Final Report v2

Detailed Ecological Investigations: Yarra Valley Quarry Stage 3, Launching Place, Victoria

Prepared for

Yarra Valley Quarries

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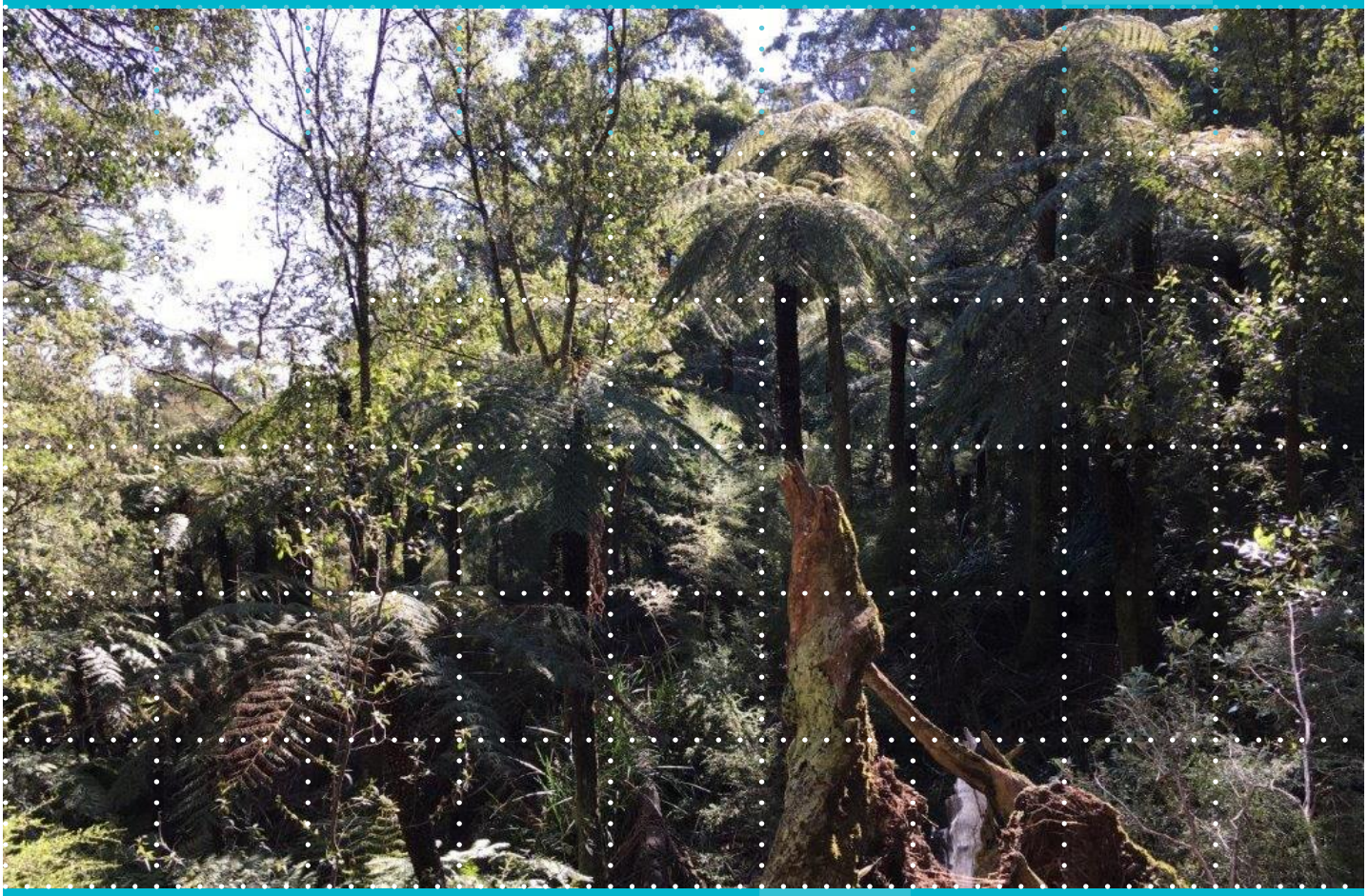

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Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

GLOSSARY

Acronym	Description
ALA	Atlas of Living Australia
CaLP	*Catchment and Land Protection Act 1994*
CMA	Catchment Management Authority
DBH	Diameter at Breast Height
DEECA	Victorian Department of Energy, Environment and Climate Action
DELWP	Victorian Department of Environment, Land, Water and Planning
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
EE Act	*Environmental Effects Act 1978*
EES	Environment Effects Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
NES	National Environmental Significance
NVIM Tool	Native Vegetation Information Management Tool (DEECA)
NVR	Native Vegetation Removal
PMST	Protected Matters Search Tool (DoEE)
TPZ	Tree Protection Zone
VBA	Victorian Biodiversity Atlas (DEECA)

SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Yarra Valley Quarries to undertake Detailed Ecological Investigations for the Yarra Valley Quarry Stage 3, Launching Place, Victoria. The surveys were required to document the extent and quality of native vegetation and fauna habitats, to determine the presence or absence of any significant flora and fauna species within and adjacent to the study area, and to address the relevant considerations under Commonwealth and State environmental legislation associated with the proposed quarry expansion.

Methods

Flora

Surveys for significant flora species were undertaken over five days in Spring 2020 (28, 29 and 30 September, and 16, 17 November 2020, and 16, 26 March 2024) to maximise the detection of species identified as having the potential to occur within the study area.

Fauna

Surveys for terrestrial and aquatic fauna were undertaken in spring and summer 2020, and comprised fauna habitat assessments, incidental observations, spotlighting, nocturnal call playback surveys, infra-red remote camera surveys, and active searching. Surveys were conducted in accordance with approved methods outlined in relevant guidelines for detecting ground-dwelling and arboreal mammals, owls and crayfish, with surveys focusing on suitable habitats identified within the study area.

Results

Flora

Targeted surveys for the following significant flora species were undertaken across the proposed extraction areas; Clover Glycene *Glycine latrobeana*, Maroon Leek-orchid *Prasophyllum frenchii*, Green-striped Greenhood *Pterostylis chlorogramma*, Round-leaf Pomaderris *Pomaderris vacciniifolia*, Matted Flax-lily *Dianella amoena* (EPBC Act), Purple Eyebright *Euphrasia collina* subsp. *Muelleri*, River Swamp Wallaby-grass *Amphibromus fluitans* and additional FFG listed flora that may occur in the study area. However, no national or State significant flora were recorded during the site surveys and based on the result of the detailed surveys there is a low likelihood that any significant flora species are present within the proposed extraction area.

Fauna

Two species of national significance (Greater Glider *Petauroides volans*, Gang-gang Cockatoo *Callocephalon fimbriatum*) and three species of state significance (Dingo *Canis lupus dingo*, Powerful Owl *Ninox strenua* and Lace Monitor *Varanus varius*) were detected within the study area during the targeted fauna surveys. The likelihood of any additional national or state significant fauna occurring within or adjacent to the impact area is considered low due to the absence of suitable habitat and/or lack of records in proximity to the study area.

Legislative and Policy Implications

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act - Commonwealth)

The proposed action is not likely to result in a significant impact on matters of NES. However, an EPBC Act referral is likely to be submitted to the DCCEEW as part of the proposed quarry expansion for a determination under the EPBC Act.

Environmental Effects Act 1978 (EE Act – Victoria)

The criteria for an EES referral are outlined in the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE 2006). The project impacts have yet to be considered against these referral criteria. A referral may be required under the EE Act to determine whether the proposed development will trigger the requirement for an Environment Effects Statement.

Flora and Fauna Guarantee Act 1988 (FFG Act - Victoria)

There are confirmed observations of three species listed as threatened and/or protected under the FFG Act. However, the study area is privately owned, and as such a permit under the FFG Act is not required.

Planning and Environment Act 1987 (Victoria)

A planning permit under Clause 42.01 will be required for works associated with the construction of the project. A planning permit for the proposed removal of native vegetation is also required.

Catchment and Land Protection Act 1994 (Victoria)

One noxious weed listed as noxious under the *Catchment and Land Protection Act 1994* were recorded during the assessment (Blackberry *Rubus fruticosus* spp. agg). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (Feral Cat *Felis catus,* Red Fox *Vulpes Vulpes,* Sambar Deer *Rusa unicolor*). A Weed and/or Pest Management Plan may be required.

Wildlife Act 1975 and Wildlife Regulations 2013 (Victoria)

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

Water Act 1989 (Victoria)

Several permanent and ephemeral drainage lines / streams are present throughout the study area. A 'works on waterways' permit from the Melbourne Water Catchment Management Authority is likely to be required where any action impacts on waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DEECA with the Melbourne Water CMA included for comment.

Mineral Resources (Sustainable Development) Act (Victoria)

Yarra Valley Quarries will need to prepare a Work Plan that includes a Rehabilitation Plan demonstrating the progressive rehabilitation of land disturbed by the project, and the proposed future land use for the site. This Work Plan will be developed post approval.

CONTENTS

SUMMARY OF CLAUSE 52.17 APPLICATION REQUIREMENTS

Table S1. Application requirements for a permit to remove native vegetation (Victoria Planning Provisions Clause 52.17; DELWP 2017)

No.	Application Requirement	Response
Application requirements under the Detailed Assessment Pathway		
1	Information about the native vegetation to be removed, including: The assessment pathway and reason for the assessment pathway; A description of the native vegetation to be removed; Maps showing the native vegetation and property in context; and The offset requirement that will apply if the native vegetation is approved to be removed.	Refer to Section 3.1 and Appendix 3 (Ensym Report)
2	Topographic and land information relating to the native vegetation to be removed, showing ridges, crests and hilltops, wetlands and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion, as appropriate.	Refer to Section 1.2 and Figure 1
3	Recent dated photographs of the native vegetation to be removed.	Refer to Section 3.1
4	Details of any other native vegetation that was permitted to be removed on the same property with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before the application to remove native vegetation is lodged.	No removal of native vegetation has been removed by the proponent within the property within the past five years
5	An avoid and minimise statement. The statement describes any efforts to avoid the removal of, and minimise the impacts on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	Refer to Section 5.1.1
6	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* that applies to the native vegetation to be removed.	Not applicable
7	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This statement must have regard to other available bushfire risk mitigation measures. This statement is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay.	Not applicable as the vegetation clearance is not for defendable space
8	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations at decision guideline 8.	Not applicable as the application responds to Clause 52.17
9	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines.	Refer to Section 3.5

No.	Application Requirement	Response
10	A site assessment report of the native vegetation to be removed, including: • A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status. • The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches. • The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	Refer to Figure 2, Appendix 1.2 (habitat hectares assessment)
11	Information about impacts on rare or threatened species habitat, including the relevant section of the Habitat importance map for each rare or threatened species requiring a species offset.	Refer to Appendix 3 (NVR Report)

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Yarra Valley Quarries (herein referred to as YVQ) to undertake Detailed Ecological Investigations for the Yarra Valley Quarry Stage 3, Launching Place, Victoria.

We understand that YVQ is seeking to understand the pre-feasibility for the Yarra Valley Quarry Stage 3 Development Project, and as part of the study, targeted surveys for significant ecological values within the study area are required. Historical targeted ecological assessments within the study area were completed approximately 25 years ago (Mueck and Delaney 1996), and therefore up to date surveys to assess the current ecological conditions and potential significant ecological values within the study area are required.

Victoria's population is set to reach 10 million before 2050, requiring 1.6 million new homes to be built. An average of eight tonnes of stone, gravel and sand per Victorian is required every year to build the infrastructure needed to cater for this growth. As the population rises, so does the demand for quarry materials. In addition, the Victorian Government is investing an average of over $10 billion per annum over the next four years into new infrastructure such as schools, hospitals and the transport network to cater for this growth.

The proposed development seeks to realise the full potential of a known extractive resource, to supply Victoria with essential quarry materials and thereby support and enhance the economic viability of the State. Extractive materials are a key component of construction materials, without which our roads, buildings and schools could not be built.

It is likely that the approvals process for the proposed Yarra Valley Quarry expansion project will require referrals under the State *Environmental Effects Act 1978* (EE Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1988* (EPBC Act). Therefore, the purpose of this assessment was to identify the extent and type of native vegetation present within the study area and to determine the likely presence of significant flora and fauna species and/or ecological communities. This report presents the results of the assessment and discusses the potential ecological and legislative implications associated with the proposed action.

1.2 Objectives

The objectives of the project included the completion of detailed ecological investigations within the study area and document the findings for likely inclusion in an EE Act and EPBC Act referral. The objectives of the project included:

- Completion of a desktop review and field surveys to confirm the likelihood of each target species occurring within the study area and surrounding landscape;
- Completion of a vegetation assessment and targeted surveys within the study area to assess:
    - The current conditions of the study area, including patches of native vegetation and Habitat Hectare assessments;
    - The locations and extents of Threatened Ecological Communities listed under the Victorian FFG Act; and,

  - Presence and location of EPBC Act and FFG Act listed threatened flora and fauna species.

- Identification of known and potential impacts on the target species associated with the proposed activity and determine the significance of impacts with reference to the significant impact criteria specified in the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines – Matters of National Environmental Significance* (DoE 2013), and significant impact guidelines developed for individual species;
- Provision of information in relation to any implications of Commonwealth and State environmental legislation and policy associated with significant species and the proposed activity; and,
- Identification of measures that should be undertaken to avoid and/or mitigate potential adverse impacts on significant species.
- Presentation of the findings in GIS mapping format; and,
- Preparation of this report – suitable for submission of as part of an EE Act and EPBC Act referrals – and provision of a robust ecological assessment of the study area.

1.3 Study Area

The study area is located at Yarra Valley Quarry Stage 3, Launching Place, comprising three properties:

- 30 Moora Road Mount Toolebewong 3777 – Parcel 50C ~ C\PP2717;
- 215 McMahons Road, Mount Toolebewong 3777 – Parcel 49A\PP2717; and,
- 130 McMahons Road, Launching Place 3139 – Parcel PC364849 (north-eastern extent).

The study area is located approximately 55 kilometres east of Melbourne's CBD (Figure 1). The study area covers approximately 125 hectares, comprising approximately 24 hectares in the proposed extension site and an additional 101 hectares in the proposed offset sites. The study area is bound by Mount Toolebewong State Forest to the north and west and the existing Dandy Premix Quarry to the south and east. According to the Department of Energy, Environment and Climate Action (DEECA) NatureKit Map (DEECA 2023a), the study area is modelled to contain Damp Forest and Foothill Forest EVCs, and this was confirmed by previous ecological investigations within the study area (Mueck and Delaney 1996). Based on the approximate age of the forest and indicators of logging truck infrastructure (turnaround bays etc.), it is likely that historical land use within the study area included logging operations. The most recent historical bushfire event in the study area was the 1939 fires, which likely burnt the entire site (CeRDI 2021).

The study area currently contains remnant native vegetation, as well as a residential dwelling and associated infrastructure in the south eastern corner. The study area contains substantial steep slopes, with west and east facing aspects, a ridge line through the centre of the study area and a creekline traversing the study area east to west towards the southern extent.

According to DEECA's NatureKit Map (DEECA 2023a), the study area is located within the Highlands-Southern Fall bioregion, Melbourne Water Catchment Management Authority (CMA) and Yarra Ranges Shire Council.

1.4 Target Species

1.4.1 *Flora*

Seven significant flora species, all of which are species of National Environmental Significance (NES) were targeted during the surveys (Table 1).

Table 1. Target significant flora species

Species	Suitable habitat within the study area	Survey Timing	Closet known records (within 10km)
Nationally Significant			
River Swamp Wallaby-grass *Amphibromus fluitans*	Areas of suitable habitat for the target species includes all areas of seasonally or permanently wet environments including areas of Riparian Forest and Damp Forest. Minor areas dominated by introduced vegetation were also included, as the species is known to occupy areas dominated by introduced vegetation;	November – December 2020	None
Matted Flax-lily *Dianella amoena*	Areas of suitable habitat for the target species includes grassland and grassy woodland habitats including areas of Shrubby Foothill Forest within the study area.	November – December 2020	Approx. 4.5km south-west
Purple Eyebright *Euphrasia collina* subsp. *muelleri*	Areas of suitable habitat for the target species includes Riparian Forest, Damp Forest, and Shrubby Foothill Forest. Specific habitat requirements included areas of increased light penetration through the tree canopy, and areas that receive inundation from water.	October – December 2020	None
Clover Glycene *Glycine latrobeana*	Areas of suitable habitat for the target species includes Shrubby Foothill Forest. Specific requirements for the target species includes dryer wooded areas and grassy understory areas.	September – October 2020	None
Round-leaf Pomaderris *Pomaderris vacciniifolia*	Areas of suitable habitat for the target species includes Riparian Forest, Damp Forest and Shrubby Foothill Forest. Specific habitat requirements included areas of moist forest scrub.	September – October 2020	None
Maroon Leek-orchid *Prasophyllum frenchii*	Areas of suitable habitat for the target species includes Damp Forest and Shrubby Foothill Forest. Specific habitat requirements include low levels of habitat disturbance and sheltered areas.	November – December 2020	None
Green-striped Greenhood *Pterostylis chlorogramma*	Areas of suitable habitat for the target species includes Damp Forest and Shrubby Foothill Forest. Specific habitat requirements include low levels of habitat disturbance and sheltered areas.	September – October 2020	None

1.4.2 *Fauna*

Six significant fauna species, including two species of national significance and four species of State significance were targeted during the surveys (Table 2).

