits**
Ecosystem Credits										
1300-Whalebone Tree – Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion	3.18	53	0.78	8	0	0	2.4	44	0.005	1
720-Bracelet Honey-myrtle – Australian Indigo dry shrubland on volcanics, southern Sydney Basin Bioregion	1.19	9	0	0	1.19	9	0	0	0	0
Species Credits (flora)										
Zieria granulata	1.19	2,074				2,074				

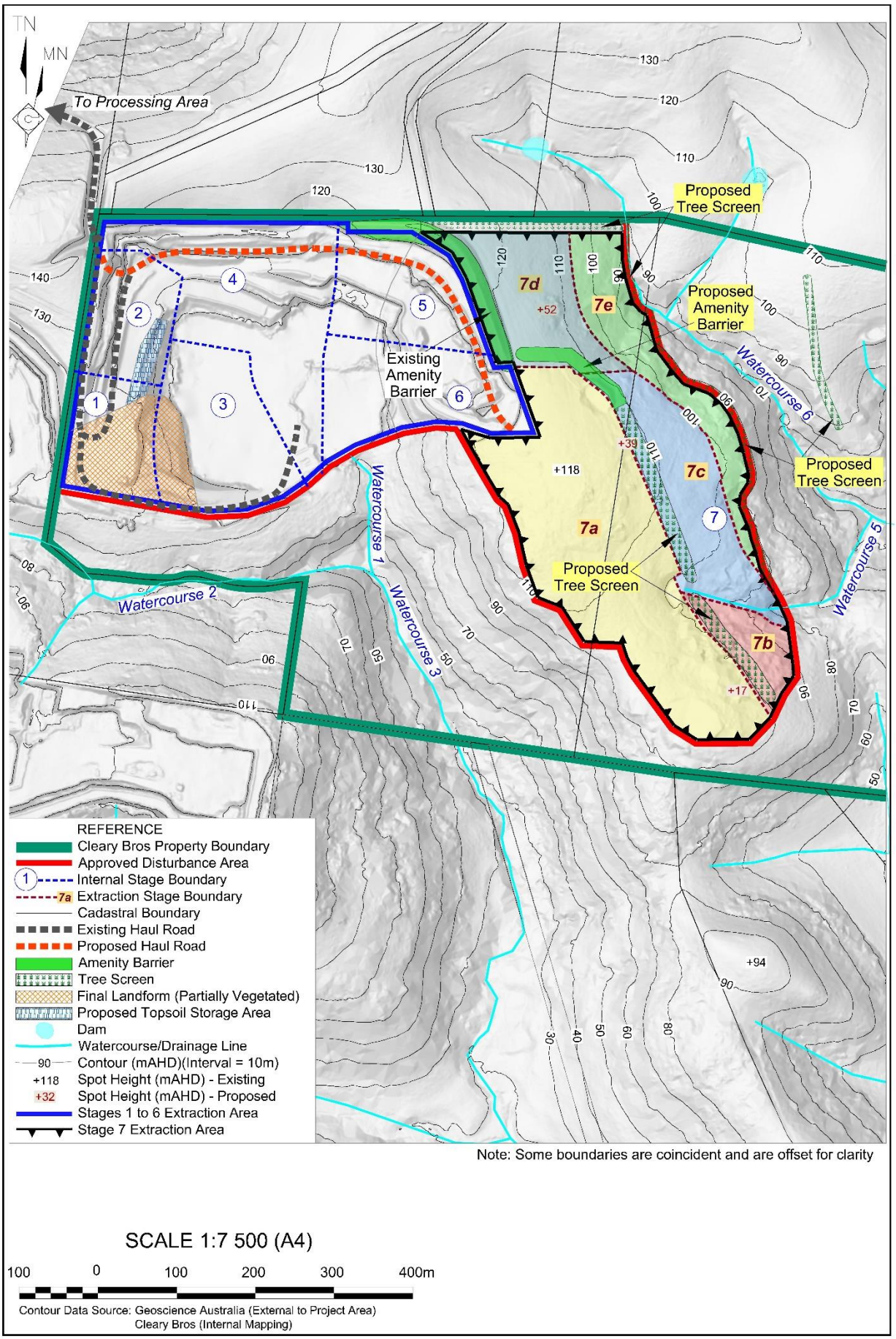

Figure 5 - Approved Quarry Layout

4. Potential Biodiversity Impacts

4.1 Potential impacts to biodiversity from the development footprint

An assessment of the potential impacts of the proposed works on biodiversity is provided in Table 7. Impacts are categorised as direct or indirect as described in DPIE (2020a), which states:

"Direct impacts: impacts on biodiversity values and threatened species habitat that relate to clearing native vegetation and impacts on biodiversity values prescribed by the BC Regulation. This includes impacts from activities related to the construction or operational phase of the proposal.

Indirect impacts: impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish). This includes impacts from activities related to the construction or operational phase of the proposal and prescribed impacts."

A likelihood rating of known, high, moderate, low or none has been assigned to each of the potential impacts listed in Table 8.

Table 8 – Direct and indirect impacts as a result of the Project

Impact within the development footprint	Impact	Likelihood of impact
Direct impacts		
Removal or modification of native vegetation	Approximately 4.37 ha of native vegetation, including areas of two TECs (ISR and MAS) would be removed as part of the project. The total extent of ISR (PCT 1300) is estimated to be approximately 6,357 ha; therefore, the extent would be reduced by approximately 0.05% after removal of 3.18 ha. The total extent of MAS (PCT 720) is estimated to be 164.36 ha; therefore, the extent would be reduced by approximately 0.7% after removal of 1.19 ha.	Known
Loss of individuals of a threatened species	An area of 1.33 ha of *Zieria granulata* habitat will be removed by the project with an area of approximately 2.92 ha to be retained within areas zoned for extraction. The amended Project amounts to the clearing of 31% and retention of 69% of the habitat within the Quarry, noting this figure overestimates the proportion of habitat to be cleared on the property, with additional habitat present beyond the Quarry. The area to be removed supports an estimated 3,045 plants comprising 1,037 mature plants and 2,008 immature plants as described in Section 2.3. A large number of immature plants occur at the site due to the species response to previous disturbance.	Known
Removal or modification of threatened species habitat other than native vegetation (micro-habitat features)	The area to be impacted contains limited tree hollows or other important habitat features which are recognised as important habitat for threatened species. The site does however provide foraging habitat for a range of threatened fauna.	Low/moderate
Death through trampling or vehicle strike	Clearing is the main impact from the project and there would be limited increased risk from trampling or vehicle strike.	Low

Impact within the development footprint	Impact	Likelihood of impact
Death through poisoning	No poisons are proposed to be used as part of the Project other than as required to control exotic species to meet obligations under the NSW *Biosecurity Act 2015*.	Low
Fragmentation	Vegetation within the Extraction Area is already fragmented. Clearing proposed would increase fragmentation impacts, however the majority of impacts would impact lesser quality remnant vegetation.	Moderate
Indirect impacts		
Predation by domestic and/or feral animals	The project is not likely to increase the presence of domestic or feral animals in the local area as the Extraction Area is within a semi-rural area with nearby agricultural farms.	Low
Loss of shade/shelter	The removal of 4.37 ha of native vegetation in the Extraction Area would result in a loss of shade and shelter for local fauna. This impact is considered low considering there is similar habitat in the immediate vicinity that would not be impacted by the Extraction Area.	Low
Loss of individuals through starvation	The habitat to be removed in the Extraction Area is considered unlikely to cause loss of individuals through starvation.	Low
Edge effects (noise, light and traffic)	The Extraction Area is unlikely to increase traffic although will increase light and noise levels within the site as the Extraction Area expands. Clearing of vegetation would increase light exposure for adjacent remnant vegetation which may lead to higher weed density.	Moderate
Deleterious hydrological changes	The project is likely to cause some alteration to existing flow regimes of 1st and 2nd order ephemeral watercourses within and adjacent to the Extraction Area. The footprint has avoided the first and second order watercourse to the north-east. Hydrological impacts from the project are considered within SEEC (2021) which states: *The catchments draining to these watercourses will decrease slightly as they will drain internally towards the west and not to the existing watercourses to the east. This has the potential to decrease flows in these downstream catchments, however this will be offset by the discharge of runoff captured within the quarry sump(s) following the settlement of any fines, resulting in minimal change in overall flows.*	Low
Aquatic habitat impacts	The project has the potential to indirectly impact aquatic habitats outside of the Extraction Area, however, such impacts are considered minimal or negligible based on SEEC (2021): *The Project has the potential to decrease peak flows in downstream catchments. However this would be offset by the discharge of runoff captured within the quarry sump(s) following the settlement of fine sediment, resulting in a reduced potential impact in overall flow volumes. This change would reduce peak flow volumes while extending the duration of flows following storm events.* The most notable or sensitive habitats that are potentially impacted by the project are wetland and river floodplain habitats approximately 1.5 km to the south-east, including dam and ephemeral wetland habitat. These habitats have been formed from the former dredge ponds of the Dunmore Sand and Soil sand extraction operation, which occurs in an agricultural setting west of the Princes Highway. Given the modelled decreases in peak flows for watercourses around ephemeral wetland habitat west of the Princes Highway (approximately 4% to 18%) and discharge from the quarry sump to compensate for some of the loss in peak flows, predictions of limited water quality impacts to sensitive downstream areas are expected to be minor. Potential water quality	Low