Table 2. Target significant fauna species

Species	Suitable habitat within the study area	Closest Known Records (within 10km)
Nationally Significant		
Leadbeater's Possum *Gymnobelideus leadbeateri*	Forested areas supporting a structural mix of large, hollow-bearing trees and middle-storey species. Leadbeater's Possum has been recorded on multiple occasions in the local area, mostly within the Mount Toolebewong State Park. Based on the moderate-quality habitat present in the study area, targeted surveys for this species were undertaken.	Approx. 5km north-east
Greater Glider *Petauroides Volans*	Forested areas supporting large, hollow-bearing trees. Greater Glider has been recorded on numerous occasions in the local area, with the closest record immediately west of the study area in 1996. Based the on high-quality habitat present targeted surveys for this species were undertaken.	Approx. 0.1km west
State Significant		
Powerful Owl *Ninox strenua*	Forested areas supporting large, hollow-bearing trees. Sooty Owl was recorded immediately west of the study area in 1996. Based the on high-quality habitat present targeted surveys for both species were undertaken.	Approx. 4.5km north-west
Sooty Owl *Tyto tenebricosa*		Approx. 0.1km west
Curve-tail Burrowing Crayfish *Engaeus curvisuturus*	Wet-forested areas. Based on the moderate quality habitat present, and the location of the study area on the fringe of the species' known range, targeted nocturnal searches were undertaken.	None
Brush-tailed Phascogale *Phascogale tapoatafa*	Open forested areas supporting large, hollow-bearing trees. Based on the low-moderate quality habitat present, targeted surveys for both species were undertaken.	Approx. 5.5km north-west
Smoky Mouse *Pseudomys fumeus*	Forested areas including dry ridgeline areas to wet gullies. Based on the moderate quality habitat present, targeted surveys for the species were undertaken.	None
Spot-tailed Quoll *Dasyurus maculatus*	Forested areas containing rock crevices, hollow logs, burrowing opportunities and tree hollows. Based on the moderate-high quality habitat present, targeted surveys for the species were undertaken.	None

2 METHODS

2.1 Nomenclature

Common and scientific names of vascular plants follow the Victorian Biodiversity Atlas (VBA) (DEECA 2024a) and the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow DEPI's Ecological Vegetation Classes (EVC) benchmarks (DEECA 2023c). The names of aquatic and terrestrial vertebrate and invertebrate fauna follow the VBA (DEPI 2011).

2.2 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DEECA NatureKit Map (DEECA 2023a) and Native Vegetation Information Management (NVIM) Tool (DEECA 2023b) for:
    - Modelled data for location risk, native vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DEECA 2023c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DEECA 2024a);
- The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017) and Atlas of Living Australia (ALA) (ALA 2020) for assistance with the distribution and identification of flora species;
- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DCCEEW 2024);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DEECA 2024c);
- The online VicPlan Map (DEECA 2023d) to ascertain current zoning and environmental overlays in the study area;
- Aerial photography of the study area; and
- Previous ecological assessments relevant to the study area; including;
    - Flora and Fauna Assessment (Mueck and Delaney 1996);
    - Yarra Valley Quarries Net Gain Offset Plan (Norris and Schoeffel 2010); and,
    - Vegetation Assessments (Norris 2018).

2.3 Flora Surveys

2.3.1 *Patches of Native Vegetation*

The current vegetation condition within the study area was assessed; the study area was walked, with all commonly observed vascular flora and fauna species recorded, significant records mapped and the overall condition of vegetation and habitats noted. Ecological Vegetation Classes (EVCs) were determined with reference to DEECA pre-1750 and extant EVC mapping (DEECA 2023a) and their published descriptions (DEECA 2023c).

Where native vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment (DSE) 2004).

2.3.2 *Targeted Flora*

Surveys for significant flora species were undertaken over several days (28 September, 29 September, 30 September, 16 November, 17 November 2020) (Table 3) to maximise the likelihood of detection of significant flora species identified as having the potential to occur within the study area. Each targeted survey was undertaken by a team of Botanists and involved systematically traversing all areas of habitat identified as being suitable for each species within the study area. Handheld GPS units were used to record the location of any significant species encountered.

This survey methodology is in accordance with the Commonwealth of Australia's *Survey Guidelines for Australia's Threatened Orchids* (Commonwealth of Australia 2013).

Table 3. Targeted flora survey effort

Survey date	Significant species or groups targeted	Botanists
28 September 2020	Orchids, herbs, shrubs	Two botanists
29 September 2020	Orchids, herbs, shrubs	Two botanists
30 September 2020	Orchids, herbs, shrubs	Two Botanists
16 November 2020	Orchids, herbs, shrubs, grasses	Two Botanists
17 November 2020	Orchids, herbs, shrubs, grasses	Two Botanists

2.3.3 *Large Trees*

Large trees in patches within the proposed extension area were previously recorded and mapped by another consultant (Norris 2018). Large tree mapping completed in 2018 was verified by two Botanists attending the site on 28, 29 and 30 September 2020, and 26 May 2022. The following method was adopted for verifying the accuracy of the previous large tree assessment. Two qualified Botanists walked a six-hectare sample area within the proposed extension area at 10 metre transects and recorded the large trees present. Accuracy of the previous large tree assessment was verified upon comparison to the sample area large tree mapping results.

2.4 Fauna Surveys

A range of survey techniques for terrestrial fauna were undertaken across spring 2020 (Table 4). A total of 13 days (26 person-days and more than 230 person-hours) of terrestrial fauna surveys were undertaken as part of the investigations:

- 12, 15 and 16 October 2020 (six person-days);
- Between 16 and 19 November 2020 (10 person-days);
- 26 November 2020 (two person-days);
- 23 December 2020 (two person-days);
- 14 January 2021 (two person-days);
- 18 August 2021 (two person-days);
- 2 September 2021 (two person-days); and,
- 16 and 26 March 2024 (four person days).

Table 4. Fauna survey techniques and total survey effort.

Survey technique	Significant species or groups targeted, or with potential to be detected using the technique	# Sites	Total survey effort
Habitat assessments and incidental observations of fauna	N/A	Entire survey area, with detailed assessments completed at each survey site	Duration of the survey period
Spotlighting	Significant owl, mammal, and reptile species listed in Table A3.2, Appendix 3.2	Spotlighting transects undertaken throughout the study area	Four nights of spotlighting across the study area (17, 18, 19, 26 November 2020)
Nocturnal call playback	Powerful Owl, Sooty Owl, Masked Owl	Six sites across the study area (CPB1-CPB6)	At least one call playback event completed at each survey site during each survey event
Infra-red remote camera trapping	Greater Glider, Leadbeater's Possum, Smoky Mouse, Spot-tailed Quoll, Brush-tailed Phascogale, Lace Monitor	Proposed extension area: 30 cameras comprising 6 arboreal camera sites, 10 ground camera sites. Potential offset areas: four cameras comprising one arboreal camera site and one ground camera site	At least 30 survey nights per camera
Active searching	Curve-tail Burrowing Crayfish	Active searching during transects in the study area	Duration of nocturnal survey transects

2.4.1 Ground-dwelling Mammals

Targeted surveys for ground-dwelling mammals were implemented using infra-red motion detector cameras. Surveys were undertaken in accordance with EPBC Act survey guidelines: *Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (SEWPAC 2011a).

Seven infra-red motion detector cameras were placed at key locations within the study area and remained in the field for a minimum of 30 nights across one survey period: 12 October to 17 November 2020. Cameras were positioned within suitable habitat with the focal points aimed at bait stations containing a mix of peanut butter, rolled oats, and honey, and sardines in the case of cameras targeting Spot-tailed Quolls.

Significant fauna species targeted by the above method included Smoky Mouse and Spot-tailed Quoll.

2.4.2 *Arboreal Mammals*

Targeted surveys for arboreal mammals were undertaken in accordance with DELWP survey guidelines *The Department of Environment, Land, Water & Planning Threatened Species Survey Standards: Leadbeater's Possum* (DELWP 2015). As per the survey guidelines, approximately four arboreal Reconyx infra-red cameras were setup per 3ha of potential habitat for Leadbeater's Possum, over a minimum of 30 nights across one survey period (i.e. from 15 October to 17 November 2020). The study area comprises 1939 regrowth forest. Cameras were therefore placed by a team of qualified Arborists approximately 15 metres above the forest floor, as per the survey guidelines (DELWP 2015) (Plate 1 and Plate 2). A total of 18 arboreal cameras were installed across six survey sites within the proposed extension area, as well as three arboreal cameras at one site in the potential offset area.

Spotlighting was undertaken over four separate nights (17, 18, 19, 26 November 2020) by qualified zoologists along transects through areas of suitable habitat. Surveys were conducted well after dark, at a time that Greater Gliders and other significant nocturnal fauna were likely to be active. Surveys also occurred in the first half of the night as little is known about when Greater Gliders return to their hollows before dawn.

Zoologists used "Olight" LED hand-held spotlights (up to 1020 lumens/8.4 volts) and traversed the spotlighting transects on foot to increase the detection of animals in closed or thick vegetation. As well as direct observation other signs of habitation were also noted, such as scratch marks on tree trunks or around hollows, audible calls or scats on the ground.

Significant fauna species targeted by the above method included the nationally significant Greater Glider and Leadbeater's Possum.

Plate 1. Arboreal camera trapping setup in the study area

Plate 2. Arboreal camera trapping setup in the study area

2.4.3 Owls

Surveys were undertaken in accordance with DELWP survey guidelines *The Department of Sustainability and Environment Approved Survey Standards: Masked Owl Tyto novaehollandiae, Powerful Owl Ninox strenua and Sooty Owl Tyto tenebricosa* (DSE 2011b; 2011c; 2011d).

The calls of each species were broadcast through a hand-held portable speaker to attract them to the survey site or to elicit a response. This was followed by listening and spotlighting in the immediate area to locate any owls attracted to the site. This technique relies on the fact that most species of owl are territorial and use calls as a method of defending their territory from individuals of their own species. Call-playback for owls was undertaken at six survey sites over four nights (17, 18, 19, 26 November 2020) in November to avoid the hottest summer months when Powerful Owl are less responsive to call playback. Survey methodology is outlined below:

- Nocturnal call playback surveys were conducted under clear and still weather conditions (avoiding windy, rainy conditions);
- Minimum survey effort requires call-playback at stations within woodland area having a 3km diameter (700 hectares). The study area comprises a total area of approximately 125 hectares, as such one call playback station was required. Nevertheless, additional call-play back was undertaken in areas of potentially suitable habitat for a range of species to maximise detection. Approximately 20 minutes of call-playback was undertaken at each station as follows:
    - 5 minutes initial passive listening;
    - 20 seconds call–playback;
    - 30 seconds silent listening for elicited response;

- 1 minute call-playback in different direction;
- 30 seconds listening for elicited response;
- 1 minute call-playback in different direction;
- 12 minutes silent listening.

Note: if a bird responded to call-playback, call-playback for that species was ceased to avoid disturbance;

- Owl calls were broadcast in the following sequence: Powerful Owl, Sooty Owl, Masked Owl.

2.4.4 Burrowing Crayfish

Zoologists conducted active searching for burrowing crayfish species during nocturnal transects across five nights (12 October and 17, 18, 19, 26 November 2020). Much of the study area is considered potential habitat for burrowing crayfish species, and active searching during transects ensured all potential habitat types (wet forested areas) were searched.

Active searching primarily targeted the FFG-listed Curve-tail Burrowing Crayfish.

2.5 Ure Creek Assessment

A zoologist and botanist undertook a baseline assessment of ecological values along two 400 metre stretches of Moora Creek and Ure Creek on 16 and 26 March 2024. The study areas were upstream and downstream of the proposed entry point for quarry water discharge into the creek and included areas within 10 metres of the creek line including the creek itself. During the assessment, ecologists collected baseline ecological values relating to both flora and fauna prior to changes in hydrology occurring following quarry expansion. An additional assessment is proposed once hydrological changes have occurred to determine any changes to ecological values along Ure Creek. This baseline assessment comprised vegetation mapping and fauna habitat assessments, including water quality testing, establishment of photopoints, and observations of habitat type and quality.

2.6 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

Under the *Planning and Environment Act 1987,* Clause 52.17 of the Yarra Ranges Planning Scheme requires a planning permit to remove, destroy or lop native vegetation. The assessment process for the clearing of vegetation follows the '*Guidelines for the removal, destruction or lopping of native vegetation*' (the Guidelines) (DELWP 2017). The '*Assessor's handbook: Applications to remove, destroy or lop native vegetation*' (Assessor's handbook) (DELWP 2018b) provides clarification regarding the application of the Guidelines (DELWP 2017). While a planning permit to remove native vegetation is not required under Clause 52.17 as extractive Industry is listed in the table of exemptions to the Clause, the proposed removal of native vegetation is captured under the *Mineral Resources (Sustainable Development) Act 1990* and therefore the Guidelines apply (DELWP 2017).

2.6.1 Assessment Pathway

The Guidelines manage the impacts on biodiversity from native vegetation removal using an assessment-based approach. Two factors – extent risk and location category – are used to determine the risk associated with an

application for a permit to remove native vegetation. The location category (1, 2 or 3) has been determined for all areas in Victoria and is available on DEECA's NVIM Tool (DEECA 2023b). Determination of assessment pathway is summarised in Table 5.

Table 5. Assessment pathways for applications to remove, destroy or lop native vegetation (DELWP 2017).

Extent		Location		
		1	2	3
Native Vegetation	Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
	Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
	0.5 hectares or more	Detailed	Detailed	Detailed

Notes: For the purpose of determining the assessment pathway of an application to remove native vegetation the extent includes any other native vegetation that was permitted to be removed on the same contiguous parcel of land with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before an application to remove native vegetation is lodged.

2.6.2 Vegetation Assessment

Native vegetation (as defined in Table 6) is assessed using two key parameters: extent (in hectares) and condition. For the purposes of this assessment, both condition and extent were determined as part of the habitat hectare assessment.

Table 6. Determination of a patch of native vegetation (DELWP 2017).

Category	Definition	Extent	Condition
Patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; OR An area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy; OR any mapped wetland included in the *Current Wetlands map*, available in DELWP systems and tools.	Measured in hectares. Based on hectare area of the native patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.
Scattered tree	A native canopy tree that does not form part of a native patch.	Measured in hectares. Each Large scattered tree is assigned an extent of 0.071 hectares (30m diameter). Each Small scattered tree is assigned a default extent of 0.031 hectares (10 metre diameter)	Scattered trees are assigned a default condition score of 0.2 (outside a patch).

Notes: Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'.

2.6.3 *Impact Avoidance and Minimisation*

All applications to remove native vegetation must demonstrate the three-step approach of avoid, minimise and offset. This is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to what is reasonably necessary, and that biodiversity is appropriately compensated for any native vegetation removal that is approved.

2.6.4 *Offsets*

Biodiversity offsets are required to compensate for the permitted removal of native vegetation. Offset obligations and offset site criteria are determined in accordance with the Guidelines (DELWP 2017) and are divided into two categories, being General Habitat Units and Species Habitat Units.

The offset requirements for native vegetation removal are calculated by DEECA and presented in a Native Vegetation Removal (NVR) Report, which are based on the vegetation condition scores determined during the biodiversity assessment.

2.7 Impact Assessment

The impact assessment has assessed the impacts of construction and operations of the project against the quality and extent of the ecological values recorded within or have the potential to be present within or adjacent to the project footprint. The impact assessment approach included:

- Determining the existing conditions by using the desktop assessments and field assessments to establish the likelihood of threatened species presence;
- Assessing impacts to native vegetation and significant species habitat with consideration of:
    - The extent and quality of indigenous vegetation that would be impacted during construction and the quantum of offsets that may be necessary;
    - The impact to threatened flora and fauna species;
    - Impacts to known and potential terrestrial fauna habitat terrestrial within the Assessment Area; and,
    - The construction and operation of the project.

2.7.1 *Native Vegetation*

Direct impacts have been assessed using the 'Disturbance Footprint' provided by Yarra Valley Quarries on 22 May 2022. Impacts to patches of native vegetation were determined by overlaying the project extraction footprint, the proposed plant equipment areas and proposed internal access roads against the mapped existing conditions and identifying any overlap.

All ecological values located within the impact areas, and immediately adjacent (where the disturbance footprint encroaches by 10% or greater into the Tree Protection Zone (TPZ) of a scattered tree or Large Tree in a patch) are assumed to be lost.

Within the extraction footprint and plant equipment area, all native vegetation was assumed as lost.

2.7.2 *Significant Flora, Fauna and Ecological Communities*

Significant impact assessments were completed for all listed species and ecological communities recorded or considered likely to occur within the Assessment Area and this is based on a combination of desktop analysis on previously documented species data and detailed on-site assessments. Therefore, there is a high level of confidence that the information that was used to undertake the impact assessment is sufficiently rigorous to undertake the impact assessment. The assessments were completed in accordance with the significant impact criteria specified in the *Matters of National Environmental Significance, Significant Impact Guidelines 1.1* (DoE 2013).

Whilst the significant impact assessment criteria have been developed for matters of NES, this assessment applies the criteria to all ecological communities and species of State significance, which have been recorded or are considered to have a moderate or high likelihood of occurring within the project footprint. To review the significance of impacts on State significant species, the criteria for species listed under the EPBC Act have been applied.

Under the Commonwealth Significant Impact Guidelines (DoE 2013), an important population is defined as:

- Populations identified as such within a Recovery Plan;
- A key source population either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or,
- Populations that are near the limit of the species range.

The results of the significant impact assessment (post-mitigation) are summarised in Section 6.1.

2.8 Assessment Qualifications and Limitations

This report has been written based on the quality and extent of the ecological values and habitat considered to be present or absent at the time of the desktop and/or field assessments being undertaken.