Impact within the development footprint	Impact	Likelihood of impact
	impacts during the construction stage will be managed via sediment and erosion control plans.	
Weed invasion	Clearing of vegetation would increase light exposure for adjacent remnant vegetation which may lead to higher weed density.	Moderate
Increased human activity within or directly adjacent to sensitive habitat areas	The Project involves the extended area of hard rock extraction and therefore will increase human activity. An increase in human activity will result in more trampling of vegetation and more rubbish.	Known

4.2 Objective of this BMP – avoid or minimise impacts to biodiversity

Clearly Bros has aimed to avoid and minimise environmental impacts from the Project during the design process which resulted in an amended Extraction Area footprint. Environmental constraints taken into account were threatened vegetation communities, threatened species habitat and other identified ecological constraints.

As required by environmental legislation, the primary objective of the amended BDAR was to use the Biodiversity Assessment Methodology (BAM) (DPIE 2020a) to describe and assess the ecological values within the site, as required under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). As the BDAR report was compiled, avoidance measures were incorporated into the design so that 5.82 ha of land of high quality TECs and *Zieria granulata* habitat were removed from the proposed Extraction Area. More areas of cleared and mostly exotic vegetation were incorporated instead.

The BDAR has calculated the ecosystem and species credits required to offset the impacts and Cleary Bros intends to offset impacts from the project in accordance with the credit requirements outlined above via available options under the NSW Biodiversity Offset Scheme (BOS), including the establishment of a Biodiversity Stewardship Site on Cleary Bros land near to, and contiguous with, the Extraction Area.

The proposed location of the stewardship site is still being determined but a draft map has been included in this report to show the area. For this BMP, some of the mitigation measures recommended are located in the future stewardship site.

4.3 Actions to mitigate impacts to biodiversity

The BDAR recommended a number of pre-clearing, operational and quarry closure mitigation measures to minimise impacts on biodiversity. In addition to the BDAR, the Biodiversity, Conservation and Science division (BCS) has provided additional measures that this BMP should address. Table 9 lists the specific tasks or requirements for the BMP which are detailed further in Section 5.

Table 9 – Specific requirements of the BMP

Timing	Mitigation measure
Pre-clearing	Preparation of a BMP to be developed and approved by DPE. BMP to include measures listed below (BDAR 2023).
Pre clearing	Delineation of the site – establish exclusion zone around the Extraction area to ensure clearing does not occur outside those boundaries. A robust fence, with well-marked posts, would be erected and maintained for the life of the project (BDAR 2023).

Timing	Mitigation measure
Pre clearing	The type of fencing for delineation of the site should be described in the BMP including how it will be wildlife friendly fencing (BCS 2023).
Pre clearing	Pre-clearing inspections of hollow-bearing trees to be removed to ensure the absence of roosting/breeding threatened species. Any native vertebrate fauna present within hollow-bearing trees will be managed to minimise the risk of mortality or injury. Tree clearing will be undertaken in accordance with best practice principles. Clearing of hollow-bearing trees should not be undertaken during the breeding season for the majority of hollow-dwelling fauna (spring) (BDAR 2023).
Pre clearing	Impacts on habitat (such as hollow bearing trees) should extend to other features that may be reproductive or roosting fauna habitat (for example nest in a tree or shrub). Associated clearing during certain seasons should avoid the breeding season for most of the hollow dwelling fauna (spring) and avoid any relevant torpor season (typically cooler months for bats in tree hollows) (BCS 2023).
Pre clearing	A procedure or protocol for clearing should be included in the BMP, including pre-clearing surveys, daily surveys, and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing events. To avoid confusion, staged clearing should include and distinguish between timing of clearing for different habitat elements; and the clearing associated with different stages identified in Table 7 of the Conditions of Consent (BCS 2023).
Pre clearing	A detailed section for dam de-watering must be provided to demonstrate how impacts to turtles and amphibians and aquatic species (as examples) will be minimised and/or mitigated (BCS 2023).
Pre clearing	Procedure or protocol for management of injured or displaced fauna and should be included with guidance for all stages including pre-clearing and operations.
Pre clearing	Staff training and amended project briefings –communicate the importance of exclusion zones, threatened species (e.g. *Z. granulata*) and ecological communities on site, erosion and sediment controls, unexpected species finds procedure (BDAR 2023).
Pre clearing	Staff training is identified in Table 15 of the BDAR for the pre-construction stage. This should extend into the operation stage and specify frequency of refresher training or for new employees. Ideally, the BMP should describe how this training will be integrated with training requirements of Cleary Bros Environmental Management System (ISO 140001:2015). The topics for this training should also be identified in the BMP (BCS 2023).
Pre clearing	Weed Management Strategy – designed to control prevalent weeds, particularly HTW, identified at the site and within a 50 m buffer area. This would include mapping the location of HTW (e.g. Lantana) at a minimum and other problematic weeds, as well as providing hygiene measures for all vehicles and plant during construction (BDAR 2023).
Pre clearing	Preparation and application of a Vegetation Management Plan (VMP) for the life of the amended Project. The VMP would form part of the BMP and would include the Extraction Area and all areas within a 50 m buffer of its boundary. The objective of the VMP would be to monitor adjacent vegetation to detect and minimise adverse impacts from adjacent clearing such that declines in condition can be compensated for by management actions that maintain or improve vegetation condition (BDAR 2023).

Timing	Mitigation measure
Commencement of the quarry and ongoing operations.	
Prior to clearing, operations and closure	Erosion and sediment controls – Implementation of erosion and sediment controls for the duration of construction works and until excavated or disturbed areas are vegetated (BDAR 2023).
Throughout project life	Hygiene protocols - prevent the spread of weeds or pathogens between affected areas and unaffected areas (BDAR 2023).
Throughout project life	Weed control - measures would form part of operational maintenance to manage the potential dispersal and establishment of weeds during operation in accordance with the *Biosecurity Act 2015*. Such measures would include: • physical or chemical removal (via the cut and paint method) of problematic weeds present; • vehicle clean/wash prior to and before exiting the construction site (BDAR 2023).
During topsoil stripping	Stockpiling of topsoil for use in any rehabilitation areas (BDAR 2023).
During topsoil stripping	Salvaging of topsoil from the impact site for use in an appropriate location, ideally with long term security. The BMP should provide details on the topsoil collection proposal including: specific locations likely to contain native plant species soil stored seedbank, estimated volumes of soil (current depth and area) at donor site, ability to collect the soil given thin skeletal soil, its storage details (duration, location and management) and its expected coverage (depth and area) at receiving site/s. Special consideration should be given to ensure the best chance for Illawarra Zieria seedbank to remain viable for final placement in salvaged topsoil. Actions relating to the reuse of salvaged topsoil with a native plant species soil stored seedbank should have regard to the following publication: Commander, L.E., Coates, D., Broadhurst, L., Offord, C.A., Makinson, R.O. and Matthes, M. (2018). *Guidelines for the translocation of threatened plants in Australia.* Third Edition. Australian Network for Plant Conservation, Canberra. Accessed via: https://www.anpc.asn.au/translocation/ (DPE 2023).
Throughout project life	All waste would be appropriately managed (BDAR).
Throughout project life	Adopting adaptive dust management and monitoring programs to control air quality in accordance with the Air Quality Management Plan (BDAR).
Annual inspections throughout project life	Extraction Area, and adjacent buffer, to be monitored for weed invasion and managed according to the Weed Management Strategy (BDAR).
Throughout project life	Monitoring and reporting: identify the method/s proposed to document the BMP actions implemented, how these will be recorded, their performance indicators, how they will be monitored and reviewed and how they will be reported (BCS 2023).

5. Environmental Mitigation Measures

5.1 Approach to management

As detailed in previous sections, the key biodiversity features that occur within, and immediately adjacent to the Extraction Area include:

- Native vegetation comprising two PCTS (1300 Whalebone Tree - Native Quince dry subtropical rainforest and 720 Bracelet Honey-myrtle - Australian Indigo dry shrubland).
- One threatened flora species, *Zieria granulata* (listed as Endangered under the BC Act and EPBC Act). Recorded in different densities and ages.
- Five threatened fauna species:
    - Eastern Coastal Free-tailed Bat (Vulnerable under the BC Act) (recorded).
    - Eastern Bent-winged Bat (Vulnerable under the BC Act) (recorded).
    - Little Bentwinged Bat (Vulnerable under the BC Act) (recorded).
    - Yellow-bellied Sheath-tailed Bat (recorded) (Vulnerable under the BC Act) (recorded).
    - Grey-headed Flying-fox (Vulnerable under the BC Act and EPBC Act) (known).
- A range of aquatic habitats including two farm dams and two watercourse to the east and west of the Quarry.
- Eight hollows from five hollow bearing trees. All hollows are 20 cm or less in diameter. A single hollow stag was also recorded.

5.2 Pre-clearing mitigation measures

5.2.1 Preparation of a BMP

This BMP will be reviewed by the DPE, and upon approval, will be implemented as part of the Project.

5.2.2 Delineation of the site and wildlife friendly fencing

Vegetation clearing will be undertaken on a campaign basis, with each campaign clearing the area intended for quarrying over the next 24 months. Extraction will occur sequentially from Stage 7a to Stage 7e (refer Figure 5), with the biodiversity credits required for each Project stage retired prior to undertaking activities that will impact biodiversity values in that stage as summarised in Table 10. The pre-clearing process will include verification that the biodiversity credit requirements for the area proposed to be cleared have been retired.

Table 10 – Comparison between Project Stage and Biodiversity Credit Requirement Stage

Project Stage	Biodiversity Credit Requirements
Stage 7a	Stage 1
Stage 7b	Stage 2
Stage 7c	Stage 3
Stage 7d	No additional requirements
Stage 7e	No additional requirements
Final landform completion	Stage 4

Prior to the commencement of any clearing associated with quarry, the approved disturbance limits will be pegged by a registered surveyor. The survey pegs will be retained for the duration of the Project. Where existing vegetation restricts access to the disturbance boundary, pegs may be offset from the boundary within the disturbance footprint and noted as such.

Prior to each vegetation clearing campaign, vegetation clearing limits will be clearly demarcated using bunting to prevent unintended clearing of, and impacts to, native vegetation. The use of bunting will allow ease of movement of any fauna moving between the Extraction Area.

Prior to clearing works commencing:

- The boundary of the extraction area will be fully fenced where possible without clearing. The site is partially fenced currently with a 5-strand timber post and barbed wire fence. This fencing will be upgraded to wildlife friendly fencing with the barbed wire replaced with plain wire. Where dense vegetation covers the disturbance boundary such that it cannot be fenced without clearing the line, the bunting will be used until a permanent fence can be installed after clearing the boundary. No netting is currently used within the Project Area, and it will not be used for any future fencing.
- Tree protection fencing will be installed around trees that are to be retained and occur along the clearing limits of the Extraction Area.

Fencing and tree protection fencing will comply with the minimum tree protection standards as outlined in Australian Standard AS 49702009 *'Protection of trees on development sites'* (i.e. fencing is required to protect the tree and the tree root protection zone, such that no canopy should be overhanging the fencing). This will prevent any stockpiling or standing of heavy plant from occurring within the tree root protection zone.

Fencing will minimise impacts on fauna habitat resources outside the Extraction Area. Fencing will assist to discourage fauna from entering the Extraction Area, as the site will be devoid of all fauna habitat, but will be easily modified to create a gate and allow any trapped fauna to escape. No extractive activities will take place while fauna is trapped within 100 metres of operations in the Extraction Area. If fauna becomes trapped within the Extraction Area, the trapped and injured fauna procedure will be implemented.

5.2.3 Pre-clearing inspections of hollow-bearing trees and other habitat features

Pre-clearing surveys are required to determine what species are likely to be using the hollow-bearing trees. Prior to clearing, all hollow-bearing trees and stags, any trees containing nests or dreys, and salvageable standing and fallen timber within the Extraction Area will be clearly marked and observed by a qualified ecologist for signs of roosting/nesting fauna, including threatened species. The ecologist will record all fauna observed and take note of threatened species, including microbats which may require identification of calls using an Anabat and call identification software. All hollows in living and dead wood, as well as all suitable fallen and standing dead wood, will be identified as options for habitat salvage.

Pre-clearance surveys for the collection and propagation of any threatened flora species present within the Extraction Area will be undertaken prior to vegetation clearing, based on the timing of seed heads being present. For *Zieria granulata*, the recommended propagation method is seed collection given that there is scientific uncertainty of the success and risks associated with translocation of plants (DEC 2005).

If an incidental (not previously recorded on site) threatened flora species is found in the Extraction Area, the following protocol/process should be followed:

- Record and map all individuals of the threatened plant in the immediate area with GPS (samples may need to be collected to confirm identification). If the species is confirmed as an incidental threatened flora species, the following protocol/process should be followed:
- Inform the Environmental Manager, who will:
    - Immediately cease all work that may affect the threatened species.
    - Contact the Project Manager and advise them of the situation.
    - Contact stakeholders, including the Project Ecologist and any other relevant organisations.
    - Determine in consultation with stakeholders, corrective actions and additional safeguards to be undertaken.

- A plan will be developed for the transplanting and/or propagation of the threatened flora species, in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia* (Australian Network for Plan Conservation 2018 [third edition]).
- Construction works may recommence only once the Environmental Manager, in consultation with the Project Ecologist, has confirmed that all corrective actions and additional safeguards have been implemented.

5.2.4 Erosion and sediment controls

Erosion and sediment retention will be managed in accordance with the Erosion and Sediment Control Plan (ESCP), which forms part of the Water Management Plan (WMP) for the Quarry.

The main objectives of erosion and sediment control at the Quarry are:

a) Meeting the requirements of development consent relevant to the operation of the Quarry.
b) Minimising the amount of land utilised for operations and undertaking rehabilitation activities that are commensurate with operational requirements.
c) Preventing contamination of clean water by quarry activities, particularly with respect to nearby watercourses.
d) Establishing and maintaining controlled diversion of clean water around quarry activities into existing watercourses so as to reduce the volume of sediment laden material.
e) Detaining all dirty water by the use of appropriate run-off controls and storage.
f) Conducting the Erosion & Sediment Control Program in a manner which meets or exceeds the requirements of all regulatory agencies.
g) Establishing responsibilities for the management of erosion and sediment control issues at the Quarry.