The 'snapshot' nature of a standard ecological assessment meant that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

Due to the large scale of the study area, only native vegetation and habitat within or adjacent to the impact area was surveyed. Therefore, if the impact area is adjusted additional vegetation surveys, and if required, targeted significant species surveys will be undertaken.

A comprehensive list of all terrestrial flora and fauna present within the study area was not undertaken as this was not the objective of the assessment. Rather a list of commonly observed species was recorded to inform the habitat hectare assessment and assist in determining the broader biodiversity values present within the study area.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of +/-5 metres. This level of accuracy is considered to provide an accurate assessment of the ecological values present within the study area; however, this data should not be used for detailed surveying purposes.

Fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd research permit (10008283) issued by DEECA under the *Wildlife Act 1975*.

Overall it is considered that the terrestrial flora and fauna data collected during the field assessment, habitat assessments, and information obtained from relevant sources (e.g. biological databases and relevant literature) provides an accurate assessment of the fauna species and habitat values within the study area to inform the EES and EPBC Act referrals (i.e. project assessment and approvals). However, due to the cryptic nature of many of the target species surveyed for, the precautionary principle has been applied when determining the likelihood of occurrence.

3 RESULTS

3.1 Flora

Most of the study area is covered by contiguous remnant native vegetation. Areas not supporting native vegetation included the existing Yarra Valley Quarry and cleared areas for residential dwellings and associated infrastructure. A list of all commonly observed flora species recorded during the field assessment are provided in Appendix 1.1.

3.1.1 Patches of Native Vegetation

Native vegetation in the study area is representative of three EVCs: Riparian Forest (EVC 18), Damp Forest (EVC 29) and Shrubby Foothill Forest (EVC 45). The presence of these EVCs is generally consistent with the modelled pre-1750s native vegetation mapping (DEECA 2023c). Specific details relating to observed EVCs are provided below.

Table 7. Extent of mapped vegetation type (EVC) and BCS within the surveyed area

Bioregion	EVC	BCS	Mapped Area (ha)
Highlands – Southern Fall	Riparian Forest (EVC 18)	Least Concern	2.14
	Shrubby Foothill Forest (EVC 45)	Least Concern	10.34
	Damp Forest (EVC 29)	Least Concern	12.94

The results of the habitat hectare assessment are provided in Appendix 1.2.

Riparian Forest

Riparian Forest occurred as a linear patch along the creekline that traverses the study area east to west towards the southern extent and was in a high-quality condition. The patch predominantly contained canopy species such as Messmate Stringybark *Eucalyptus obliqua,* a mid-layer containing Soft Tree-fern *Dicksonia Antarctica* and a diverse mixture shrubs and herbs, such as Hop Goodenia *Goodenia ovata,* Austral Bracken *Pteridium esculentum*, Kidney-weed *Dichondra repens*, Ivy-leaf Violet *Viola hederacea sensu Willis (1972)* and Forest Wire-grass *Tetrarrhena juncea,* in the ground layer (Plate 3; Plate 4) Areas of riparian forest were dominated by large thickets of sedges including Red-fruit Saw-sedge *Gahnia sieberiana*.

Plate 3. Good quality Riparian Forest along the creekline within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

Plate 4. Good quality Riparian Forest along the creekline within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

Damp Forest

Damp Forest was the dominant EVC present within the study area and was generally in a high-quality condition. This EVC supported an overstorey of Messmate Stringybark *Eucalyptus obliqua* and Mountain Grey-gum *Eucalyptus cypellocarpa* (Plate 5). The understorey contained specimens of Hazel Pomaderris *Pomaderris aspera,* Blanket-leaf *Bedfordia arborescens* and the midstorey and ground layer contained a diverse mixture of shrubs and herbs, including Common Cassinia *Cassinia aculeata,* Prickly Currant-bush *Coprosma quadrifida,* Common Bottle-daisy *Lagenophora stipitata,* Spiny-headed Mat-rush *Lomandra longifolia,* Austral Bracken, Common Maidenhair *Adiantum aethiopicum* and Wonga Vine *Pandorea pandorana* (Plate 6).

Plate 5. Good quality Damp Forest within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

Plate 6. Good quality Damp Forest within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

Shrubby Foothill Forest

Drier areas of Eucalypt forest, primarily on east facing ridgelines were floristically different from areas of surrounding Damp Forest EVC. While not included in DEECA 2005 EVC modelling (DEECA 2023c) the best fit EVC for these areas is Shrubby Foothill Forest.

This EVC supported an overstorey of Silvertop Ash *Eucalyptus sieberi* (Plate 7). The understorey contained specimens of Hop Goodenia *Goodenia ovata*, Common Correa *Correa reflexa* and the ground layer contained a diverse mixture of shrubs and herbs, including, Austral Bracken and Variable Sword-Sedge *Lepidosperma laterale* (Plate 8). Areas of Shrubby Foothill Forest were observed in high-moderate condition and several fauna trails and foraging activity were observed in this area during site assessment.

Plate 7. Shrubby Foothill Forest within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

Plate 8. Shrubby Foothill Forest within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

3.1.2 Large Trees in Patches

The study area contains 186 large trees. As outlined above, Large trees in patches within the proposed extension area were previously recorded and mapped by another consultant (Norris 2018). Large tree mapping completed in 2018 was verified by two Botanists attending the site on 28, 29 and 30 September 2020, and 26 May 2022. The following method was adopted for verifying the accuracy of the previous large tree assessment. Two qualified Botanists walked a six-hectare sample area within the proposed extension area at 10 metre transects and recorded the large trees present. Accuracy of the previous large tree assessment was verified upon comparison to the sample area large tree mapping results.

Plate 9. Large Tree in the Proposed Extension Area (Ecology and Heritage Partners Pty Ltd 23/12/2020).

Plate 10. Large Tree in the Proposed Extension Area (Ecology and Heritage Partners Pty Ltd 23/12/2020).

3.1.3 Introduced and Planted Vegetation

Areas not supporting native vegetation contained mostly bare ground or exotic grass species such as Couch-grass and were limited to the areas that have previously been cleared for residential purposes and the existing mine in the southern extent of the study area.

One noxious weed, as defined under the CaLP Act, were present within the study area, with Blackberry *Rubus fruticosus* spp. agg. was observed mainly located in the gullies and areas that sustain higher levels of moisture. Blackberry is also a Weed of National Significance (WoNS). Other introduced species included Arum Lily *Zantedeschia aethiopica*, Camellia *Camellia spp.,* English Ivy *Hedra Helix,* English Holly *Ilex aquifolium, and* Wild Oat *Avena fatua.*

Plate 11. An individual of Arum Lily along the creekline within the study area (Ecology and Heritage Partners Pty Ltd 30/09/2020).

Plate 12. Emergent specimens of English Holly within the study area. (Ecology and Heritage Partners Pty Ltd 30/09/2020).

3.2 Ure Creek Assessment

3.2.1 Flora

Contiguous native vegetation was recorded along the northern and southern Ure Creek section (Figure 8). The vegetation along the northern and southern sections of the creek were generally consistent in that they supported high quality native vegetation (i.e. floristically and structurally diverse) (Figure 8). However, the southern portion dissected several properties and was comparatively more disturbed due to the presence of several river crossings and managed lawns, driveways, housing and sheds adjoining the creek.

Fifty-two flora species were observed within the study area, including 42 indigenous and 10 non-indigenous species. A list of all flora species recorded during the field assessment is provided below (Appendix 1.1). Specific details relating to observed EVCs are provided below.

Patches of Native Vegetation

Native vegetation in the study area is representative of one EVC: Riparian Forest (EVC 18). The presence of this EVC is generally consistent with the modelled extent (2005) native vegetation mapping (DEECA 2024a).

Riparian Forest EVC

Riparian Forest is characterised by a tall eucalypt tree layer to 30-metres tall, which occurs along riverbanks and associated alluvial terraces. It occasionally occurs in the heads of gullies leading to creeks and rivers and contains an open to sparse secondary layer of wattles, scattered dense patches of shrubs, ferns, grasses and herbs.

Riparian Forest occurred along the northern, Moora Creek (Plate 15 and Plate 16) and southern, Ure Creek (Plate 13 and Plate 14) (Figure 2). It predominantly comprised a canopy layer containing Mountain Grey-gum *Eucalyptus cypellocarpa* and Messmate Stringybark *Eucalyptus obliqua.* The mid-storey comprised a dense

cover of Kunzea *Kunzea spp.,* Rough Tree-fern *Cyathea australis,* Hazel Pomaderris *Pomaderris aspera,* Prickly Currant-bush *Coprosma quadrifida,* Wonga Vine *Pandorea pandorana subsp. pandorana,* and Silver Wattle *Acacia dealbata*. The ground layer contained Hop Goodenia Goodenia ovata, Mother Shield-fern *Polystichum proliferum* Fishbone Water-fern *Blechnum nudum,* Bat's Wing Fern *Histiopteris incisa,* Snowy Daisy-bush *Olearia lirata,* Tall Sword-sedge *Lepidosperma elatius,* Variable Sword-sedge *Lepidosperma laterale,* Austral Bracken *Pteridium esculentum,* Yellow Wood-sorrel *Oxalis corniculata s.l.,* Australina pusilla *Shade Nettle,* Weeping Grass *Microlaena stipoides var. stipoides,* Forest Clematis, *Clematis glycinoides,* Forest Wire-grass *Tetrarrhena juncea*, among others.

Plate 13. High quality Riparian Forest (RF2 on Figure 8) along Ure Creek, containing Tree Ferns, Kunzea, Wonga Vine and Tall Sword-sedge (Ecology and Heritage Partners Pty Ltd 26/03/2024).

Plate 15. High quality Riparian Forest (RF1 on Figure 8) along Moora Creek, containing Tree Ferns (Ecology and Heritage Partners Pty Ltd 13/03/2024).

Plate 14. A patch of Riparian Forest (RF2 on Figure 8) along Ure Creek, containing Tree Ferns, Mountain Grey-gum and Tall Sword-sedge (Ecology and Heritage Partners Pty Ltd 26/03/2024).

Plate 16. A patch of Riparian Forest (RF1 on Figure 8) along Moora Creek, containing Water Fern and Tree Ferns (Ecology and Heritage Partners Pty Ltd 13/03/2024).

Large Trees

Large Trees were present in Riparian Woodland patches, adjacent to both Moora Creek and Ure Creek. Most of these specimens comprised Mountain Grey-gum and Messmate Stringybark (Plate 17; Plate 18)

Plate 17. One Large Tree (Mountain Grey-gum) in RF1 along Moora Creek (Ecology and Heritage Partners Pty Ltd 13/03/2024).

Plate 18. One Large Tree (Mountain Grey-gum) in RF2 along Ure Creek (Ecology and Heritage Partners Pty Ltd 26/03/2024).

Introduced and Planted Vegetation

Native vegetation predominantly covered both Moora Creek and Ure Creek; however, scattered occurrences of exotic grass species and environmental weeds were present, predominantly in previously disturbed access tracks or managed lawns.

Along Moora creek previously disturbed areas (i.e. vehicle access tracks) (Plate 19) were the only areas that contained environmental weeds, including Ragwort *Jacobaea vulgaris,* Spear Thistle *Cirsium vulgare,* Couch Grass *Cynodon dactylon* and Flatweed *Hypochaeris radicata.*

Ure Creek dissected several residential properties which contained managed lawns and several river crossing. Environmental weeds occurred in higher abundance due to the increased levels of disturbance, including Couch Grass, Spear Thistle, Self-heal *Prunella vulgaris,* Blackberry *Rubus fruticosus spp. agg.,* Flatweed, Elkhorn Fern *Platycerium bifurcatum* (Plate 20) and Wandering Jew *Tradescantia fluminensis.*

Noxious weeds, as defined under the *Catchment and Land Protection Act 1994* (CaLP Act), were present within the study area, with Blackberry and Spear Thistle present in limited numbers. Blackberry is also a Weed of National Significance (WoNS).

Plate 19. Previously disturbed river crossing along Moora Creek, containing scattered specimens of Spear Thistle and Couch Grass (Ecology and Heritage Partners Pty Ltd 13/03/2024).

Plate 20. Elkhorn Fern present along Ure Creek (Ecology and Heritage Partners Pty Ltd 26/03/2024).

Water Quality

In situ water quality was collected at several sites along the Ure and Moora Creek study areas, which showed water quality was within the normal band for upper catchment riverine waterways, and included the following parameters:

- Water temperature;
- pH;
- Electrical conductivity;
- Dissolved oxygen; and
- Turbidity.

Table 8. In situ water quality testing results.

Site	Date	pH (pH units)	Dissolved Oxygen mg/L	Electrical Conductivity (mS/cm)	Total dissolved solids g/L	Temp °C
Moora Creek s1	13/03/2024	7.65	8.22	0.108	0	15.18
Moora Creek s2	13/03/2024	6.92	8.65	0.102	0.066	14.93
Moora Creek s3	13/03/2024	n/a	n/a	n/a	n/a	n/a
Moora Creek s4	13/03/2024	7.44	8.86	0.102	0.066	14.82
Moora Creek s5	13/03/2024	7.54	9.33	0.107	0.07	14.74
Moora Creek s6	13/03/2024	7.46	9	0.102	0.066	14.67
Ure Creek s1	26/03/2024	7.02	9.18	0.113	0.074	13.73

Site	Date	pH (pH units)	Dissolved Oxygen mg/L	Electrical Conductivity (mS/cm)	Total dissolved solids g/L	Temp °C
Ure Creek s2	26/03/2024	6.61	7.48	0.114	0.074	13.88
Ure Creek s3	26/03/2024	7.02	11.72	0.113	0.073	13.62
Ure Creek s4	26/03/2024	7.09	9	0.113	0.073	13.76
Ure Creek s5	26/03/2024	6.98	7.68	0.108	0.07	13.85
Ure Creek s6	26/03/2024	6.93	8.13	0.114	0.074	13.82

3.2.2 Fauna

High-quality riparian habitat was present along much of the northern and southern study areas. Flowing water was present along the extent of the creekline at the time of survey, with some stagnant pools recorded in the southern section. A significant cover of leaf litter, woody debris and loose rocks was present along the creekline and embankment, which is likely to support a high diversity of aquatic invertebrates. Although no fish were observed within instream habitat, numerous Burrowing Crayfish burrows were present along the full extent of both northern and southern study areas (Plate 21).

Minimal disturbance was present overall; however evidence of pig pugging was recorded in the northern study area while human disturbance in the form of driveways, river crossings, concrete pipes and partially buried hosing was interspersed in the southern study area. Some fringing, and to a lesser degree emergent, aquatic vegetation was present intermittently along both creek sections, including in streamside pools likely to support a range of common frog species (Plate 22).

Plate 21. Burrowing Crayfish burrow along Moora Creek, (Ecology and Heritage Partners Pty Ltd 13/03/2024).

Plate 22. Streamside Pools provided suitable amphibian habitat along Ure Creek (Ecology and Heritage Partners Pty Ltd 26/03/2024).

3.3 Fauna

3.3.1 Habitat

The study area covers approximately 125 hectares of predominantly eucalypt forest, comprising approximately 24 hectares in the proposed extension area and an additional 101 hectares in the potential offset areas. Much of the study area comprises 40 to 50-year-old eucalypt forest, most likely affected by historical logging operations. The 1939 bushfires were the last major fire to impact the study area (CeRDI 2021).

There are some patches of intact older-growth forest – largely confined to the gullied areas – that provide greater nesting, protective habitat and dispersal opportunities for fauna. In these areas, middle storey species such as large tree-ferns are more common, and a greater proportion of large hollow-bearing trees remain. There is significant habitat connectivity between the study area and Mount Toolebewong State Forest, which is directly adjacent to the study area along the northern and western boundaries. Several gullies and riparian habitats are likely to act as important dispersal corridors for native fauna moving between the study area and Mount Toolebewong State Forest.

The existing Dandy Premix Quarry is adjacent to the study area on the southern and eastern borders of the proposed extension area. This interface zone is likely to be subject to edge-effects, such as noise pollution and erosion among other impacts. Edge-effects have likely reduced the quality of habitat in these interface zones for native fauna.

The proposed extension area and potential offset areas currently provide habitat for fauna that prefer closed eucalypt forest and riparian forest. Detail on habitat relating to specific species recorded in the study area during field assessments is provided below (Section 3.3.2).

3.3.2 Fauna surveys

Incidental observations of fauna were recorded during field assessments (Appendix 2.2). Species included Gang-gang Cockatoo *Callocephalon fimbriatum* (listing upgraded to Endangered under the EPBC Act on 2nd March 2022), Crimson Rosella *Platycercus elegans,* Rose Robin *Petroica rosea,* Laughing Kookaburra *Dacelo novaeguineae*, and Tiger Snake *Notechis scutatus.* Camera trapping during October-November 2020 (Table 9 and Table 10) recorded a variety of common arboreal and ground-dwelling species including Swamp Wallaby *Wallabia bicolor*, Short-beaked Echidna *Tachyglossus aculeatus* (Plate 26), Common Wombat *Vombatus ursinus* and Common Brushtail Possum *Trichosurus vulpecula.* Several common arboreal mammals were detected during spotlighting over November 2020, including Ringtail Possum *Pseudocheirus peregrinus*. The FFG-Act listed Dingo *Canis lupus dingo* was also recorded within the proposed extraction area, with characteristic white paws and tail tip, as well as black lips and nose (Table 9; Plate 24).

Evidence of Burrowing Crayfish *Engaeus sp.* was present throughout the study area, and most prevalent near watercourses (Plate 23; Plate 25). Burrowing Crayfish holes and their characteristic mounds were recorded in the proposed extension and the surrounding potential offset areas. Based on the known distribution of Burrowing Crayfish species, it is likely the holes belong to one of three species: State significant Curve-tail Burrowing Crayfish, Central Highlands Burrowing Crayfish *Engaeus affinis* or Tubercle Burrowing Crayfish *Engaeus tuberculatus* (DEECA 2024a). Burrowing Crayfish in the study area were not able to be identified to

species level as this would require direct observation of the species, which typically requires the use of tunnel tube traps.

Plate 24. State significant Dingo recorded within the proposed extraction area (Ecology and Heritage Partners Pty Ltd 17/10/2020).

Plate 26. Short-beaked Echidna recorded within the proposed extraction area (Ecology and Heritage Partners Pty Ltd 15/11/2020).

Plate 23. Burrowing Crayfish holes and characteristic mounds in the study area (Ecology and Heritage Partners Pty Ltd 15/01/2021).

Plate 25. Burrowing Crayfish holes and characteristic mounds in the study area (Ecology and Heritage Partners Pty Ltd 15/01/2021).

Table 9. Remote camera survey results (native mammals and reptiles) (October – November 2020).

Site ID	Swamp Wallaby	Agile Antechinus	Short-beaked Echidna	Bare-nosed Wombat	Common Brushtail Possum	Mountain Brushtail Possum	Lace Monitor	Bush Rat	Sugar Glider	Common Ringtail Possum	Dingo
H1	✓	✓	✓	✓	✓						
H4						✓					
H7							✓				
H8								✓			
H9									✓		
H19								✓			
R02								✓		✓	
R19										✓	
H12											✓

Note: Introduced species not included.

Table 10. Remote camera survey surveys (birds) (October – November 2020).

Site ID	Brown Thornbill	Superb Lyrebird	Eastern Whipbird	Grey Shrike Thrush	Eastern Yellow Robin	Bassian Thrush	Grey Currawong	Australian Wood Duck	White-browed Scrubwren	Crimson Rosella
H1	✓	✓	✓							
H2				✓	✓					
H5						✓				
H7							✓	✓		
H8									✓	
R36										✓

Note: Introduced species not included.

Southern Greater Glider *Petauroides volans*

Southern Greater Glider primarily feeds on the young leaves and flower buds of eucalypt species as they have a higher moisture content and lower fibre than mature leaves. Preference is shown for several species of *Eucalyptus* and *Corymbia* species and vary according to the location. Presence of large, old hollow-bearing trees is critical for determining presence of Southern Greater Gliders.

Two Southern Greater Gliders were detected within the proposed extension area during spotlighting surveys, and a further four Southern Greater Gliders were detected in the western potential offset area. The species were recorded on the 17 and 19 of November 2020 and observed sitting in canopy tree species (eucalypts) (Figure 6).

Southern Greater Gliders were detected in higher numbers in the potential offset areas compared to the proposed extension area. While the entire study area provides suitable habitat for Southern Greater Glider (Plate 27), habitat quality for the species is comparatively higher in the potential offset areas, due largely to

the greater density of hollow-bearing trees and absence of edge-effects likely to be present in the proposed extension area (Plate 28).

Plate 27. Large Hollow-bearing Tree suitable for Southern Greater Glider nesting in the Proposed Extension Area (Ecology and Heritage Partners Pty Ltd 23/12/2020).

Plate 28. Large Hollow-bearing Tree suitable for Southern Greater Glider nesting in the Potential Offset Area (Ecology and Heritage Partners Pty Ltd 14/01/2021).

Lace Monitor *Varanus varius*

One State significant Lace Monitor was detected on a ground remote camera, during the camera trapping survey event (Plate 29). The species was detected in the western extent of the proposed extension area on 10 November 2020. Termite mounds within the study area showed evidence of use by Lace Monitor for breeding (Plate 30). Lace Monitor are known to use termite mounds for egg laying, with the mound acting as an incubator.

Plate 29. Lace Monitor moving through the camera frame within proposed extension area (Ecology and Heritage Partners Pty Ltd 10/11/2020).

Plate 30. Termite mound likely to have been used by Lace Monitor for breeding (Ecology and Heritage Partners Pty Ltd 15/01/2021).

Powerful Owl *Ninox strenua*

Within Victoria, Powerful Owl mostly occurs to the south of the 36°30' line of latitude. This is the largest owl species in Australia. It prefers tall open sclerophyll forest and woodlands, requiring large, hollow-bearing eucalypts for breeding. The Powerful Owl prefers areas with dense scrub nearby but has been recorded in a variety of wooded habitats. It prefers large tracts of continuous forest but will sometimes occur in more fragmented landscapes or near permanent streams dominated by Mountain Grey Gum *Eucalyptus cypellocarpa* and other eucalypts. It is occasionally recorded in parklands and adjoining suburban areas, but rarely, if ever, breed in these areas (Higgins 1999).

One Powerful Owl adult was detected within the proposed extension area during call playback surveys on 18 November 2020. A further two juvenile Powerful Owls were observed and heard calling in the western potential offset area during spotlighting transects on two occasions (19 and 26 November 2020), while a further one adult was detected in the western potential offset area (18 August 2021) (Figure 6 and Plate 31). The adult Powerful Owl in the proposed extension area was observed sitting in a canopy tree and is likely to have flown in following call playback projection. The two juvenile Powerful Owls were observed on both occasions to be moving frequently between trees in the southern extent of the western potential offset area.

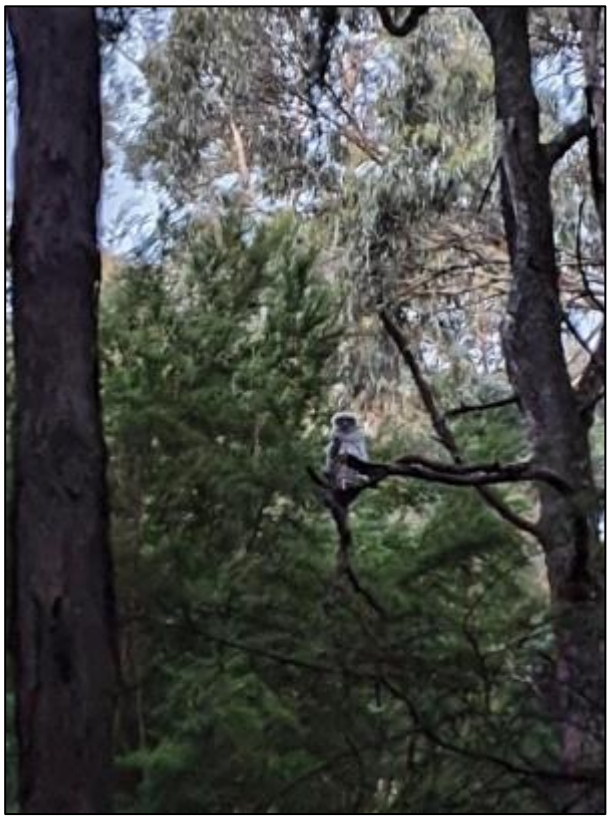

Plate 31. Juvenile Powerful Owl detected in potential offset area (Ecology and Heritage Partners Pty Ltd 26/11/2020).

Plate 32. Large hollow-bearing tree in proximity to Powerful Owl in the potential offset area (Ecology and Heritage Partners Pty Ltd 14/01/2021).

While a breeding pair of Powerful Owls are likely to have nested in the vicinity of the study area, there is no evidence of a Powerful Owl nest tree in the proposed extension area. This was confirmed during a field assessment in the proposed extension area on 23 December 2020. The assessment confirmed the presence of 20 hollow-bearing trees in the proposed extension area that may be suitable for Powerful Owl nesting (Plate 34). However, based on hollow-bearing tree mapping in the potential offset areas, the relative importance of Powerful Owl breeding habitat in the proposed extension area is likely to be comparatively lower than the surrounding Mt Toolebewong Forest. In the potential offset area to the north (similar in size to the proposed extension area), 74 hollow-bearing trees that may be suitable for Powerful Owl nesting were recorded (Figure 15; Plate 33).

An additional Powerful Owl nest search was conducted on 18 August and 2 September 2021, and was timed to coincide with the breeding season, prior to the known fledging period, in line with Powerful Owl survey guidelines (DSE 2011c). The search included a call-playback survey (18 August) and pre-dawn survey for Powerful Owl (2 September), which involved 30-minutes of listening for Powerful Owl calls in several locations within the western potential offset area, immediately before dawn when the species is likely to have just returned to the nest from hunting. This survey method is designed to allow the owl's calls to reveal its nest location. The western potential offset area was also searched for evidence of current or historical Powerful Owl nesting sites (e.g. presence of white-wash, pellets, discarded prey, etc.), focussing on areas containing the greatest proportion of hollow-bearing trees – such as gullies. All suitable habitat in the western potential offset area was searched. Numerous suitable hollow-bearing eucalypts were recorded during the searches, however none showed evidence of Powerful Owl nesting.

The greater proportion of hollow-bearing trees outside the proposed extension area may be due to land-use factors such as historical logging operations. While there may be a very small number of missed or unrecorded hollow-bearing trees in the areas surveyed, we have a high-level of confidence that the hollow-bearing tree survey results accurately represent the difference in habitat quality between the potential extension area and proposed offset areas. The proposed offset areas to the east were not surveyed for hollow-bearing trees, as the proposed offset areas were considered comparable. Further surveys were unnecessary as the previous consultant report identified a similar LOT count per hectare, and forest age and structure between proposed offset areas (Norris 2018).

Powerful Owls typically have a home range of between 1,000 and 5,000 hectares (Soderquist and Gibbons 2007). In this context, it is likely the local Powerful Owl breeding pair and juveniles utilise the entire surrounding landscape, including the proposed extension area for foraging and roosting activities.

Plate 33. Large hollow-bearing tree and potential nest site in the potential offset area (Ecology and Heritage Partners Pty Ltd 14/01/2021).

Plate 34. Large hollow-bearing tree and potential nesting habitat in the proposed extension area (Ecology and Heritage Partners Pty Ltd 23/12/2020).

3.4 Significance Assessment

Matters of National Environmental Significance (NES) are listed and protected under the EPBC Act. State significant species and communities are protected under the FFG Act. Matters of NES and state significance relating to biodiversity are discussed below in relation to the project based on the results of the PMST (DoEE 2020), desktop review of literature, and the results of field surveys.

3.4.1 Flora

One nationally significant and 42 State significant flora species have been previously recorded within 10 kilometres of the study area (DEECA 2024a) (Figure 3). The PMST nominated an additional 13 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2024) (Figure 3; Appendix 1.4).

Targeted surveys for State and nationally significant flora species with a moderate to high likelihood of occurrence within the study area were undertaken across the proposed extraction areas. The following species were targeted: Clover Glycene *Glycine latrobeana*, Maroon Leek-orchid *Prasophyllum frenchii*, Green-striped Greenhood *Pterostylis chlorogramma*, Round-leaf Pomaderris *Pomaderris vacciniifolia*, Matted Flax-lily *Dianella amoena* (EPBC Act), Purple Eyebright *Euphrasia collina* subsp. *Muelleri*, River Swamp Wallaby-grass *Amphibromus fluitans* and additional FFG listed flora that may occur in the study area. However, no national or State significant flora were recorded during the site surveys and based on the result of the detailed surveys there is a low likelihood that any significant flora species are present within the proposed extraction area.

3.4.2 Fauna

Twenty-one nationally significant and 37 State significant fauna species have been previously recorded within 10 kilometres of the study area (DEECA 2024a) (Figure 4). The PMST nominated an additional 19 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2024) (Figure 4; Appendix 2.1).

Of these species, Southern Greater Glider (listed as Endangered under the EPBC Act), Gang-gang Cockatoo (listed as Endangered under the EPBC Act), Powerful Owl (Vulnerable under the FFG Act), Dingo (Vulnerable under the FFG Act) and Lace Monitor (Endangered under the FFG Act) were recorded in the study area during surveys. Additionally, there is suitable habitat within the study area for the nationally significant Brown Treecreeper, Yellow-bellied Glider, Pilotbird, and Leadbeater's Possum, as well as the State significant Platypus, Curve-tail Burrowing Crayfish, Sooty Owl, and Southern Toadlet. However, several of these species were investigated, and not detected, during targeted surveys and are therefore considered unlikely to occupy the study area. Targeted surveys have not yet been undertaken for the State significant Platypus, Curve-tailed Burrowing Crayfish, and Southern Toadlet.

The likelihood of any additional nationally significant fauna occurring within or adjacent to the impact area is considered low due to the absence of suitable habitat and/or lack of records in proximity (Appendix 2.1).

Southern Greater Glider (EPBC Act-listed)

Two Southern Greater Gliders were detected within the proposed extension area during spotlighting surveys, while a further four Greater Gliders were detected in the western potential offset area. The species were recorded on the 17 and 19 of November 2020 and observed sitting in canopy tree species (eucalypts) (Figure 6).

Gang-gang Cockatoo (EPBC Act-listed)

Gang-gang Cockatoo was detected during diurnal habitat surveys in the proposed extension area. Two individuals were observed foraging in canopy tree species and moving across the study area.

Powerful Owl (FFG Act-listed)

One Powerful Owl adult was detected within the proposed extension area during call playback surveys on 18 November 2020. A further two juvenile Powerful Owls were observed and heard calling in the western potential offset area during spotlighting transects on two occasions (November 19 and 26 2020) (Figure 6). The adult Powerful Owl was observed sitting in a canopy tree and is likely to have flown in following call playback projection. The two juvenile Powerful Owls were observed on both occasions to be moving frequently between trees in the southern extent of the western potential offset area.

Lace Monitor (FFG Act-listed)

One Lace Monitor was detected on a ground remote camera, during the camera trapping survey event. The species was detected in the western extent of the proposed extension area on 10 November 2020. Evidence of breeding habitat was recorded in the form of termite mounds within the study area.

Dingo (FFG Act-listed)

One Dingo was detected on a ground remote camera, during the camera trapping survey event. The species was detected in the eastern extent of the proposed extension area on 17 October 2020.

Table 11. Significant fauna with the highest likelihood of occurrence.

Species	Listing	Suitable habitat within the Project Site	Closest VBA records	Presence within study area
Southern Greater Glider	Endangered (EPBC Act)	Large hollow-bearing trees suitable for nesting are present. Foraging opportunities available including young leaves and nectar from Eucalyptus and Corymbia species	104 records within 10km of study area. Most recently recorded in 2021	Recorded during targeted surveys
Gang-gang Cockatoo	Endangered (EPBC Act)	Potential foraging and roosting opportunities present in the form of large tree hollows	184 records within 10km of study area. Most recently recorded in 2020	Recorded incidentally
Brown Treecreeper	Vulnerable (EPBC Act)	Some open eucalypt forest and suitable nesting hollows present	5 records within 10km of study area. Most recently recorded in 2019	Not recorded during surveys
Yellow-bellied Glider	Vulnerable (EPBC Act)	Large hollow-bearing trees suitable for nesting are present. Foraging opportunities available including sap and nectar	78 records within 10km of study area. Most recently recorded in 2020	Not recorded during targeted camera trapping and spotlighting
Pilotbird	Vulnerable (EPBC Act)	Habitat present in the form of thick understorey, particularly along preferred foraging areas such as gullies and riparian corridors	26 records within 10km of study area. Most recently recorded in 2019	Not recorded during surveys
Leadbeater's Possum	Critically Endangered (EPBC Act)	Large hollow-bearing trees suitable for nesting and adequate middle-storey acacia species to enable dispersal are present. Foraging opportunities available including lerp and sap	26 records within 10km of study area. Most recently recorded in 2021	Not recorded during targeted camera trapping and spotlighting

Species	Listing	Suitable habitat within the Project Site	Closest VBA records	Presence within study area
Powerful Owl	Vulnerable (FFG Act)	Suitable large tree hollow nesting and foraging opportunities in study area	63 records within 10km of study area. Most recently recorded in 2022	Recorded during targeted surveys
Lace Monitor	Endangered (FFG Act)	Suitable habitat in the form of large tree hollows, gullied and forested areas	24 records within 10km of study area. Most recently recorded in 2019	Recorded during targeted surveys
Dingo	Vulnerable (FFG Act)	Suitable forested habitat	1 record within 10km of study area. Most recently recorded in 2015	Recorded during camera trapping surveys
Platypus	Vulnerable (FFG Act)	High-quality vegetated, permanent streams (Ure Creek) present	82 records within 10km of study area. Most recently recorded in 2021	No targeted surveys undertaken
Curve-tailed Burrowing Crayfish	Endangered (FFG Act)	Evidence of Burrowing Crayfish was present throughout the study area, and most prevalent near watercourses	n/a	No targeted surveys undertaken
Sooty Owl	Endangered (FFG Act)	Suitable large tree hollow nesting and foraging opportunities in study area	38 records within 10km of study area. Most recently recorded in 2020	Not recorded during targeted spotlighting surveys
Southern Toadlet	Endangered (FFG Act)	Some suitable habitat in the form of forested areas containing ephemeral drainage lines and gullies	31 records within 10km of study area. Most recently recorded in 1978	No targeted surveys undertaken

3.4.3 Ecological Communities

One nationally listed ecological community – Alpine Sphagnum Bogs and Associated Fens – is predicted to occur within 10 kilometres of the study area (DCCEEW 2024). However, vegetation within the study area did not meet the condition thresholds that define any national or State-significant communities due to the absence of key indicator species.

3.5 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

The below clearing scenario is based on the proposed quarry extension size and access requirements. It is understood that the proposed extension area and impact footprint includes a two metres buffer around all works to compensate for any unintended impacts during construction.