Erosion and sediment management will be undertaken in accordance with *Managing Urban Stormwater: Soils and Construction (The Blue Book)* (Landcom 2004). In the interest of protecting biodiversity during construction, the following measures apply:

- Implement the standard erosion and sediment controls for the throughout the project life and regularly maintain erosion and sediment controls until disturbed areas are revegetated.
- Appropriate controls to minimise impacts to water quality from erosion will include the use of sediment fencing and other measures where appropriate in accordance with *Managing Urban Stormwater: Soils and construction - Volume 1* (Landcom 2004).
- Sediment fence will be installed prior to clearing downslope of the clearing area, and downslope of any unsealed roads outside of the quarry excavation. They will be left in place until the area upstream of the fence has been diverted to the quarry excavation sediment basin.
- The Quarry Manager will monitor and maintain sedimentation measures monthly and as soon as possible after moderate – heavy rainfall and adjust sedimentation measures as required.
- All quarry workers have a responsibility to report any observed fault in sediment fencing to their supervisor.
- Permanent stabilisation and revegetation of the disturbance footprint is detailed in the Rehabilitation Management Plan.

For any erosion control breeches, additional sediment control measures may be required within the disturbance footprint.

5.3 Clearing mitigation measures

5.3.1 Clearing protocol

Where possible, clearing should be scheduled to occur in autumn-winter (March/April/May/June) which is outside of breeding, nesting and hibernation (torpor) periods of threatened fauna species that are known, or considered highly or moderately likely to occur, in the Extraction Area.

The process for vegetation clearing will involve the following stages:

Stage 1

All non-habitat vegetation may be removed (i.e. under-scrubbing leaving hollow-bearing/habitat trees/shrubs/logs in place). Habitat vegetation to remain in place untouched for a minimum of 48 hours to allow unassisted departure of native fauna from remaining habitat.

Stage 2

Removal of habitat vegetation (i.e. hollow-bearing/habitat trees/shrubs/logs) under the supervision of an ecologist. Trees/shrubs/logs will be gently tapped with machinery several times (with several minutes wait in between) to encourage any resident fauna to leave.

Hollow-bearing trees/logs will be dismantled in pieces so that hollows are retained and lowered gently. Hollows will be inspected for fauna. Native fauna will be relocated or the hollow retained in situ until wildlife can be relocated effectively. Non-native fauna will be taken to a local veterinary clinic for euthanasia.

Where fauna has not fled or does not seem likely to flee from a habitat or hollow-bearing tree/shrub, the ecologist will advise on the potential to block any hollow exits and move the section of the habitat tree/shrub/log with the fauna to retained areas of native vegetation beyond the clearing limits of the Extraction Area, where the exits can be unblocked at an appropriate time of day and the animal left to exit and move on its own.

Where this method of relocation is not considered acceptable by the ecologist, the ecologist will attempt to capture or encourage any un-injured fauna that is capable to move or relocate from the Project site.

If it proves difficult to remove an animal from a hollow, these trees/logs will be left on the ground overnight to give these animals a chance to relocate before the tree is mulched or moved.

Typically, most fauna in this situation will have multiple roosts throughout the region and will vacate the hollow and move away from an impact area.

Any small and nocturnal fauna that are unable to relocate themselves, such as lactating female micro-bats, will be captured, placed into individual calico bags, and then stored in a cool location for release after dusk. Any captured fauna will be released into suitable habitat beyond the clearing limits of the Extraction Area.

If an animal is injured during these works, the ecologist will ensure that they receive the appropriate level of care. Depending on the level of injury, WIRES and/or the nearest veterinary clinic will be contacted to take the animal into care upon delivery by the ecologist.

5.3.2 Dam de-watering

There are two small dams in the Extraction Area that provide some aquatic habitat. The wall of each dam can be broken with an excavator or alternatively, a pump can be set up to move water from the dam to a nearby area. For both de-watering techniques, the pump outlet and dam release channel should be set up with a fine net to ensure the collection of aquatic fauna. The goal of dam de-watering is to rescue and relocate any aquatic fauna using the dams e.g. eels, fish, tortoises, tadpoles and frogs, and macroinvertebrates.

Both dams are relatively small and it is estimated that both dams can be emptied over two days. Water from dams should first be collected in a range of containers that can hold different fauna types. Prior to commencing de-watering a release site should be chosen which has similar geology, position in the catchment, and vegetation, to assist the translocated species with acclimatisation. If large numbers of predatory fish are recovered (ie. Long-finned Eels), additional release points must be considered so that the risk of predation on existing fauna at release sites is reduced. There are two other small farm dams east of the Project Area on Cleary Bros landholding which can be used as release points. Where the final landform has been completed in the western part of the Project Area (Stages 1-6), the final western sump could also be utilised as a release point.

A range of nets will be employed to trap and collect aquatic fauna with the nets being different sizes to target different fauna types. In the final stages of the dam de-watering water quality will have a lower dissolved oxygen level; therefore, ecologists should access the water body with waterproof overalls and try to rescue any remaining fauna as quickly as possible.

Any injured native fauna may be able to be rehabilitated by WIRES or another wildlife rescue group, or alternatively, euthanised consistent with the *Prevention of the Cruelty to Animals Act 1979*. Euthanising exotic aquatic fauna should be conducted by the same method.

It is unlikely that Carp (*Carassius auratus*) are present in the dams, however, should they occur, they will need to be euthanised and the dam water disposed of and checked for Carp eggs. Division 6 20D of the *Fisheries Management Act 1994* prevents the release of noxious fish species into natural waterways.

5.3.3 Procedure for handling injured or displaced wildlife

The following procedure will apply to the pre-clearing, operations and closure stages:

1. Should native fauna be observed near the works area, and they are potentially at risk of being harmed, then the following procedure will be followed:

- Contact the site supervisor.
- The site supervisor reviews if the animal is at risk of being harmed.
- If yes, all works in the vicinity of the animal (works in other areas may continue) will cease. The animal, if highly mobile (e.g. Kangaroo), will be slowly and gently encouraged to leave the construction area (i.e. corralled toward).
- If the animal is not at risk of being harmed, then works will cease in the vicinity of the animal until it moves on (works may continue in other areas of the site).

If the animal is not capable of moving on of its own accord, then the following steps will ensue.

2. If an animal is found within the site that is injured the following procedure will be implemented:

- Contact the site supervisor.
- The site supervisor determines the most appropriate person to engage:
- Project ecologist, or
- The Wildlife Information and Rescue Services (WIRES), who will respond to all sick, injured or orphaned native wildlife queries.

3. If the injuries are too great for the animal to be relocated, then the animal will be taken to a WIRES Wildlife Carer or Veterinary Clinic.

5.4 General mitigation measures

5.4.1 Staff and contractor training on environmental issues

Cleary Bros is responsible for environmental awareness and training of quarry employees and contractors in accordance with Cleary Bros Training and Induction Work Instruction. This will include training on matters relevant to each workers role, including hygiene and weed requirements, vegetation clearing protocols, unexpected finds, identifying endangered species which may be present in the project area, as well as what to do in the event an injured animal is encountered. The Environmental Officer will be responsible for the adoption and implementation of this BMP, including ensuring that outcomes are reported to the Cleary Bros Management Team and CEO.

General environmental awareness training is also provided to all employees and contractors through the Site Induction process.

5.4.2 Weed Management Strategy

The Weed Management Strategy applies to all stages of the Project (i.e. pre-clearing, operations and quarry closure).

The existing Quarry operations is already subject to a VMP which includes strategies for weeds, including mapping, management and control of weeds. The VMP was first prepared for the site in 2007 and most recently updated in 2018. The VMP has guided revegetation and weed management for the Quarry to date.

Cleary Bros uses bush regeneration specialists to carry out a number of weed management actions at the site including:

- Application of the VMP through on-ground weed control (bush regeneration and spraying).
- Application of the VMP through monitoring of 12 established 20m x 20m monitoring plots to collect data on native and exotic plants within remnant vegetation, restoration zones and planting zones.
- Annual monitoring and evaluation of the revegetation and remnant bushland areas, and associated management actions.

For this BMP, a separate weed management strategy is not considered necessary. A review of the weed management strategies already being undertaken has been conducted and provides a suitable mechanism for achieving effective weed control in the direct and indirect impact areas.