3.5.1 Vegetation proposed to be removed

The study area is within Location 1, with 25.558 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Detailed Assessment Pathway (Table 12).

Condition scores for vegetation proposed to be removed are provided in Appendix 1.2.

Table 12. Removal of Native Vegetation (the Guidelines) (DELWP 2017).

Assessment pathway	Detailed
Location Category	1
Total extent (past and proposed) (ha)	25.558
Extent of past removal (ha)	0.00
Extent of proposed removal (ha)	25.558
Large Trees (scattered and in patches) to be removed (no.)	186
EVC Conservation Status of vegetation to be removed	Least Concern

3.5.2 Offset Targets

The offset requirement for native vegetation removal is Species Habitat Units for seven separate species (Brickmaker's Sedge, Round-leaf Pomaderris, Long Pink-bells, Mountain Bird-orchid, Silky Golden-tip, Green Scentbark and Powelltown Correa) and 186 Large Trees.

A summary of proposed vegetation losses and associated offset requirements is presented in Table 13 and the Native Vegetation Removal (NVR) report is presented in Appendix 3.

Table 13. Offset Targets.

General Habitat Units Required	0
Species Habitat Units Required	34.580 species units of habitat for Brickmaker's Sedge *Gahnia grandis*
	34.765 species units of habitat for Round-leaf Pomaderris *Pomaderris vacciniifolia*
	34.765 species units of habitat for Long Pink-bells *Tetratheca stenocarpa*
	28.074 species units of habitat for Mountain Bird-orchid *Chilogolottis jeanesii*
	34.765 species units of habitat for Silky Golden-tip, *Goodia pubescens*
	34.765 species units of habitat for Green Scentbark *Eucalyptus fulens*
	34.765 species units of habitat for Powelltown Correa *Correa reflexa* var. *lobata*
Large Trees	186
Vicinity (catchment/council)	Melbourne Water CMA / Yarra Ranges Shire Council
Minimum Strategic Biodiversity Value*	N/A

*The minimum Strategic Biodiversity Value is 80% of the weighted average score across habitat zones where a General offset is required.

3.5.3 Offset Impacts and Strategy

The proponent proposes to secure approximately 101 hectares of remnant vegetation adjacent to the development area to satisfy offset requirements for the project, including the Species Habitat Units outlined in Table 13 and below (Appendix 3) and the Large Trees. Offset sites must be protected in perpetuity with an on-title security agreement. A first-party offset security agreement via a Section 69 under the *Conservation, Forests and Lands Act 1987* is proposed to be established on the land parcel directly to the west of the proposed extraction area.

4 IMPACT ASSESSMENT

4.1 Threatening Processes

The project has the potential to exacerbate several threatening processed that are recognised under the EPBC Act and FFG Act. These are summarised below (Table 14).

The potential risks and impacts outlined in Table 15 as a result of threatening processes listed under the FFG Act and EPBC Act are addressed in the mitigation measures (Table 17):

Table 14. Threatening processes listed under the FFG Act and EPBC Act relevant to the Project Area

Threatening Processes	
EPBC Act	**FFG Act**
Alteration to the natural flow regimes of rivers and streams.	
Degradation of native riparian vegetation along Victorian rivers and streams.	
Habitat fragmentation as a threatening process for fauna in Victoria.	Land clearance
Increase in sediment input into Victorian rivers and streams due to human activities.	
Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis.	Dieback caused by the root-rot fungus *(Phytophthora cinnamomi*)
	Infection of amphibians with chytrid fungus resulting in chytridiomycosis
Input of toxic substances into Victorian rivers and streams.	
Invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg.	
Invasion of native vegetation by 'environmental weeds'.	
Loss of coarse woody debris from Victorian native forests and woodlands.	
Loss of hollow-bearing trees from Victorian native forests.	
Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases.	Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases
Predation of native wildlife by the cat, *Felis catus*.	Predation by feral cats
Predation of native wildlife by the introduced Red Fox *Vulpes vulpes*.	Predation by European red fox
Prevention of passage of aquatic biota as a result of the presence of instream structures.	
Reduction in biodiversity resulting from Noisy Miner (*Manorina melanocephala*) populations in Victoria.	Aggressive exclusion of birds from potential woodland and forest habitat by over-abundant noisy miners (*Manorina melanocephala*)
Reduction in biomass and biodiversity of native vegetation through grazing by the Rabbit *Oryctolagus cuniculus*.	Competition and land degradation by rabbits
Removal of wood debris from Victorian streams.	
Use of Phytophthora-infected gravel in construction of roads, bridges and reservoirs.	

Threatening Processes	
EPBC Act	**FFG Act**
Wetland loss and degradation because of change in water regime, dredging, draining, filling and grazing	
	Fire regimes that cause declines in biodiversity

4.2 Potential Impacts

The construction and operational phases of the project involve activities and associated processes that will, or have the potential to, lead to the loss, reduction or reduced viability of ecological values within the Assessment Area and project locality. The impact assessment identifies the potential impacts associated with the project, including the loss and/or degradation of terrestrial species and habitats.

The correlation of project activities with key threatening processes, and the potential impacts outlined above are summarised below (Table 15). All activities linked to key threatening processes will extend across the construction and operational phases of the project.

Table 15. Project activities, key risks and likely / potential impacts.

Activity	Project stage	Key ecological risks	Impacts
Land clearing associated with infrastructure development and mining	Construction and Operation	Vegetation removal Habitat fragmentation and edge effects Loss of hollow-bearing trees Loss of significant flora / fauna interruptions/impacts to breeding behaviour and/or habitat Proliferation of weed and pest species	Loss and/or degradation of terrestrial species Loss and/or degradation of terrestrial habitat Loss and/or degradation of ecological communities
Development of roads and powerlines associated with infrastructure development and mining	Construction and Operation	Vegetation removal Habitat fragmentation and edge effects Direct fauna mortality	Loss and/or degradation of terrestrial species Loss and/or degradation of terrestrial habitat Loss and/or degradation of ecological communities
Disturbance to waterbodies associated with infrastructure development and mining	Construction and Operation	Vegetation removal Habitat fragmentation Direct fauna mortality Loss and degradation of aquatic habitat Loss and degradation of GDEs	Loss and/or degradation of wetland dependant species Loss and/or degradation of wetland habitats Loss and/or degradation of ecological communities
Use of vehicles and machinery associated with infrastructure development and mining	Construction and Operation	Vegetation removal Noise, dust and light Proliferation of weed and pest species	Loss and/or degradation of terrestrial habitat Loss and/or degradation of ecological communities

Activity	Project stage	Key ecological risks	Impacts
Increased human activity associated with infrastructure development and mining	Construction and Operation	Vegetation removal Noise, dust and light. Proliferation of weed and pest species	Loss and/or degradation of terrestrial habitat Loss and/or degradation of ecological communities

The following sections detail the known and potential impacts on ecological values associated with each key threatening process.

4.3 Direct Impacts

4.3.1 Vegetation Removal and Habitat Loss

The following assessment is based on the extent of impacts to native vegetation within the 'Disturbance Footprint' provided by Yarra Valley Quarries on 2 May 2022 (Table 16).

All ecological values located within the impact areas, and immediately adjacent (where the disturbance footprint encroaches by 10% or greater into the Tree Protection Zone (TPZ) of a scattered tree or Large Tree in a patch) are assumed to be lost.

The proposed activity will result in the direct and indirect impact to 25.558 hectares of native vegetation comprising 25.542 hectares of native patch vegetation located within and immediately adjacent to the disturbance footprint, 186 Large Trees in patches of native vegetation, and two large scattered trees (Table 16; Appendix 1.3).

A summary of the extent of native vegetation proposed to be impacted is provided below (Table 16).

Table 16. Summary of impacts to patches of native vegetation and Large Trees in patches

EVC (patches of native vegetation)	BCS*	Large Trees	Area (ha)
Riparian Forest (EVC 18)	Least Concern	9	2.14
Damp Forest (EVC 29)	Least Concern	104	13.94
Shrubby Foothill Forest (EVC 653)	Least Concern	73	10.34
Total		**186**	**25.542**

Note: ** BCS in the bioregion where the impact occurs

Whilst the proposed quarry extension is may have an impact at a Regional level (i.e. within 30 kilometres of the Project Area), after detailed mitigation measures are undertaken, the project is not expected to have a significant impact on ecological values (i.e. vegetation communities, significant flora and fauna species) at a National or State scale. Nevertheless, a Biodiversity Management Plan for the project must be prepared and implemented to ensure there is sufficient monitoring of key ecological values and should significant impacts occur additional mitigation measures / strategies will be undertaken (Section 5.1.2).

4.3.2 *Impacts to significant flora, fauna and ecological communities*

Flora

Potential impacts to significant flora species with the highest likelihood of occurrence are assessed in detail in Appendix 3.

Of the 1 nationally significant and 42 State flora species that are known to occur within 10 kilometres of the Project Area, one nationally significant (Matted Flax-lily) and five State significant species (Section 3.4.1) were considered to have the highest likelihood of occurrence within the study area (Section 3.4.1).

Targeted surveys did not record any State or nationally significant flora within the study area. However, suitable habitat for the State significant Clover Glycene, Maroon Leek-orchid, Green-striped Greenhood, Round-leaf Pomaderris, Purple Eyebright is proposed for removal as part of the proposed action.

No known locations of any other significant flora species will be impacted by the Project and no significant flora species are likely to be significantly impacted by the Project.

Fauna

Potential impacts to significant fauna species with the highest likelihood of occurrence are assessed in detail in Appendix 3. Of the 21 nationally significant and 37 State significant fauna species that are known to occur within 10 kilometres of the Project Area, six nationally significant and seven State significant species were considered to have a moderate to high likelihood of occurrence within the study area (Section 3.4.2).

Despite targeted surveys being undertaken for Yellow-bellied Glider, Leadbeater's Possum, and Sooty Owl none of these species were detected with the study area. Targeted surveys have not been undertaken for three cryptic significant species with a moderate likelihood of occurrence (Southern Toadlet, Curve-tailed Burrowing Crayfish, Platypus).

The nationally significant Southern Greater Glider was recorded within the proposed extraction area. Although the habitat is lower relative quality compared to the proposed offset areas (i.e. contains a lower density of hollow-bearing trees and is subject to edge effects from the existing quarry site) the species is likely to still rely on habitat within the proposed extraction area for foraging or breeding purposes due to the number of the species' preferred foraging eucalypts present, and the nesting site opportunities present. The proposed action will lead to the removal of 24.65 hectares of suitable habitat for the species, including breeding habitat.

The nationally significant Gang-gang Cockatoo was recorded within the study area incidentally during field assessments. Gang-gang Cockatoo typically occupy mature forests and woodlands, dominated by eucalypts with dense acacia understories during summer months, preferring drier, open woodland at lower altitudes during winter (DAWE 2022a). The species relies strongly on hollow-bearing trees with chambers that are approximately 20-centimetre floor diameter, 50-centimetre depth, and 5 to 9.4 metres above the ground (Davey and Mulvaney 2020; Davey 2021).

The species is likely to regularly visit the study area for foraging purposes within native forest habitat, particularly during the winter months, and may roost / shelter in larger suitable hollows within the study area. Given the low altitude, the species is unlikely to breed within the study area.

The state significant Powerful Owl was recorded within the study area in the proposed extension and offset sites. Although adults and fledglings were recorded, nor confirm surveys did not detect the presence of a

nesting/roosting site, despite the presence of suitable nesting habitat. Proposed impacts will result in a reduction in foraging and relatively lower-quality breeding habitat for the species, and reduce connectivity to larger, contiguous areas of habitat (i.e. Mt Toolebewong State Park).

Powerful Owl typically has a home range of between 4,000 and 5,000 hectares (DSE 2004b; Soderquist and Gibbons 2007). In this context, it is possible that the local Powerful Owl population would use habitat resources within the Project Area for foraging activities. The proposed action will lead to the removal of 24.65 hectares of suitable habitat for the species, including breeding habitat.

The project will also result in a reduction in foraging habitat for Dingo and breeding habitat for Lace Monitor, although large areas of higher quality habitat occur within the broader landscape surrounding the proposed extraction area. Habitat assessments for Lace Monitor core breeding habitat identified termite mounds likely to be used by the species for breeding. Lace Monitor commonly uses termite mounds to lay eggs inside.

4.3.3 Ecological Communities

No national or State significant ecological communities were recorded within the Assessment Area, and as such, no direct or indirect impacts to listed ecological communities are considered likely to occur.

4.3.4 Loss of Important Habitat for EPBC Act Migratory species

The potential impact of loss of important habitat for an EPBC Migratory species is assessed here using the criteria outlined for Migratory species in the Impact Significance Guidelines 1.1 under the Commonwealth EPBC Act. The Migratory status of a species is a Commonwealth and international matter rather than a state (Victoria) matter. The consequence and severity of losing important habitat for a Migratory species would be major, because it could jeopardize the success or recovery of a species internationally. And, unless comparable habitat were replaced nearby, the duration would be long-term, because the habitat would be lost permanently. However, these impacts are not expected to occur during construction, because important habitat is not expected to be lost as a result of construction of this project.

No species of bird recognised under the migratory provisions of the EPBC Act was recorded within the Assessment Area during field surveys. Therefore, the study area is not considered to be classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013), in that it does not contain:

- Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species;
- Habitat utilised by a migratory species which is at the limit of the species range; or,
- Habitat within an area where the species is declining.

4.3.5 Direct Fauna Mortality

Project construction may result in the injuring or killing of fauna, mainly through land clearing (habitat removal) or fauna straying into a construction area. Fauna most at risk are fauna that reside in the habitats to be removed and that have limited mobility (such as frogs, small reptiles, possums), and/or dependent young (such as young birds in a nest), or fauna that stray into a construction area during a quiet time (for example,

overnight). Fauna straying into a noisy active construction site during the day is considered unlikely and would be actively managed by the site environmental officer (via a CEMP).

Some diurnal (day active) and mobile species, such as birds, may be able to move away from the path of clearing and may not be greatly affected unless they are nesting. However, other species that are less mobile (i.e. ground dwelling reptiles and mammals), or those that are nocturnal and nest or roost in tree hollows during the day (i.e. arboreal mammals such as possums and microchiropteran bat species), may find it difficult to escape roosts and move rapidly over relatively large distances when disturbed. During clearing activities, susceptible species are at high risk of direct mortality.

Entrapment of wildlife in trenches or other excavations is another potential cause of fauna injury or death. Species most likely to become trapped in pits or other excavations are larger ground dwelling species that can move across a modified landscape in the absence of woodland or forest habitat (e.g. macropods and reptiles).

There is also a chance of an increase in fauna mortality through vehicle strike during the construction and operational phases of the project. Fauna most at risk are fauna that readily cross substantial barriers such as roads to get to other habitat patches, including possums, birds, foxes, rabbits and kangaroos.

Movement will also be limited between habitat on either side of the haul road during quarry operational hours and presents a risk of wildlife and vehicle collisions. Death or injury of some fauna may occur, but is expected to be infrequent and localised, and most likely to affect individuals rather than populations or species.

While killing an individual animal would be permanent, the impact on the population of that species (particularly if that species is common and adaptable) may be only short-term. Therefore, death or injury of common species is not expected to have a long-lasting effect on any of the populations of fauna in the project boundary.

4.3.6 Loss of Hollow-bearing Trees

Whilst habitat loss is recognised above in Section 4.3.1, the loss of hollow-bearing trees requires specific mention due to the important role hollows play in supporting a wide range of fauna and the difficulty associated with the replacement of this resource.

Loss of hollow-bearing trees is a threatening process listed under the FFG Act. Several listed fauna species known or considered potentially present within the study area use hollow tree resources for breeding and roosting (i.e. Powerful Owl, Southern Greater Glider, Yellow-bellied Glider, Sooty Owl).

Presence of large, old hollow-bearing trees is critical for the persistence of Southern Greater Gliders, with the species highly dependent on large hollows for shelter and nesting. Powerful Owl generally nests in hollow eucalypts in unlogged, unburnt gullies and lower slopes within 100 metres of streams or minor drainage lines, with hollows greater than 45 centimetres diameter and greater than 100 centimetres deep, surrounded by canopy trees and subcanopy or understorey trees or tall shrubs. Hollow entrances are generally greater than six metres above ground, and commonly more than 20 metres where the forest permits (DEC 2006).

The field surveys identified hollow-bearing trees within the assessed sections of the project footprint (Figure 7). The size of the hollow entrance utilised varies for many species, as entrance size is related to the body length of individuals (Goldingay 2009). Hollows less than 10 centimetres would be utilised by microchiropteran bats, hollows between 11-15 centimetres by lorikeets and parrots, and hollows 20 centimetres or larger by owls and mammals. Most hollows within the study area are between 10 and 20 centimetres. However, a high number of larger tree hollows were observed in the patches of more mature native vegetation, particularly

along gullies. While many attributes of tree hollows may be selected by hollow using species, such as hollow depth, entrance size and hollow type, hollows are more likely to occur and be used by wildlife in large trees that are many decades or even centuries old (Goldingay 2009).

Field surveys confirmed that many of these mature trees support hollows suitable for a range of fauna species.

The project will result in the loss of 186 Large Trees, of which, a total of 20 trees contained large (i.e. >20cm) hollows.

Mitigation for the loss of hollow-bearing trees is included in Section 5.3.

4.4 Indirect Impacts

4.4.1 Habitat Fragmentation

The movement of animals, plants and ecosystem processes is critical to species survival and healthy ecosystem functioning. Wildlife need to move across a range of spatial and temporal scales, which vary from short-distance daily movements to access food, shelter and mates, to annual migrations.

Habitat fragmentation relates to the dividing up of once continuous habitats into separate smaller 'fragments' (Fahrig 2002). The habitat fragments created by fragmentation tend to be smaller and separated from each other by a matrix of less suitable habitat. The new dividing habitat type between fragments is often artificial and less suitable to the species remaining within these newly created fragments (Bennett 1990) or is generally only used by adaptive and aggressive generalist species [e.g. Noisy Miners, (Grey *et al.* 1998)]. Consequently, the inadvertent selection for aggressive generalist species through habitat fragmentation further decreases population levels of other species remaining in the fragments.

Existing vegetation within the study area is situated in a landscape that is not subject to any major fragmentation. It is unlikely that the proposed habitat clearance will result in the fragmentation and/or isolation of any existing patches.

4.4.2 Edge Effects

Habitat clearance leads to edge effects - zones of changed environmental conditions (e.g. altered light levels, wind speed, temperature, noise, erosion) occurring along the edges of habitat areas. These new environmental conditions along the habitat edges can promote the growth of different vegetation types (including weeds), promote invasion by pest animals specialising in edge habitats, or change the behaviour of resident animals (Moenting and Morris 2006). Edge zones can be subject to higher levels of predation by introduced mammalian and native avian predators.

However, habitat removal can promote increased growth rates in eucalypts near the edge of remnants, with increased mortality for large trees being higher (relative to the remainder of the patch) only within 10 metres of the edge (King *et al.*, 2018). Within the study area, it is likely that the project would increase the overall extent of edge effects, particularly along the western boundary.

4.4.3 Proliferation of Weed and Pest Species

Weed species are largely not well established within the study area, with only one noxious weed species present (Appendix 1.2). Without appropriate management strategies, project activities have the potential to

disperse weeds into areas adjoining the project footprint including into native vegetation that are not currently invaded by these species.

The most likely causes of weed dispersal associated with the project include earthworks (i.e. trenching), movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. This is an indirect impact that may reduce habitat quality of native vegetation.

CaLP Act-listed weed species identified within the project boundary are listed in Appendix 1.1. Weed management activities and requirements for declared noxious weed species should be incorporated into the project Biodiversity Management Plan.

Introduced animals were commonly recorded in the study area during the field survey, including Feral Cat, Sambar Deer, and Red Fox. These species are well established in the study area and locality and the project is not predicted to increase their prevalence or increase the impact of these species on native wildlife. Project activities have the potential to disperse pest species out of the study area across the surrounding landscape due to habitat removal, noise and human presence during construction and operations. However, the project is not likely to result in the establishment of these pest species in areas where they are currently absent.

Cinnamon Fungus *Phytophthora cinnamomi,* is widely spread throughout Victoria and is associated with impacts such as dieback in eucalypts. The study area lies within an environment at risk to Cinnamon Fungus (DSE 2004c). The risk of impacts from, and transmission of Cinnamon Fungus during site construction and operational activities, will be high if the pathogen is not managed during construction.

4.4.4 Noise, Dust, Light and Spills

Noise

Many animals detect and depend on sound to communicate, navigate, evade danger and find food. Anthropogenic noise can alter the behaviour of animals or interfere with their normal functioning (Bowles 1997).

Noises that disturb fauna tend to be loud, sudden and unexpected noises (such as blasting) rather than predictable constant noises (such as loud machinery in continual use). Fauna can become habituated to predictable noises, even if those noises are very loud (for example, birds that use airfields as habitat).

During construction there will be increased noise levels in the study area and locality due to ground disturbance, machinery and vehicle movements, and vegetation clearing. Machinery including bulldozers, front end loaders, excavators, graders, trucks (water, concrete), tippers, rollers, cranes, generators, welding machines, and pumps will be in operation. The noise associated with the operation of this machinery during the construction phase may disturb animals and may interrupt various stages of their life cycle.

During daylight hours, construction noise has the potential to impact on terrestrial fauna in multiple ways. It may result in temporary displacement of active diurnal birds, with individual birds choosing to forage and roost further from the study area. It may also result in displacement of roosting nocturnal fauna (such as possums) to seek a quieter location. This may result in nocturnal fauna being more susceptible to predators if being displaced during daylight hours, competitors and/or temporary harassment (such as mobbing of owls or other birds such as noisy miners).

Construction noise could result in temporary silencing of frogs. Frogs may not call during the period of disturbance, or may call but have lower reproductive success due to not being heard.

The study area is already subject to disturbance and noise form the existing quarry operations is affected by some machinery noise daily. Roads are nearby and therefore occasional background noise is present. Native fauna species are likely to habituate to noise associated with the proposed activity over time, and are considered likely to continue to use the areas adjoining the project footprint for foraging, roosting and/or breeding.

Dust

The construction and operational activities of the project have the potential to increase dust levels if appropriate mitigation measures are not employed. These activities include the removal, handling and transport of soil and rock, dumping, crushing and processing of material, and increased traffic along existing, newly constructed internal roads and access tracks, mainly during the project's construction.

Dust, depending on its physical and chemical attributes and severity of occurrence, can have a variety of negative effects on vegetation. Effects that may occur include higher levels of plant stress (Shah *et al*. 2017; Liang *et al*. 2016) such as decreased photosynthesis rates, transpiration and respiration capacities, in turn leading to reduced growth and productivity (Shah *et al*. 2017). Additional impacts may include an alteration of the vegetation habitat structure (Paal *et al*. 2013). In turn, these impacts to vegetation may cause the loss or degradation of fauna habitat.

Dust settling near waterbodies where runoff is likely to occur (e.g. banks and riparian zones) can cause deterioration in water quality, which in turn may have negative impacts to terrestrial and aquatic species, which use habitats in these areas. Dust can also be contaminated with other substances and exacerbate these negative effects.

To mitigate against potential impacts occurring, dust control measures need to be put in place, and included within the Construction Environmental Management Plan (CEMP). The following must be considered when undertaking appropriate mitigation measures to manage dust:

- Inadequate dust suppression measures may result in a wider geographical spread of dust contamination;
- Excessive dust suppression may result in excess runoff of sediment and/or contaminants; and,
- Particular construction activities that lead to the generation of high dust levels should be avoided during very windy conditions (i.e. blasting) and/or appropriate dust suppression techniques employed.

Measures to mitigate potential risks and impacts to flora and fauna within the study area are included in Section 5 of this report.

Light

Ecological light pollution is the descriptive term for light pollution that includes direct glare, chronic or periodic increased illumination, and temporary unexpected fluctuations in lighting (including lights from a passing vehicles), that can have adverse effects on wildlife (Longcore and Rich 2004).

Studies relating to the effect of ecological light pollution on animals have indicated light pollution from a variety of sources can trigger detrimental behavioural and physiological responses.

However, the overall risk of impacts to native fauna associated with light pollution is expected to be low as the quarry will only operate during daylight hours.

Spills

Indirect impacts on biodiversity values associated with off-site activities, including transportation and storage of heavy mineral concentrate and other liquids (fuel) may occur. Transport of heavy mineral concentrate will occur via road corridors, and therefore the risk of this material entering ecological sensitive areas such as remnant native vegetation, waterways and wetlands is low. Any indirect impacts are likely to be localised and can be appropriately managed / mitigated.

5 MITIGATION MEASURES

As outlined in the Guidelines (DELWP 2017) a project should be designed to take into consideration the three-step approach, which is:

- Avoid environmental impacts;
- Minimise impacts; and,
- Where impacts cannot be avoided or minimised, compensate for the residual impacts using other mitigation measures such as offsets.

These principles have been followed for the project as detailed below.

5.1 Preliminary Measures

While the project footprint is largely defined by the extent of the resource, there will be ongoing opportunities to further avoid impacts to native vegetation and fauna habitat at a local scale, as the alignment and final siting of project infrastructure are further refined.

A detailed assessment of individual Large Trees, scattered trees and the associated presence of fauna habitat was undertaken, with the aim of retaining ensuring these values could be retained where possible.

5.1.1 Avoidance and Minimisation

Due to the nature of the project (extractive industry), it is not possible to avoid the removal of native vegetation without completely undermining the feasibility of the proposal. Measures to avoid and minimise the removal of native vegetation have been undertaken during the project design phase.

The proposed extraction timeline of the site is over a period of 15 – 30 years, with stage removal of material proposed in approximately one to two-hectare areas of disturbance per year. Given this, it is not anticipated that all native vegetation will be removed at commencement of activity, but over the lifespan of the quarry as needed.

Due to the nature of the proposed development (extractive industry), aside from the buffer zones around the perimeter of the site (Figure 2), the majority of the study area will be subject to extractive industry, focusing on the centre of the study area. Approximately 101 hectares of remnant vegetation has been set aside for potential use as an offset site and therefore avoided in the proposed clearing scenario. The 101 hectare remnant vegetation identified as an offset is directly adjacent to the proposed extraction area.

As part of the development of the Work Plan, additional measures to ensure that further, indirect impacts on biodiversity are minimised will be incorporated. This can be achieved via engineering solutions to reduce run-off, wastewater treatment, and rehabilitation works within the buffer areas and post extractive industry activities.

5.1.2 *Planning*

Implementation of measures associated with the minimisation of impacts relies on the development of management plans to detail the measures, timeframes and performance objectives and responsibilities.

As part of the ongoing project planning process, detailed contingency and mitigation measures must be developed and presented within a Biodiversity Management Plan (or similar). The Biodiversity Management Plan will outline the management and monitoring of biodiversity during the construction and operational phases of the project.

Management Plans (including the Biodiversity Management Plan) will be provided to DEECA and DTP for approval, who will have an opportunity to review and comment of the contents of the Plans as required. The required management plans can then be updated as required as part of the approval process.

The Biodiversity Management Plan will include, where appropriate, procedures for:

- Detailed design of mitigation measures, including:
    - Location and maintenance of No-Go Zone fencing and signage around the perimeter of the disturbance footprint during construction and operations to ensure no impacts to areas of retained native vegetation. All contractors / workers should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Habitat Zones (areas of sensitivity) should be included as a mapping overlay on the quarry operational plans;
    - Implementation of Tree Protection Zones (TPZs) in accordance with AS4970-2009 around trees to be protected.
    - Ongoing audit of native vegetation removals.
- Tree Protection Zones (TPZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2011). A TPZ applies to a tree and is a specific area above and below the ground, with a radius 12 x the DBH. At a minimum standard a TPZ should consider the following:
    - A TPZ of trees should be a radius no less than two metres or greater than 15 metres;
    - Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) should be excluded from the TPZ;
    - Where encroachment is 10% or more of the total area of the TPZ, the tree should be considered as lost and offset accordingly (unless an arboricultural report specifies otherwise);
    - Directional drilling may be used for works within the TPZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;
    - The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained, and no offset would be required; and,
    - Where the minimum standard for a TPZ has not been met an offset may be required.
- Staff and contractor inductions to address the location of sensitive ecological values and their roles and responsibilities in the protection and/or minimisation of impacts to all native biodiversity;

- The removal of hollow-bearing trees should be undertaken under the supervision of an appropriately qualified zoologist to salvage and relocate any displaced fauna. The Biodiversity Management Plan should include information relating to the fauna salvage and relocation process (e.g. any fauna displaced during clearing should be captured where possible and relocated to pre-planned areas of retained habitats adjoining the study area);
- Pre-clearing surveys and fauna salvage/ relocation where practical;
- Vegetation clearing protocols;
- Construction stockpiles / overburden, machinery, access roads, and other infrastructure should be placed away from retained areas supporting native vegetation, and in areas that may restrict fauna movement across the study area;
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Agency guidelines (EPA 2020a; 2020b; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands;
- As indigenous flora provides valuable habitat for indigenous fauna, site indigenous species associated with Damp Forest will need to be used as part of the site revegetation and rehabilitation over several years. A seed collection and propagation program should be undertaken as part of the restoration and revegetation actions required across the study area;
- Contingency measures to manage the potential unexpected discovery of listed flora and fauna species during construction and operation of the project; and,
- Rehabilitation and restoration measures, including the establishment of:
    - Rehabilitation protocols;
    - Weed control measures;
    - Planting of species for visual amenity, where necessary;
    - Embellishment of retained patches of native vegetation through supplementary planting;
    - Potential creation of artificial habitat features (i.e. nest boxes), or supplementation of natural habitat features (i.e. retention of logs) within retained areas of native vegetation; and,
    - Pest management measures.

The Biodiversity Management Plan will be important for enacting the 'avoid and mitigate' principles during the construction and operational phases and must include clear objectives and actions including:

- Minimising human interferences to flora and fauna;
- Monitor the risk of impacts from, and transmission of Cinnamon Fungus during site construction and operational activities;
- Minimising vegetation clearing/disturbance; and,
- Minimising impact to threat-listed species and communities.

The measures outlined above, together with additional habitat protection and restoration actions should be outlined in the Biodiversity Management Plan and several sub-plan documents listed below. The following plans will need to be prepared and implemented prior to any extension of the quarry operations:

- Biodiversity and Rehabilitation Management Plan. This plan should provide detailed information on the objectives, performance targets, timeframes and responsibilities for the successful management and reinstatement of biodiversity across the study area. The Plan should include specific protection, management, restoration and reporting requirements across the study area
- Species Protection Management Plan (SPMP) that addresses pre, during and post construction issues for native flora and fauna, and aims to salvage plants (i.e. understorey species), and avoids (where possible) the mortality, injury, and displacement of native fauna throughout all phases of quarrying operations. This should include a Vegetation Clearance Strategy that provides prescriptions on the specific actions required prior to and during habitat clearing.
- Weed Management Plan. This plan should follow the guidelines outlined in the CaLP Act, and clearly outline any obligations of Yarra Valley Quarries in relation to minimising the spread of weeds as a result of quarry operations. This may include a pre-clearance weed survey undertaken prior to any construction activities to record and map the locations of all noxious and environmental weeds, and ongoing biosecurity and control of weeds across the study area. Ongoing weed control (i.e. woody and herbaceous species) will be a requirement of the first-party offset site.
- Construction Environmental Management Plan (CEMP). The CEMP should include specific species/vegetation conservation strategies, daily monitoring, sedimentation management, site specific rehabilitation plans, weed and pathogen management measures, etc.

5.2 Specific Mitigation Measures

Specific mitigation measures recommended for implementation to minimise impacts to biodiversity (Table 17). Each direct and indirect impact type has been assigned one or more mitigation measures to reduce the risk associated with each potential impact.

Table 17. Proposed mitigation measures.

Impact	Control Measures	Description	Project Phase *		
			C	O	Cl
Native Vegetation Removal and Habitat Loss	CM01	Vegetation removal must not proceed until applicable approvals and permits are obtained, and relevant conditions satisfied, including the provision of offsets.	Yes	Yes	No
	CM02	The extent of vegetation clearance must be clearly defined to ensure disturbance within areas to be retained are avoided.	Yes	Yes	No
	CM03	Temporary fencing must be established around all retained native vegetation prior to any works, and these must be clearly identified as 'no-go' areas. TPZs must be protected from impacts in accordance with AS4970-2009	Yes	Yes	No
	CM04	Prepare a Biodiversity Management Plan detailing all impacts and mitigation associated with the Construction, Operation and Closure phases of the project	Yes	Yes	Yes

Impact	Control Measures	Description	Project Phase *		
			C	O	CI
	CM05	A qualified zoologist should be present to conduct pre-clearance searches in any identified fauna habitats, and to supervise any habitat removal in order to salvage fauna as per protocols in Biodiversity Management Plan.	Yes	Yes	No
	CM06	Revegetation or landscape plantings will include species appropriate to the local EVC	Yes	Yes	Yes
	CM07	Access tracks and roads must be clearly marked to prevent the establishment of secondary tracks and indirect native vegetation impacts.	Yes	Yes	No
	CM08	Post clearing audit to reconcile the extent of native vegetation impacted during operation and construction against the permitted losses.	Yes	Yes	No
	CM09	Water testing must be undertaken bi-annually in retained waterbodies to ensure no detrimental impacts to fauna habitats	Yes	Yes	No
	CM10	High threat weeds, which include noxious weeds should be mapped prior to construction and removed from the Project Area	Yes	Yes	No
	CM11	Appropriate hygiene controls must be implemented throughout the entire project to prevent the spread of environmental and noxious weeds and Cinnamon Fungus. Any new infestation of high threat weeds must be controlled as soon as they are detected.	Yes	Yes	Yes
	CM12	Undertake revegetation and habitat improvement activities to maintain and improve habitat connectivity in accordance with the protocols in the Biodiversity Management Plan.	Yes	Yes	Yes
	CM13	All contractors must complete an environmental induction identifying all significant environmental issues, and associated protection and mitigation measures to be applied during construction and operation. Maps identifying all areas of environmental sensitivity must be provided during the induction	Yes	Yes	No
Direct Fauna Mortality	CM14	Fauna escape features and refuges must be provided around native vegetation patches adjacent to the operational area of the project (including ramps and damp sandbags).	Yes	Yes	No
	CM15	Sides of the trenches must be graded to allow for animal escape. Any trapped animals will be removed before works commence.	Yes	Yes	Yes
	CM16	Implement speed limits on vehicular traffic along haulage and internal access roads/tracks	Yes	Yes	Yes
	CM17	Progressive rehabilitation of areas no longer required for operation will be undertaken species appropriate to the local EVC.	No	Yes	Yes
	CM18	Develop and implementation of best practice air and dust management controls	Yes	Yes	Yes