It is recommended, however, that, in addition to the current strategy for weed management, the number of monitoring plots be increased from 12 to 17 with an additional five plots to be established beyond, and within 50m of, the Extraction Area boundary. These plots will capture changes in the density and frequency of weed and native species over time.

As detailed above, there is already a VMP for the Quarry which is being implemented. Creating another VMP is not required and this BMP will supersede the VMP over the next 12 months.

5.4.3 Hygiene protocol - prevent the spread of weeds or pathogens

To prevent the introduction of weeds and pathogens to the site and their spread to other sites, the following protocols will be implemented:

- Non-active parts of the Project area which are currently utilised for agriculture will operate under Cleary Bros Farm biosecurity protocols, which includes notification to the Farm Manager prior to entry, and vehicle, boot, and equipment cleaning to prevent the introduction of new biosecurity risks.
- All new mobile plant to the Project will be inspected on arrival using the Mobile Plant Induction Form to ensure it is free of any soil or other material with the potential to introduce weeds and pathogens.

- Access into the Project Area will be restricted to quarry workers only. Quarry workers are trained in the vehicle and boot hygiene protocols through the site induction process and ongoing training.
- An automatic wheel wash has been installed at the exit from the Sales Area to remove any soil from the tyres of vehicles leaving the site.
- A wash down bay is provided on site for washing mobile equipment, attachments, and vehicles prior to entering and prior to leaving the site as required. The wash down bay will be used to remove any material that cannot be removed using the wheel wash, such as for mobile equipment and attachments or for removing mud from the body and wheel arches of vehicles.
- Any materials brought into the site (e.g. soil, mulch) will be inspected prior to use to ensure free of weeds and pathogens.

5.4.4 Ongoing weed control

See section 5.4.2 for weed control measures which apply to all stages of the Project.

5.4.5 Management of topsoil

Soil mapping has been undertaken across the site and is included in the Rehabilitation Management Plan (RWC 2024b). All topsoil and subsoil resources will be salvaged during stripping for reuse in rehabilitation of the Quarry as described in the Rehabilitation Management Plan. While much of the site comprises cleared farmland dominated by exotic kikuyu grass with a low value native seedbank, some areas comprise moderate and high-density stands of *Zieria granulata* (refer to Figure 3). Other areas comprise regrowth of native communities of PCT1300 with minimal lantana invasion (ISR condition class "Low" on Figure 2). Both of these areas likely hold a high value soil seedbank.

Prior to the stripping of topsoil from these areas, off-site trials will be undertaken on the viability of the soil seedbank by collecting soil samples and germinating the samples in shallow trays in a greenhouse environment. For each sample, the number of each species which germinates will be tallied, allowing for a comparison of native vs non-native species in each sample. This data will be used to refine the areas targeted for specialist collection and reuse of the topsoil resources for the establishment of native vegetation in the final landform. The topsoil identified as part of this process will be segregated from the other soil resources retained, and utilised for the rehabilitation of parts of the Native Ecosystem Doman, as described in the Rehabilitation Strategy (RWC 2024a). This is expected to boost the establishment of native vegetation and particularly *Zieria granulata* in these parts of the rehabilitated landform.

There is no formal data that provides guidance on how long the seed of *Zieria granulata* can be stored for (both in soil and as collected seeds) so the stockpiling of soil should be used within two years of being collected (where practical). Equipment used to handle topsoil will be cleaned prior to and after use, and before moving to a different part of the quarry to prevent unwanted seed spread.

For further information on the retention, stockpiling and use of the soil resources, refer to the Rehabilitation Management Plan.

5.4.6 Collection of seed

The collection, storage and germination of seed from *Zieria granulata* is broadly recommended in both the Conservation Advice (Threatened Species Scientific Committee 2015) and Recovery Plan (NSW Department of Environment and Conservation [DEC] 2005) for the species.

In a recent paper that considers the biology, pollination vectors and breeding system of *Zieria granulata*, Lopresti et al (2023, pg. 266) state, "It is pollinated by a range of insect species, predominantly from the Diptera and Hymenoptera orders. Seed predation was shown to inhibit viable-seed production for all populations examined, but this was not the sole limitation. Pre-dispersal seed predators prevented viable-

seed production in 46% of seed examined and some seeds from all study sites had signs of insect predation. This result suggests that bagging branches with developing fruit to exclude predators may help improve seed yield for conservation or restoration purposes. This simple action appeared to greatly improve the proportion of viable seeds however, no comparison was made to the viability of seeds from unbagged branches, so it is difficult to say whether the improved viability was due solely to bagging, to the increased rainfall, or a combination of both."

In a paper published in 2009 (Martyn et al), 112 species of plants in the Rutaceae family (including *Zieria granulata*) were investigated for seed fill (measure of the proportion of outwardly undamaged seeds that have all the tissues essential for germination), viability and germination (the number of seeds that germinate). The main findings from this study found that threatened species were more likely to have low seed fill than common species, though viability and germination were similar. Problems with seed viability can be minimised by ensuring seeds are collected as close to maturity as possible (including bagging seeding branches if practical), followed by thorough cleaning, appropriate storage (cool dry conditions) and monitoring of viability during storage (Martyn et al 2009).

Seeds of *Zieria granulata* have physiological dormancy as they are capable of taking in water and respond to germination stimulants such as Gibberellic acids (plant hormones) and smoke. It is unknown how long the seeds of *Zieria granulata* can be stored, and the storage conditions and seed age is likely to affect subsequent germination (Martyn et al 2009).

Seed collection for *Zieria granulata* should be undertaken the year prior to clearing any area with Zieria in accordance with the Australian benchmark guidelines developed by Florabank for native seed collection. Experienced contractors will be used for any native seed collection in line with the Model Code of Practice. The following current industry standard resources should be referred to:

- Florabank Guidelines: Model Code of Practice.
- Florabank Guideline 1: Native Seed Storage for revegetation.
- Florabank Guideline 2: Basic Methods For Drying, Extraction And Cleaning Native Plant Seed.
- Florabank Guideline 3: Improving On Basic Native Seed Storage.
- Florabank Guideline 4: Keeping Records On Native Seed.
- Florabank Guideline 5: Seed Collection from Woody Plants for Local Revegetation.
- Florabank Guideline 6: Native Seed Collection.
- Florabank Guideline 7: Seed Production Areas for Woody Native Plants.
- Florabank Guideline 8: Basic Germination and Viability Tests For Native Seed Plant.
- Florabank Guideline 9: Using Native Grass Seed In Revegetation.
- NSW Office of Environment and Heritage: Seed Collecting.
- Greening Australia (2003): Revegetation Techniques.

5.4.7 Air quality through dust management

Air quality issues are managed through operational mitigation measures such as the use of water carts and dust suppression on a broader scale. For issues relevant to this BMP, stockpiled topsoil would be temporary seeded where not immediately reused.

5.4.8 Waste management

It is not expected that there will be any hazardous waste associated with the clearing of vegetation at the project site. General waste at the site should be appropriately removed and managed. All native woody material should be mulched and stockpiled for use in rehabilitation areas.

5.4.9 Monitoring & reporting

See Section 6 for recommended monitoring and reporting measures applicable to this BMP.

5.5 Quarry Rehabilitation

The Rehabilitation Strategy (RWC 2024a) provides a strategic overview of the proposed rehabilitation of the lands impacted by quarrying within the Project. It describes the rehabilitation objectives and maps the Final Land Use Domains across the site (refer Figure 6). The Strategy further describes the completion criteria and how the landform will fit within the broader landscape. The Strategy also describes the ongoing maintenance of the rehabilitation and how this will be managed, which is further described in the Rehabilitation Management Plan (RWC 2024b). The Rehabilitation Management Plan includes plans showing areas proposed for rehabilitation over each of the first 5 years of the Project. The Rehabilitation Management Plan will be updated at least every five years to ensure currency and set direction for the subsequent five years. The Rehabilitation Management Plan provides a high level of detail on rehabilitation methodologies, including the establishment of the landform and growth medium, and the planting/seeding parameters that will be employed.

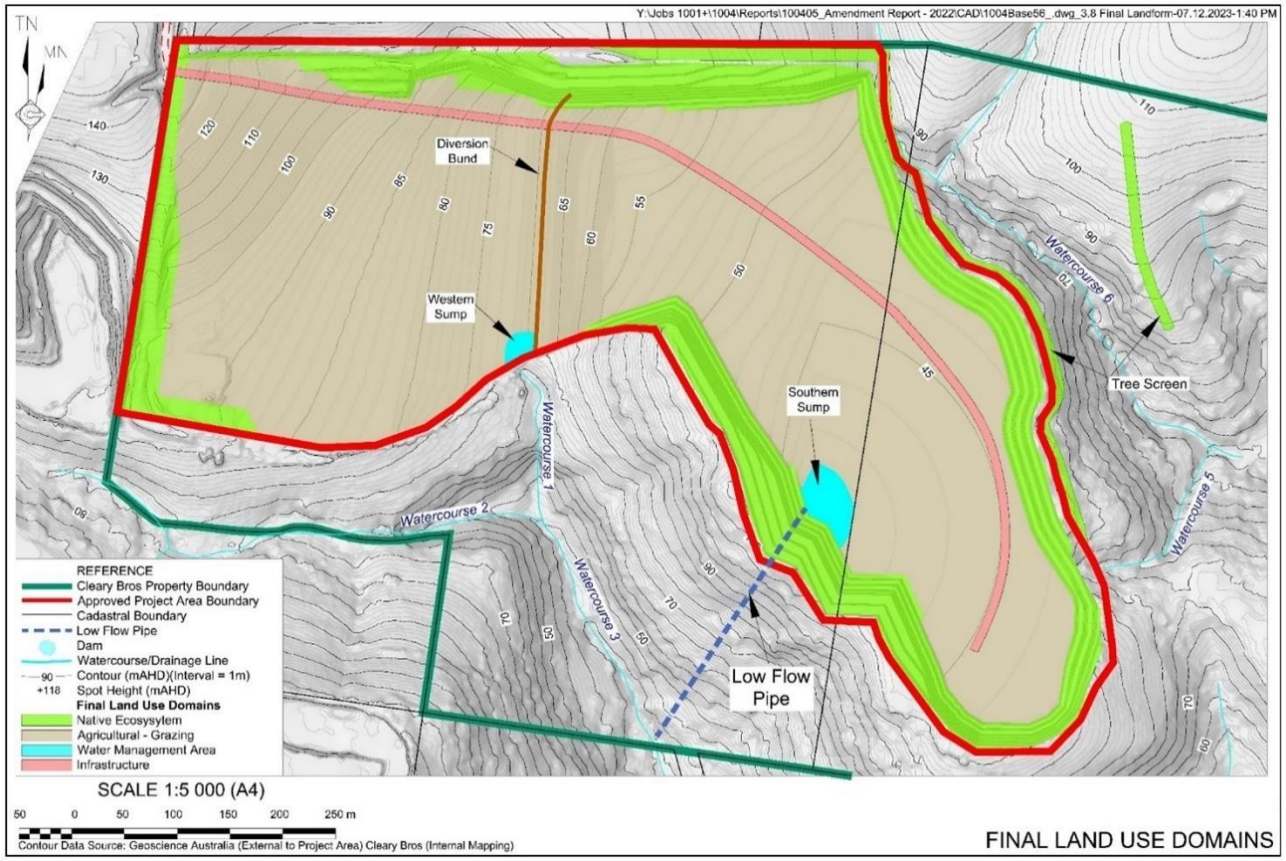

Figure 6 – Final Land Use Domains

6. Monitoring, performance indicators and adaptive management

6.1 Broad goals

Monitoring of the site will be conducted to assess the effectiveness of the biodiversity related mitigation measures recommended in this BMP and to ascertain the requirement for further work. Only the mitigation measures that are practical to monitor are provided in this section of the BMP (Table 9). Many mitigation measures prescribed in this BMP are short term activities and monitoring is not feasible.

The monitoring requirements in the previous Quarry VMP are to be adopted as part of this BMP, and include:

a) Establishment of baseline data for existing vegetation and habitat in the area.
b) Vegetation management on all areas of the site outside the working area of the quarry.
c) Conservation, maintenance and enhancement of threatened communities, including 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodlands'.
d) Conservation, maintenance and enhancement of threatened plant species, including *Cynanchum elegans* (White Cynanchum), *Daphnandra johnsonii* (Illawarra Socketwood), and *Zieria granulata* (Illawarra Zieria).
e) Establishment and maintenance of vegetation/habitat for threatened fauna species, including the Grey-headed Flying fox.
f) Ongoing management of weeds and pests, including the provision of stock-proof fencing and replacement of damaged plantings.
g) A program for how the performance of the measures described in (b) to (f) above would be monitored over time.
h) A program for monitoring the effect of quarrying, including water management, on vegetation communities (biannual and annual surveys).

Details of risks, the perceived severity of risk to biodiversity, performance indictors and contingency actions are provided in Table 11. Internal reviews will also assess the performance of the following mitigation measures against the performance indicators in Table 12.

In accordance with the Conditions of Consent, in the event that monitoring indicates performance measures are considered to have been exceeded or are likely to be exceeded, a contingency plan will be implemented. This contingency plan will include:

- Investigation, identification and assessment of exceedance or likely exceedance.
- An audit of the current BMP and existing management measures.
- Identification of improvements to management measures or required remediation measures.
- Identification of additional monitoring, where required, to inform proposed remediation measure effectiveness.

The success of remediation measures that have been implemented for any exceedance would be reviewed as part of the corrective action and documented in the Annual Review.

Cleary Bros has adopted a Trigger Action Response Plan (TARP) methodology for identifying key risks to the successful achievement of biodiversity performance criteria.

6.2 Risks to the successful implementation of the BMP

Environmental factors present the greatest degree of risk to the implementation of the BMP as these are uncontrollable variables. Non-environmental risks can be controlled at the site level. As mentioned, details of risks, the perceived severity of risk to biodiversity, performance indictors and contingency actions are provided (Table 11).

Table 11 – Risks to the implementation of the BMP and mitigation actions as identified in a Trigger Action Response Plan (TARP)

Risk aspect	Risk level	Mitigation/contingency actions and response
Accidental over-clearing of native vegetation across Extraction Area, wrong use of topsoil, disturbance of heritage items and biodiversity credits not retired.	Low	CB will implement an internal 'Permit to Disturb' process which is a checklist and sign off system.
Bushfires burning the bushland adjacent to the project area and establishment of weeds due to the disturbance.	Moderate	Bushfire Emergency Management and Evacuation Plan in place. Additional resources made available for weed control after a bushfire.
Bushfires burning the bushland within the Extraction Area prior to clearing or before *Zieria granulata* seed is collected.	High	Bushfire management plan in place. Collect *Zieria granulata* as soon as this BMP is approved.
Establishment of new weed species in the bushland adjacent to the project area.	Moderate	Identify and record any new species for treatment. Include details when the BMP is updated.
Excessive rain causing significant breeches of sediment and erosion control measures and subsequent damage to the adjacent habitat.	High	Coir logs, jute matting and active revegetation will be used to rehabilitate any affected adjacent habitat, and will assist to mitigate topsoil loss during future excessive rain events.
Non-compliance of contractors to undertake weed control, monitoring and seed propagation correctly.	Low	All engaged subcontractors will be identified with pre-qualified checks to make sure only qualified personnel attend the Extraction Area. All personnel are inducted and undergo environmental awareness training. Continued failure of a subcontractor to perform their duties should trigger reassignment of the contract to another provider.
Shortage of materials for mitigation measures (e.g. sediment fencing).	Moderate	Work will not commence until all appropriate environmental protection measures are in place or a suitable and effective alternative has been installed.