Impact	Control Measures	Description	Project Phase *		
			C	O	CI
	CM19	Use of water sprays on haul roads and unsealed surfaces.	Yes	Yes	Yes
	CM20	Reduce speed limit during highest wind events.	Yes	Yes	Yes
	CM21	Regular monitoring of internal access road must be undertaken for the presence of injured wildlife. The Biodiversity Management Plan must include a suitable management response for the presence of injured wildlife.	Yes	Yes	Yes
Noise and Dust Pollution	CM22	High impact noise events (i.e. blasting) limited to daylight hours.	Yes	Yes	No
	CM23	Where operations or equipment that emit excessive noise or vibrations, control measures such as baffles or mufflers will be employed.	Yes	Yes	Yes
	CM04	Prepare a Biodiversity Management Plan detailing all impacts and mitigation associated with the Construction, Operation and Closure phases of the project	Yes	Yes	Yes
	CM14	Fauna escape features and refuges must be provided around native vegetation patches adjacent to the operational area of the project (including ramps and damp sandbags).	Yes	Yes	No
	CM17	Progressive rehabilitation of areas no longer required for operation will be undertaken species appropriate to the local EVC.	No	Yes	Yes
	CM24	Traffic noise levels to not exceed the objectives specified in the VicRoads Traffic Noise Reduction Policy.	Yes	Yes	Yes
Edge Effects	CM08	Post clearing audit to reconcile the extent of native vegetation impacted during operation and construction against the permitted losses.	Yes	Yes	No
	CM25	Monitor ongoing habitat use by fauna (frogs, waterbirds, turtles).	Yes	Yes	No
	CM06	Revegetation or landscape plantings will include species appropriate to the local EVC	Yes	Yes	Yes
	CM26	Monitor habitat quality/suitability along Ure Creek biannually. Any decline in habitat quality will trigger revegetation activities to restore suitable habitat condition.	Yes	Yes	No
	CM07	Access tracks and roads must be clearly marked to prevent the establishment of secondary tracks and indirect native vegetation impacts.	Yes	Yes	No
	CM27	Installation of nest boxes in retained areas of native vegetation to provide suitable breeding habitat for impacted significant species such as Powerful Owl and Southern Greater Glider.	Yes	Yes	Yes
Phytophthora Control	CM11	Appropriate hygiene controls must be implemented throughout the entire project to prevent the spread of environmental and noxious weeds and Cinnamon Fungus. Any new infestation of high threat weeds must be controlled as soon as they are detected.	Yes	Yes	Yes

Impact	Control Measures	Description	Project Phase *		
			C	O	Cl
	CM28	All contractors must complete an environmental induction identifying all significant environmental issues, and associated protection and mitigation measures to be applied during construction and operation. Maps identifying all areas of environmental sensitivity must be provided during the induction	Yes	Yes	No
	CM29	Establish wash-down protocols for all vehicles entering site, and all contractors entering areas of environmental sensitivity	Yes	Yes	No

Note: * C = Construction; O = Operation; Cl = Closure.

5.3 Habitat Creation

5.3.1 Nest Boxes

Many species of wildlife rely on natural tree hollows for nesting, breeding and shelter. Hollows provide a safe home away from the weather and predators. In eucalypt trees, small hollows may take over 70 years to develop and large hollows many decades longer. The range of hollow sizes and types is matched by the range of wildlife able to use them.

Nest boxes are an important aspect to wildlife conservation in that they provide additional habitat for hollow-dependant fauna in areas where hollows are in short supply, and in addition, support the persistence or reintroduction of a species in any areas where natural nesting hollows are not available.

The installation of nest boxes of varying types and size will create habitat for arboreal fauna (i.e. Greater Glider, forest owls) with a focus on species who have previously been recorded within the Project Area (i.e. Powerful Owl).

Further, the installation of artificial nesting habitat is a management outcome consistent with the Action Statement for Powerful Owl, Barking Owl, Sooty Owl and Masked Owl.

Nest Box Design

The different requirements of local wildlife necessitate that nest boxes are specially designed to incorporate essential features that mimic the characteristics of their natural nesting hollows. A number of familiar introduced species, especially the Common Myna, Common Starling and House Sparrow all nest in tree hollows and will use nest boxes intended for native birds or mammals. They tend to be very aggressive around nest sites, and Mynas have been recorded driving nesting birds away and tossing their eggs and nestlings from hollows or nest boxes. Devices such as the Anti-Myna Baffle may be used to encourage use of nest boxes by native species.

Alternative Nest Box Options

Traditional artificial nest boxes have often found to be under-utilised by species such as Powerful Owl, with only one known occurrence of a successful breeding event (McNabb and Greenwood 2011). Further, many nest boxes set up to offset previous habitat loss fail to attract native animals due to them being utilised by

non-native fauna (Lindenmayer *et al.* 2017), and they also tend to disintegrate and become unusable after only a few years.

3-D Printed Nest Boxes

A recent development that has been trialled in the City of Knox has been the creation and installation of 3-D printed nest boxes – created specifically to mimic the naturally occurring characteristics of known Powerful Owl nesting sites. These nest boxes can be moulded to a unique fit from a range of organic materials including hemp concrete, wood earth (i.e. clay, mud) and/or fungus, and as they are lightweight, they can be easily fixed onto trees.

The utilisation applicability of using 3-D printed nest boxes for Powerful Owl is currently being trialled in a partnership between the City of Knox and a team in the Architectural Design Lab at Melbourne University (Nadine Gaskell, *pers. comm*). Further consideration is recommended to investigate the applicability of 3-D printed nest boxes being utilised at this site.

Installation of Carved Hollows and/or Logs

The creation of carved hollows into tree trunks has been shown to better mimic the physical and thermal properties of natural tree hollows compared to artificial nest boxes and log hollows (Terry *et al.* 2021; Griffiths *et. al.* 2018). Artificial hollows carved directly into live trees can produce thermally stable supplementary habitats that could potentially buffer hollow-dependent fauna from weather extremes, whereas, poorly insulated plywood nest boxes produce lower-quality thermal environments.

Installation of carved hollows and/or logs provides an opportunity to create long-term, sustainable ecologically robust habitat that increases the chances of successful breeding outcomes for hollow-dependant fauna such as the Powerful Owl or Greater Glider.

Any existing hollows present within trees that are proposed to be impacted within the development footprint should be re-installed within retained vegetation outside of the impact area.

Location

The nest boxes, (artificial wood, 3-D printed nest boxes, or carved logs) should be fixed securely to the trunk or a sturdy branch of the tree at least two metres above the ground, but at a height where it can be monitored easily, and is out of the prevailing wet-weather winds, in the shade or semi-shade, and near sources of food and water.

5.3.2 Logs

Logs provide an excellent habitat and food for many species and are extremely important for the proper function of a healthy ecosystem. Frogs, reptiles and small mammals use logs with hollows for shelter and a food resource. It is recommended that any trees that are proposed to be impacted by any development within the Project Area are repurposed for use as habitat.

6 LEGISLATIVE AND POLICY IMPLICATIONS

Throughout the assessment process, consideration has been given to the following Commonwealth and Victorian environmental policy and legislation.

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Effects Act 1978* (EE Act)
- *Flora and Fauna Guarantee Act 1988* (FFG Act)
- *Planning and Environment Act 1987* (P&E Act)
    - The Guidelines for the removal, destruction and lopping of native vegetation (DELWP 2017)
- *Mineral Resources (Sustainable Development) Act*
- Local Council Planning Scheme
- *Wildlife Act 1975* (Wildlife Act)
- *Catchment and Land Protection Act 1994* (CaLP Act).

6.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of NES.

Table A3.1. Significant impact assessment - Critically Endangered and Endangered matters of NES (EPBC Act).

Significant Impact Criteria - will the activity:	Feature and Conservation Status		
	Southern Greater Glider (E)	Gang-gang Cockatoo (E)	Leadbeater's Possum (CR)
Lead to long-term decrease in the size of a population	The species was detected through targeted surveys, however populations within the study area are expected to be very small in numbers given the survey results, higher relative quality of adjacent habitat. The proposed action will result in the removal of 24.65 hectares of suitable breeding and foraging habitat for the species, including a number of hollow-bearing trees as well as other mature trees that will form hollows over time. It is unknown whether the proposed activity will result in a long-term decrease to any populations within, and immediate surrounds of the study area, although there is higher relative quality habitat adjoining the study area that is proposed for retention.	The project will result in the disturbance of areas of suitable habitat for this species, including forested and riparian areas. However, given the wide distribution of the species across Victorian and the northern states, and the mobile and dispersive nature of the species, the removal of habitat within the study area will not lead to a long-term decrease in the size of the population.	Given this species was not detected through targeted surveys, any populations within the broader area are expected to be very small in numbers, and at best, possibly represented by only a few individuals. Given the absence of the species in the study area, the project will not result in the long-term decrease in the size of the population.
Reduce the area of occupancy of the species	The project may potentially reduce the area of occupancy for this species, principally along the western and northern edge of the study area.	The project will reduce the area of potential occupancy for this species. However, given the wide distribution of the species across Victoria and the northern states, and the mobile and dispersive nature of the species, the removal of habitat within the study area will reduce the overall area of occupancy available for the species.	The species was not recorded within the study area during targeted surveys. The project may potentially reduce the area of occupancy for this species, principally along the western and northern edge of the study area.
Fragment an existing population into two or more populations	The study area is located towards the south-eastern edge of suitable habitat for Southern Greater Glider. Due to being located on the edge of habitat, the removal of potential foraging and breeding habitat will not fragment an existing population.	Given the wide distribution of the species across Victoria, and the mobile and dispersive nature of the species, the removal of habitat within the study area will not fragment Gang-gang Cockatoo populations.	The study area is located towards the south-eastern edge of suitable habitat for Leadbeater's Possum. Due to being located on the edge of habitat, the removal of potential foraging habitat will not fragment an existing population.

Significant Impact Criteria - will the activity:	Feature and Conservation Status		
	Southern Greater Glider (E)	Gang-gang Cockatoo (E)	Leadbeater's Possum (CR)
Adversely affect habitat critical to the survival of a species	No critical habitat for these species is listed under the EPBC Act, nor is habitat within or adjacent to the Project Area critical to the survival of these species.		Some critical habitat under the EPBC Act for this species is present within the study area in the form of older growth forest within gullies comprising large hollow-bearing trees and a suitable midstorey species. The proposed action may adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	The project footprint encompasses large areas of vegetation and hollow-bearing trees suitable for breeding. Based on the results of targeted surveys there is a potential for the project to impact breeding habitat for these species	Gang-gang Cockatoo is likely to occasionally visit the study area for foraging purposes. Given the wide distribution of the species across Victorian, and the mobile and dispersive nature of the species, the removal of habitat within the study area is unlikely to disrupt the breeding cycle of a population.	No individuals were recorded within the study area. Therefore, it is unlikely that the breeding cycle of a population will be impacted.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project will remove large areas of potential habitat for these species, including potential foraging and breeding resources. Given the availability of high-quality habitat in the project locality and region, it is considered unlikely that these species would decline as a result of the proposed activity, and significant impacts are not likely to occur.	Gang-gang Cockatoo is likely to occasionally visit the study area for foraging purposes. Given the wide distribution of the species across Victorian and the northern states, and the mobile and dispersive nature of the species, the removal of habitat within the study area is not likely to contribute to the species' decline.	The project will remove Shrubby Foothills Forest and Damp Forest and Riparian Forest that provides potential habitat for this species. Given the absence of the species within and adjacent to the study area, the project is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline reduce the to cause the decline in the population.

Significant Impact Criteria - will the activity:	Feature and Conservation Status		
	Southern Greater Glider (E)	Gang-gang Cockatoo (E)	Leadbeater's Possum (CR)
Result in a harmful invasive species becoming established in the species' habitat	With the implementation of appropriate mitigation measures, it is unlikely that harmful invasive species would become established as a result of the project.		
Introduce disease that may cause the species to decline	It is unlikely that the project would introduce a disease that would impact any individuals that may periodically reside within the Project Area.		
Interfere with the recovery of the species.	There is no Recovery Plan prepared for these species. The project is unlikely to interfere with the recovery of the species.		The project is unlikely to interfere with the recovery of the species as the species was not recorded within the study area.
Conclusion	The proposed action would result in the removal of 24.65 hectares of foraging and potential breeding habitat for Southern Greater Glider. The presence of large hollow-bearing trees provides a potential breeding resource for the species. Based on the extent of habitat removal proposed and the availability of higher quality habitat in the local area and broader region, a significant impact to the species due to the proposed action is unlikely, but possible.	Gang-gang Cockatoo was detected opportunistically during the ecological survey program and is likely to use habitat occasionally for foraging. However, given the wide distribution of the species across Victorian, the mobile and dispersive nature of the species, and widespread availability of suitable habitats, the removal of habitat within the study area will not lead to a significant impact to the species.	The project will remove Shrubby Foothills Forest and Damp Forest and Riparian Forest that provides potential habitat for this species. Given the absence of the species within and adjacent to the study area, it is unlikely that the species would be significantly impacted by the project.

Table A3.2. Significant impact assessment - Vulnerable matters of NES (EPBC Act).

Significant Impact Criteria - will the activity:	Feature and Conservation Status		
	Brown Treecreeper	Yellow-bellied Glider	Pilotbird
Lead to a long-term decrease in the size of an important population of a species	Brown Treecreeper was not detected within the study area during multiple rounds of fauna assessments. Suitable habitat for the species is present and given the species' significant capacity for dispersal, there is a moderate to high likelihood the study area is used for foraging and potentially breeding purposes. However, given the presence of higher quality habitat in adjacent areas with greater availability of hollow-bearing trees, proposed fauna inspection and salvage mitigation measures and protocols, the project is unlikely to lead to the long-term decrease in the size of an important population of the species.	Although not recorded within the study area there are several documented records within nearby forested areas. While the species has poor dispersal ability (gliding distance up to 140 metres) (DAWE 2022b), the species may occupy the study area on occasion due to high levels of connectivity with the surrounding landscape . However, as the species was not detected within the study area it's unlikely the project will result in the long-term decrease in the size of an important population of the species.	Pilotbird was not detected within the study area during multiple rounds of fauna assessments. Suitable habitat for the species is present and given the species' significant capacity for dispersal, there is a moderate to high likelihood the study area is used for foraging and potentially breeding purposes. However, given the presence of higher quality habitat in adjacent areas, proposed fauna inspection and salvage mitigation measures and protocols, the project is unlikely to lead to the long-term decrease in the size of an important population of the species.
Reduce the area of occupancy of an important population	Given the species was not recorded within the study area and the presence of higher quality habitat in adjacent areas with greater availability of hollow-bearing trees the project will not result in the reduction of the area of occupancy of an important population.	Given the absence of the species in the study area, the project will not result in the reduction of the area of occupancy of an important population.	Given the species was not recorded within the study area and the presence of higher quality habitat in adjacent areas the project will not result in the reduction of the area of occupancy of an important population.
Fragment an existing important population into two or more populations	Further habitat fragmentation is unlikely to occur as a result of the proposed action.	Further habitat fragmentation is unlikely to occur as a result of the proposed action.	Further habitat fragmentation is unlikely to occur as a result of the proposed action.
Adversely affect habitat critical to the survival of a species	No critical habitat for these species is listed under the EPBC Act, nor is the project footprint critical to the survival of these species.	No critical habitat for these species is listed under the EPBC Act, nor is the project footprint critical to the survival of these species.	No critical habitat for these species is listed under the EPBC Act, nor is the project footprint critical to the survival of these species.

Significant Impact Criteria - will the activity:	Feature and Conservation Status		
	Brown Treecreeper	Yellow-bellied Glider	Pilotbird
Disrupt the breeding cycle of an important population	Given the species was not recorded within the study area and the proposed fauna inspection and salvage mitigation measures and protocols, the project will not disrupt the breeding cycle of an important population.	Given the absence of the species in the study area, the project will not disrupt the breeding cycle of an important population.	Given the species was not recorded within the study area and the proposed fauna inspection and salvage mitigation measures and protocols, the project will not disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Given the species was not recorded within the study area and the presence of higher quality habitat in adjacent areas with greater availability of hollow-bearing trees, the project is not anticipated to result in a decline of the species.	The species was not detected within the study area. Due to the species' absence from the study area and the lower relative density of hollow-bearing trees compared to the surrounding landscape, the action is unlikely to result in the species to decline.	Given the species was not recorded within the study area and the presence of higher quality habitat in adjacent areas with greater availability of hollow-bearing trees, the project is not anticipated to result in a decline of the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	With the implementation of appropriate mitigation measures, it is not likely that harmful invasive species would become further established as a result of the project.		
Introduce disease that may cause the species to decline	With the implementation of appropriate mitigation measures, it is not likely that disease would be increased by the project.		
Interfere substantially with the recovery of the species	Given that these species were not detected within the Project Area during targeted surveys, and an important population of the species is not present, the proposed action will not substantially interfere with the actions detailed in the recovery plan for any of these species.		
Conclusion	Brown Treecreeper was not recorded within the study area. Proposed fauna inspection and salvage mitigation measures and protocols and higher quality habitat is present in adjacent areas with greater availability of hollow-bearing trees. The removal of an area of potential habitat for this species will not constitute a significant impact.	Yellow-bellied Glider was not detected through targeted surveys and is unlikely to rely on habitat within the study area. The action is unlikely to result in a significant impact for the species.	Pilotbird was not recorded within the study area. Proposed fauna inspection and salvage mitigation measures and protocols and higher quality habitat is present in adjacent areas. The removal of an area of potential habitat for this species will not constitute a significant impact.