Table 12 – Monitoring and performance indicators

Management activity	Monitoring proposed	Performance indicator	Contingency action	Report on effectiveness or breech
Demarcation of Clearing Area and Extraction Area	Pre-clearing 'Permit to Disturb' process to determine if fencing is installed correctly and in the right locations.	Fence is in place and no vegetation clearing to occur beyond clearing limits.	Where fence is damaged, fix to comply with this BMP. Where any clearing has been undertaken outside demarcated area active revegetation	Results of internal reviews are filed and can be made available on request. Rectification of breech to be inspected by quarry manager and confirmation of

Management activity	Monitoring proposed	Performance indicator	Contingency action	Report on effectiveness or breech
			must commence immediately.	effectiveness to be provided in a letter report.
Fauna Injury and Entrapment Procedure	Record all encounters that result in injury or entrapment: - Species - Location - Outcome (i.e. fauna death, fauna received care from WIRES/Vet, fauna escaped).	Ideally no incidents, or all injured fauna to receive appropriate care.	Address any identifiable causes for repeated fauna injury and entrapment and continue to evaluate records of incidents.	Records of entrapments are filed and can be made available on request.
Erosion and Sediment Management	Quarry Supervisor inspections	Sediment fencing installed in accordance with the Blue Book (Landcom 2004).	Repair sediment fencing to comply with the Blue Book (Landcom 2004) and mitigate erosion and sedimentation.	Rectification of breech to be inspected by quarry supervisor and confirmation of effectiveness to be provided in a letter report.
Pre-clearance Management Measures and Surveys - Flora	Annual Review	Monitor the storage of *Zieria granulata* seed collected.	Seed from this species is effectively propagated into tubestock for planting.	Results of propagation success are recorded.
Weed control	Biannual inspection of the project area by bush regeneration specialist.	Minimal incursion of weeds into adjacent habitat. Weed densities stay within a reasonable range of baseline ie. < 20% total cover.	Additional weeding event to control major incursions.	Bush regeneration specialist to provide short letter report containing results of inspection, determine extent of weed occurrence and report on adaptive management actions required.
Formal vegetation monitoring plots	Field based annual vegetation monitoring of existing 20m x 20m plots and 5 new plots established by this BMP (refer Section 6.4).	Monitor the presence of exotic and native plant densities including threatened communities and species. Address the management measures from the	Results will feed into weed control.	Annual report prepared and results integrated into Annual Review.

Management activity	Monitoring proposed	Performance indicator	Contingency action	Report on effectiveness or breech
		previous VMP that relate to biodiversity and habitats (refer to Section 6.1).		

6.3 Biannual Inspection

In or around December and June each year, an ecologist or bush regeneration specialist will be engaged to undertake an inspection of the native vegetation and revegetation areas within 50m of the Project footprint. The purpose of the biannual inspection is to provide expert feedback on the efforts to improve the biodiversity of these areas, and in particular guide activities to manage the indirect impacts of the Project and improve revegetation outcomes. The specialist will prepare a written report following each inspection, which will cover matters such as compliance with this management plan and any adverse environmental impacts, any recommendations and any additional mitigation measures considered necessary. The report will also include the number and species of seedlings planted since the last inspection, the condition of the fences, the number of hours spent controlling pest species, and any other relevant matter. The written reports will be included in the Annual Review for the relevant reporting period.

6.4 Annual Survey

The June (or thereabouts) inspection by the ecologist or bush regeneration specialist will include a quantitative survey. The survey is designed to assess the health of the remnant vegetation and indirect impacts associated with the Project, and the performance of the management strategies outlined in the BMP. Surveys will be undertaken in the monitoring plots established in the remnant vegetation, Planting Zone, Restoration Zone, and indirect buffer zones shown in Figure 7. The corners of each 20m x 20m monitoring plot will be marked with survey pegs, and the location of the centre of each plot logged using a GPS.

For each plot, the following will be recorded and documented in the annual report:

- Number of plantings surviving for each species (Revegetation Areas only);
- Number of plantings not surviving (Revegetation Areas only);
- Number of stems of each native species;
- Number of stems of each weed species;
- Percentage cover of weed species;
- Percentage foliage cover;
- Percentage ground cover;
- Abundance of threatened plant species or other plant species of conservation significance;
- Presence of threatened fauna species (including presence outside of marked plot;
- Pseudo-density of feral animals as determined by abundance and distribution of traces (scats, prints etc); and
- Health of vegetation community (related to potential water stress).

A survey of the known populations of threatened species in the indirect impact area will be undertaken as part of the annual survey. The aim of this inspection will be to confirm the known threatened species on site have not been adversely affected by quarrying operations. An assessment will be made as to the health of the population, as well as confirming existing controls to prevent quarry incursion on the threatened species are effective. A report will be prepared following each annual survey, which will be included in the Annual Review.

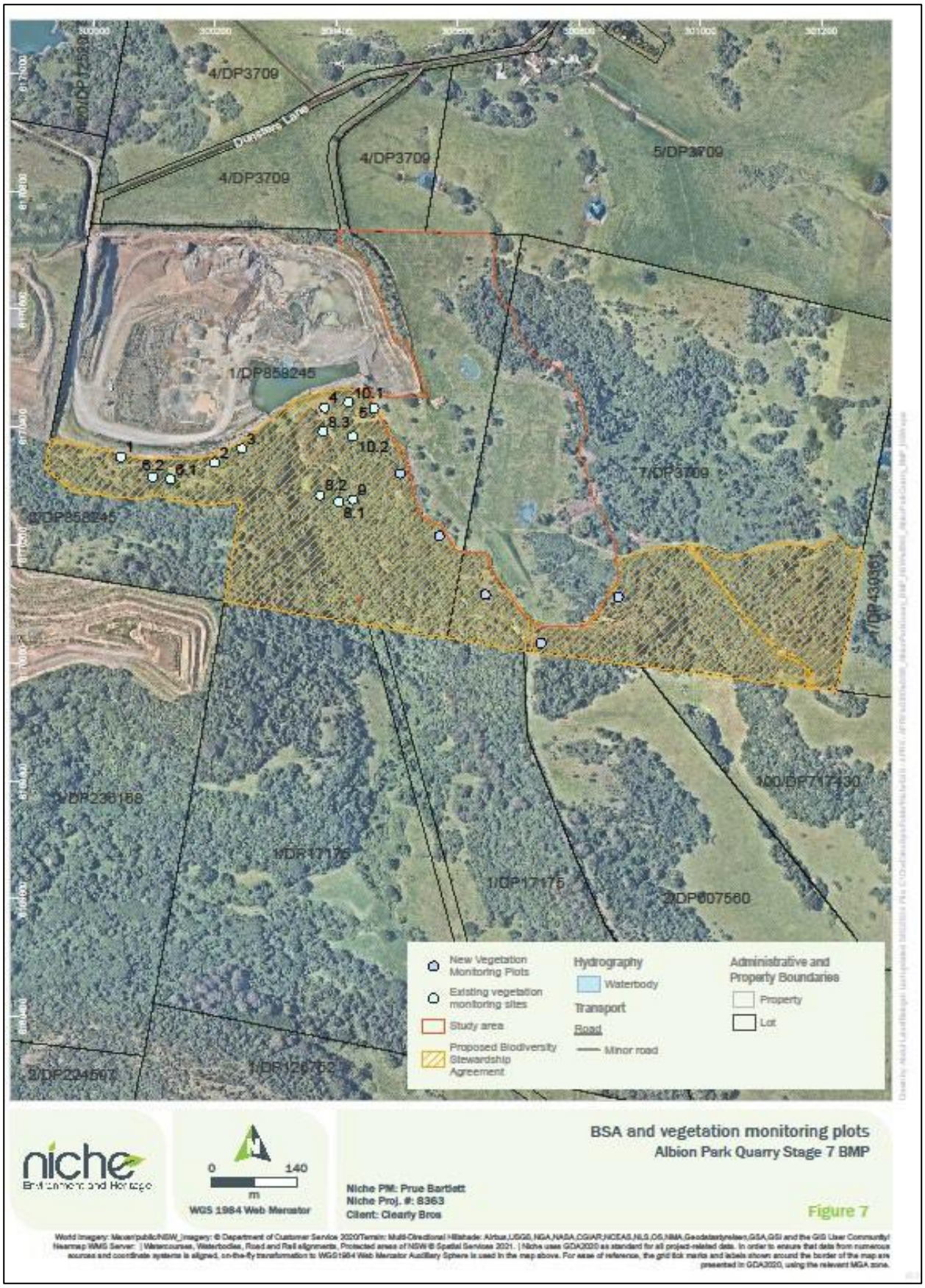

Figure 7 – Proposed BSA and Vegetation Monitoring Sites

6.5 Incidents and non-compliances

Conditions D8 and D9 of SSD10369 require Cleary Bros to notify the Department of Planning and Environment and any other relevant government agency of incidents or non-compliances with the conditions of the consent.

For the purposes of this Plan, an incident or non-compliance is as follows.

- Incident - An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. Material harm is defined as

  "harm to the environment that:

  - involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or
  - results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)

  Material harm does not include "harm" that is authorised under SSD10369 or any other statutory approval.
- Non-compliance - An occurrence, set of circumstances or development that is a breach of this consent.

A biodiversity incident or non-compliance may include any of the following:

- Disturbance of native vegetation outside the approved Project Area, or prior to surrendering the required biodiversity credits for any approved disturbance.
- Introduction or establishment of new weed species on or immediately surrounding the Project Area.
- Unexpected finds of threatened species.
- Any other quarry-related impact to biodiversity values not considered as part of the EIS.

Cleary Bros will notify the Department and BCD immediately on becoming aware of an incident, or within 7 days of becoming aware of a non-compliance. Cleary Bros will also report any non-compliance of a condition of approval 2020-8871 or a commitment under the Biodiversity Management Plan to the Commonwealth Minister. The notification will identify the location and nature of the incident of non-compliance, and the reasons for the non-compliance (where applicable).

In accordance with the Conditions of Consent, where any exceedance of the criteria or performance measures outlined within this document has occurred, Cleary Bros will:

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

Cleary Bros has adopted a Trigger Action Response Plan (TARP) methodology for identifying key risks to the successful achievement of biodiversity performance criteria (Section 6.2).

7. Implementation and Reporting

7.1 Biodiversity credit obligations

Four impact areas have been identified for the Project with credit obligations associated with each impact area. The Applicant must retire the biodiversity credits specified in the Conditions of Consent or as recalculated to the satisfaction of the BCT for each impact area prior to undertaking activities that would impact on the biodiversity values of that area. The retirement of credits must be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act, including the application of any ancillary rules published under clause 6.5 of the *Biodiversity Conservation Regulation 2017*.

Cleary Bros has engaged Niche to secure credits from the credit market to meet the offset obligation for Stage 1 (Table 6, Section 3), that is eight credits required for *Illawarra Subtropical Rainforest in the Sydney Basin Bioregion* (this is the offset trading group [OTG] for PCT 1300 Whalebone Tree – Native Quince dry subtropical rainforest). Extracts from the Credit Register, or receipt of credit transaction, that confirms the number and class of credits retired will be provided to the Planning Secretary prior to any impact to native vegetation in the Stage 1 impact area.

For each subsequent impact stage of the Project, Cleary Bros will provide the Planning Secretary with the same evidence prior to commencement of each stage in accordance with the credits per stage outlined in (Table 6, Section 3).

In addition, within 2 years of the commencement of quarrying activities in the Stage 7 area, and prior to any disturbance of the Stage 2 impact area, Cleary Bros will establish a BSA of at least 8.4ha on Lot 7 of DP3709. Cleary Bros proposes to establish a BSA of approximately 24.5 ha, which includes the area shown as the Potential BSA Boundary in Appendix 7 to SSD10369, as well as capturing other areas of predominantly ISR to the south and west of the Project Area on Cleary Bros landholding (refer Figure 7). The BSA will include PCT 720 Bracelet Honey-myrtle-Australian Indigo dry shrubland on volcanics (*Melaleuca armillaris* Tall Shrubland in the Sydney Basin Bioregion OTG). Cleary Bros will pay the Total Fund Deposit for this BSA in full within 6 months of its registration. Where the number of PCT 720 credits generated from the BSA equals or exceeds 9 credits (as required to be retired for the Project), Cleary Bros will retire the full number of credits for the Stage 2 impact area (9) from the BSA. Where there is any shortfall, Cleary Bros will secure the remaining credits through the alternative means available at the time. Where the BSA generates greater than the number of credits required to be retired for the Stage 2 impact area, these may be used to offset impacts for the Stage 3 or 4 impact areas, or otherwise traded in accordance with the Biodiversity Offsets Scheme of the BC Act.

7.2 Reporting and Publishing

An Annual Review will be prepared by 30 September each year addressing the matters identified in Condition D10 of SSD 10369. The Annual Review will include the reports from all vegetation monitoring and other relevant matters for the preceding 12-month period from 30 June, as well as measures to be implemented for the following 12-month period.

The Annual Review will include information relevant to:

- Activities undertaken during the year, and activities planned to be carried out over the next year.
- A review of all monitoring results associated with this plan, including how they compare to the limits and performance criteria identified in this plan, the risk assessment in Section4, previous years monitoring results, the predictions from the EIS, and any trends observed.
- Accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents.

- Details of any complaints received, and how Cleary Bros has responded to them.
- Any discrepancies between the observed impacts of the Quarry and that predicted by the EIS.
- Any measures that will be implemented in the next year to improve the environmental outcomes of the Quarry.
- One or more shapefile showing all clearing of any protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared.
- A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.
- The Annual Review will be uploaded to the Planning Portal or otherwise submitted to the Planning Secretary in line with the current submission process. The Commonwealth Minister will be notified of the publication of the Annual Review and the location of the review on Cleary Bros website within 5 business days of publication.

In accordance with condition D15 of SSD 10369, Cleary Bros will make the following information and documents publicly available on its website:

- the EIS;
- all current statutory approvals for the Quarry;
- all strategies, plans and programs required under the conditions SSD 10369;
- any strategy, plan, or program developed in accordance with the EIS or the conditions of this SSD 10369.
- the proposed staging plans for the Quarry;
- minutes of CCC meetings;
- regular reporting on the environmental performance of the Quarry in accordance with the reporting requirements in any plans or programs required by the conditions SSD 10369;
- a comprehensive summary of the monitoring results of the Quarry, reported in accordance with the specifications in any conditions of SSD 10369, or any strategies, plans and programs;
- a summary of the current phase and progress of the Quarry;
- contact details to enquire about the Quarry or to make a complaint;
- a complaints register, updated monthly;
- the Annual Reviews of the Quarry;
- audit reports prepared as part of any *Independent Environmental Audit* of the Quarry and the Cleary Bros' response to the recommendations in any audit report; and
- any other matter required by the Planning Secretary.

All information will be regularly updated.

8. Review and Improvement

8.1 Independent Environmental Audit

In accordance with Condition D11 of SSD 10369 and Condition 25 of 2020-8871, Cleary Bros will engage a third party to undertake an independent environmental audit of the conditions of these approvals and the implementation of the Biodiversity Management Plan. The first audit will be undertaken within 12 months of commencement of quarrying activities under SSD 10369 and will be undertaken every three years thereafter. The Independent environmental audit will be undertaken as per the process described in the Environmental Management Strategy.

In accordance with D12 of SSD 10369, Cleary Bros will review each Independent Environmental Audit and submit a response to the Planning Secretary and any other relevant agencies. The response will include a timetable for the implementation of the recommendations of the Independent Environmental Audit. The Independent Audit Report and Response will be made available on the Cleary Bros' website within 60 days following submission to the Planning Secretary.

8.2 BMP Review

In accordance with Condition D6 of SSD-10369, this BMP will be reviewed and, if required, revised within 3 months of:

- The submission of an incident report with impacts to biodiversity values at the Quarry under any current approval;
- The submission of an *Annual Review* under Condition D10;
- The submission of an Independent Environmental Audit under Condition D11;
- The approval of any modification of the conditions of SSD 10369; or
- Commencement of each Stage of the Quarry (Stage 7a to 7e).

9. References

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