6.1.1 *Implications*

The proposed action is not likely to result in a significant impact on matters of NES. However, an EPBC Act referral is likely to be submitted to the DCCEEW as part of the proposed quarry expansion for a determination under the EPBC Act.

6.2 Environment Effects Act 1978 (Victoria)

The *Environment Effects Act 1978* (EE Act) provides for assessments of proposed actions that are capable of exerting a significant impact on the environment and requires the preparation of an Environment Effects Statement (EES). A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred to the Victorian Minister for Planning.

The following implications are based on the current preliminary impact assessment and are considered to be conservative. Further impact minimisation will be demonstrated via micro siting of infrastructure during the detailed design phase of the project.

Table 18. Referral criteria under the EE Act.

Referral criteria	Potential Impacts
Individual potential environment effects Individual types of potential effects on the environment that might be of regional or State significance, and therefore warrant referral of a project, are:	
Potential clearing of 10 hectares or more of native vegetation from an area that: • is of an EVC identified as endangered by DEECA in accordance with Appendix 2 of Victoria's Native Vegetation Management – A Framework for Action (DSE 2002); • is of Very High conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management – A Framework for Action (DSE 2002); or, • is not authorised under an approved Forest Management Plan or Fire Protection Plan	Yes. A total area of 25.558 hectares of native vegetation patches are proposed to be impacted. This comprises 25.542 hectares of native vegetation from three least concern EVCs: • 2.14 hectares of RF; • 12.94 hectares of DF; and, • 10.34 hectares of SFF. Two large scattered trees are also proposed to be removed.
Potential long-term loss of a significant proportion (1-5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria	No. Flora: No significant flora species were recorded within the study area. Fauna: A total of 24.65 hectares of confirmed habitat for the Southern Greater Glider, Gang-gang Cockatoo, Powerful Owl, Dingo and Lace Monitor is proposed to be impacted. However, the loss of vegetation as part of this proposal is highly unlikely to result in the long-term loss of a significant proportion of these species' habitat (i.e. 1-5%) given these species occupy a large habitat range across much of the Victorian alpine region of Melbourne.

Referral criteria	Potential Impacts
Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Dictionary of Important Wetlands in Australia'	No. The impact area is not listed under the Ramsar Convention or in 'A Dictionary of Important Wetlands in Australia'.
Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long time	Highly unlikely. Any excavation of quarry sites will not result in extensive or major adverse impacts of aquatic waterways within the study area due to the mitigations measures to be implemented as part of a CEMP.
Potential extensive or major effect on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residents	Unknown. Outside the scope of this report.
Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility	Unknown. Outside the scope of this report.
A combination of potential environmental effects A combination or two or more of the following types of potential effects on the environment that might be of regional or State significance, and therefore warrant referral of a project, are:	
Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Act or Fire Protection Plan	Yes. A total area of 25.558 hectares of native vegetation is proposed to be removed.
Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the *National Parks Act 1975*	Unlikely. The impact footprint is not within or adjoining a National Park. The proposed action is situated within an Environmental Significance Overlay – Schedule 1 (ESO1). It is considered likely that the works in this location will result in adverse effects to environmental features on site. However, a CEMP is proposed to ensure mitigation of potential impacts to adjacent values, including waterways. Significant Landscape Overlay – Schedule 16 (SLO16). This overlay largely bushland from visual impacts and maintain the existing rural character. It is unlikely the proposed action will result in negative visual impacts along public sight lines, however the project will result in a change to rural character of the site, which can be argued is already compromised due to the presence of the existing quarry site.

Referral criteria	Potential Impacts
Matters listed under the FFG Act: • Potential loss of a significant area of a listed ecological community; • Potential loss of a genetically important population of an endangered or threatened species; • Potential loss of critical habitat; or, • Potential significant effects on habitat values of a wetland supporting migratory birds.	No listed ecological communities were recorded within the study area. Powerful Owl, Dingo and Lace Monitor were recorded during the ecological assessments. These species, as well as other State significant fauna that may utilise the site are unlikely to see the loss of a genetically important population, or critical habitat for these species due to the proposed action. No loss of a genetically important population of an endangered or threatened species, loss of critical habitat or significant effects on habitat values of a wetland supporting migratory birds is likely to occur as a result of the proposed action.
Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short of long term	Unknown. Outside the scope of this report.
Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, streamflows or regional groundwater levels	Unknown. Outside the scope of this report.
Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities	Unknown. Outside the scope of this report.
Potential for extensive displacement of residences or severance or residential access to community resources due to infrastructure development	Unknown. Outside the scope of this report.
Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions	Unknown. Outside the scope of this report.
Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise chemical hazards or associated transport	Unknown. Outside the scope of this report.
Potential extensive or major effects on Aboriginal cultural heritage	Unknown. Outside the scope of this report.
Potential extensive or major effects on cultural heritage places listed on the Heritage Register of the Archaeological Inventory under the *Heritage Act 1995*.	Unknown. Outside the scope of this report.

6.2.1 *Implications*

Based on an assessment of ecological thresholds, an EES is likely to be triggered by the Project based on ecological impacts alone as greater than 10 hectares of native vegetation is proposed for removal.

It should be noted that Ecology and Heritage Partners' have not undertaken a detailed assessment of other non-ecological referral criteria detailed in DSE (2006).

6.3 *Flora and Fauna Guarantee Act 1988* (Victoria)

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected[1] flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). Powerful Owl which is listed as a threatened species under the FFG Act was recorded within the study area during the targeted surveys. An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

6.3.1 *Implications*

There are confirmed observations of two species listed as threatened and/or protected under the FFG Act. However, the study area is privately owned, and as such a permit under the FFG Act is not required.

6.4 Mineral Resources (Sustainable Development) Act 1990 (Victoria)

Mineral exploration, extractive industries and mining in Victoria are regulated under the *Mineral Resources (Sustainable Development) Act 1990* (DPI 2008). The purpose of this Act is to encourage an economically viable mining industry that operates in a way that is compatible with the environmental, social and economic objectives of the State.

Section 77G of the Act requires that the Work Plan includes a 'Rehabilitation Plan' for the progressive rehabilitation of land disturbed by the project.

The 'Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019' require that, as of 1 July 2021, the Rehabilitation Plan component of the draft Work Plan must include a description of the safe and sustainable landform and proposed land uses after rehabilitation, which must consider the community views expressed during consultation.

The Regulations also require that the draft Work Plan must include objectives that set out distinct rehabilitation domains, criteria for measuring whether the objectives have been met, a description of each measurable step in the process of rehabilitation. Further, the work plan must include an identification and assessment of the risks that may require monitoring, maintenance, treatment or other ongoing land

[1] In addition to 'listed' flora species, the FFG Act identifies 'protected' flora species. This includes any of the Asteraceae (Daisies), all orchids, ferns (excluding Pteridium esculentum) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*), as well as any taxa that may be a component of a listed ecological community. A species may be both listed and protected.

management activities after rehabilitation is complete - in relation to the environment, any member of the public, or land, property or infrastructure in the vicinity of the rehabilitated land.

6.4.1 *Implications*

Yarra Valley Quarries will need to prepare a Work Plan that includes a Rehabilitation Plan demonstrating the progressive rehabilitation of land disturbed by the project, and the proposed future land use for the site. This Work Plan will be developed post approval.

The obligations of the Guidelines are applied through the specific mechanism of the relevant legislation (in this case the MRSD Act) and where applicable vegetation avoidance and/or minimisation much be demonstrated, then offset any clearing much be applied and documented (DPI 2009). A Biodiversity and Rehabilitation Management Plan should be prepared and approved for the proposed quarry expansion. Any permitted removal of native vegetation associated with project will need to be offsets in accordance with an Offset / Land Management Plan under the Guidelines (DELWP 2017).

6.5 *Planning and Environment Act 1987* (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17, which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation, unless an exemption under Clause 52.17-7 applies. However, a planning permit to remove native vegetation is not required under Clause 52.17 as extractive Industry is listed in the table of exemptions to the Clause, and therefore the proposed removal of native vegetation is captured under the *Mineral Resources (Sustainable Development) Act 1990* where the works needs to take into account the requirements under the Guidelines (DELWP 2017).

6.5.1 *Local Planning Scheme*

The study area is located within the Yarra Ranges Shire Council. The following zoning and overlays apply (DEECA 2023d):

- Rural Conservation Zone – Schedule 1 (RCZ1)
- Rural Conservation Zone – Schedule 2 (RCZ2)
- Special Use Zone – Schedule 1 (SUZ1)
- Bushfire Management Overlay (BMO)
- Environmental Significance Overlay – Schedule 1 (ESO1 – SITE Z18 and SITE B47)

  An application must be accompanied by a written statement identifying how the proposed development has responded to the surrounding physical and environmental features, having regard to:

  - The significance of existing native vegetation and its value as a refuge or habitat for wildlife
  - Prevention of soil erosion
  - Protection of the environment and watercourses

- Protection of the site from wildlife
- Identification of areas within which development is to be precluded, and areas which require treatment in specified ways.
- Provision for an appraisal of areas in the vicinity of land affected by the overlay and the development of programs, where possible, which are supportive of the management of such land and for consideration of external factors in relation to the site, such as buffer zones, flight paths for birds, the need for the management of feral animals and the control of environmental weeds.
- Eradication of environmental weed infestations, to prevent degradation of the site.
- Protection of the site from domestic pets and vermin.

Before deciding on an application to construct a building, construct or carry out works or remove, destroy or lop vegetation, the responsible authority must consider, as appropriate:

- Whether the proposal will conflict with the objectives of this overlay.
- The significance of any remnant vegetation that may be affected by the proposal, in terms of its rarity, variety or as a habitat for wildlife.
- The need to avoid the clearing of any remnant indigenous vegetation, especially on slopes greater than 20 percent or within 30 metres of a watercourse.
- The capability of the particular site to accommodate the proposed development without adversely affecting the environmental features of the site and its environs or causing soil erosion or other land degradation.
- Any alternative means of locating proposed buildings and works so as to protect and enhance the environmental features of the site and its environs.
- Whether appropriate management practices are proposed, including the control of vermin and environmental weeds, domestic pets, the fencing of significant vegetation from grazing animals, the prevention of soil erosion, fire prevention measures, and revegetation of degraded areas with native plant species that are indigenous to the area within which they are to be used.
- The comments of the Department of Natural Resources and Environment.

- Erosion Management Overlay (EMO)
- Significant Landscape Overlay – Schedule 6 (SLO6)

  The following landscape character objectives are to be achieved:

  - To maintain a comparatively open rural landscape of farmland and bushland patches in which houses, farm buildings and tourist facilities are generally inconspicuous.
  - To ensure that the siting and design of new buildings complements their setting and reinforces the rural landscape character of the area.
  - To retain established trees and patches of indigenous vegetation as an important element of the rural landscape and habitat for wildlife.

- To allow middle and long distance views from the valley to the surrounding ranges.
- To maintain the appearance of an uninterrupted forested backdrop to views.

A number of decision guidelines apply to an application for a permit under Clause 42.03.

6.5.2 Implications

The application must consider the objectives, information requirements and decision guidelines outlined in the ESO1. An application must be submitted under Clause 42.01 and Clause 42.03 of the Yarra Ranges Planning Scheme.

6.5.3 The Guidelines

The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) and Clause 12.01 require Planning and Responsible Authorities to have regard for 'Guidelines for the removal, destruction or lopping of native vegetation' (Guidelines) (DELWP 2017). Where the clearing of native vegetation is permitted, the quantity and type of vegetation to be offset is determined using methodology specified in the Guidelines. The primary objective of the regulations is '*no net loss in the contribution made by native vegetation to Victoria's biodiversity*'.

A works authority application will be referred to DEECA as a 'recommending authority' given that the proposed vegetation removal will be assessed under the Detailed Assessment Pathway (See Section 5).

6.5.4 Implications

The study area is within Location 1, with 25.558 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Detailed assessment pathway.

The offset requirement for native vegetation removal is Species Habitat Units and 186 Large Trees (Appendix 3).

A works authority planning permit from the Yarra Ranges Shire Council is required to remove, destroy or lop any native vegetation under Clause 52.17 and Clause 42.01 (ESO1) of the Planning Scheme. A permit will also be required to remove any vegetation under Clause 42.03 (SLO3). As the permit application falls under the detailed assessment pathway, the application is required to be referred to DEECA.

6.6 *Catchment and Land Protection Act 1994* (Victoria)

The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species to minimise their spread and impact on ecological values.

6.6.1 Implications

One noxious weed listed as noxious under the *Catchment and Land Protection Act 1994* were recorded during the assessment (Blackberry *Rubus fruticosus* spp. agg). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (Feral Cat *Felis catus,* Red Fox *Vulpes Vulpes,* Sambar Deer *Rusa unicolor*). A Weed and/or Pest Management Plan may be required.

6.7 *Wildlife Act 1975* and Wildlife Regulations 2013 (Victoria)

The *Wildlife Act 1975* (and associated Wildlife Regulations 2013) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*, issued by DEECA.

6.7.1 Implications

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

6.8 *Water Act 1989* (Victoria)

The purposes of the *Water Act 1989* are manifold but (in part) relate to the orderly, equitable, efficient and sustainable use of water resources within Victoria. This includes the provision of a formal means of protecting and enhancing environmental qualities of waterways and their in-stream uses as well as catchment conditions that may affect water quality and the ecological environments within them.

6.8.1 Implications

Several permanent and ephemeral drainage lines / streams are present throughout the study area. A 'works on waterways' permit from the Melbourne Water CMA is likely to be required where any action impacts on waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DEECA with the Melbourne Water CMA included for comment.

7 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 19.

Table 19. Further requirements associated with development of the study area.

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The proposed action is not likely to result in a significant impact on matters of NES. However, an EPBC Act referral is likely to be submitted to the DCCEEW as part of the proposed quarry expansion for a determination under the EPBC Act.	Prepare and submit a referral to the Commonwealth Environment Minister at DCCEEW.
Environment Effects Act 1978 (Victoria)	The criteria for an EES referral are outlined in the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (DSE 2006). While the project impacts have yet to be considered against these EES Act referral criteria, a referral will be prepared and submitted to DEECA to receive a determination as to whether the proposed quarry expansion will trigger the requirement for an Environment Effects Statement. The key ecological considerations when referring a project under the EE Act for this particular project are the extent of the proposed native vegetation removal (i.e. greater than 10 hectares) and impacts on listed species and ecological communities.	Prepare and submit an EES referral to DEECA for determination by the Minister.
Flora and Fauna Guarantee Act 1988	There are confirmed observations of two species listed as threatened and/or protected under the FFG Act. However, the study area is privately owned, and as such a permit under the FFG Act is not required.	No further action required.
Mineral Resources (Sustainable Development) Act 1990 (Victoria)	Yarra Valley Quarries will need to prepare a Work Plan that includes a Rehabilitation Plan demonstrating the progressive rehabilitation of land disturbed by the project, and the proposed future land use for the site. This Work Plan will be developed post approval. The obligations of the Guidelines are applied through the specific mechanism of the relevant legislation (in this case the MRSD Act) and where applicable vegetation avoidance and/or minimisation much be demonstrated, then offset any clearing much be applied and documented (DPI 2009). A Biodiversity and Rehabilitation Management Plan should be prepared and approved for the proposed quarry expansion. Any permitted removal of native vegetation associated with project will need to be offsets in accordance with an Offset / Land Management Plan under the Guidelines (DELWP 2017).	Prepare and submit a Works Plan (approved by DEECA and DJPR) under the MRSD Act.
Planning and Environment Act 1987	The study area is within Location 1, with 25.558 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Detailed assessment pathway. The offset requirement for native vegetation removal is Species Habitat Units for seven significant species and 186 Large Trees. No General Habitat Units area required.	No further action required for native vegetation removal.
Catchment and Land Protection Act 1994	One weed species listed under the CaLP Act was recorded within the study area (Blackberry *Rubus fruticosus* spp. agg). To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	A Weed and/or Pest Management Plan will need to be included as part of the Work Plan.

Relevant Legislation	Implications	Further Action
Wildlife Act 1975	Any persons engaged to conduct salvage and relocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.
Water Act 1989	A 'works on waterways' permit is likely to be required from the Melbourne Water CMA where any action impacts on waterways within the study area.	Obtain a 'works on waterways' permit from the Melbourne Water CMA.

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FIGURES

See attachments

APPENDIX 1 – FLORA

Appendix 1.1 – Flora Results

Legend:

CR/EN/VU Listed as Critically Endangered/Endangered/Vulnerable under the EPBC Act;
L Listed under the FFG Act (DEECA 2023);
***** Listed as a noxious weed under the CaLP Act;
w Weed of National Significance;
Planted Victorian and non-Victorian species;
+ Planted indigenous species that also occur in native vegetation in the study area;
****** Planted indigenous species in the study area.

Table A1.1. Flora within the study area.

Scientific Name	Common Name	Notes
INDIGENOUS SPECIES		
Acacia dealbata	Silver Wattle	-
Acaena novae-zelandiae	Bidgee-widgee	-
Adiantum aethiopicum	Common Maidenhair	-
Annual Bedstraw	Galium microlobum	-
Australina pusilla	Shade Nettle	-
Austrostipa bigeniculata	Kneed Spear-grass	-
Billardiera scandens s.l.	Common Apple-berry	-
Blechnum cartilagineum	Gristle Fern	-
Blechnum nudum	Fishbone Water-fern	-
Caladenia carnea s.s.	Pink Fingers	-
Callitriche muelleri	Round Water-starwort	-
Calystegia spp.	Bindweed	-
Carex appressa	Tall Sedge	-
Cassinia aculeata	Common Cassinia	-
Clematis aristata	Mountain Clematis	-
Clematis glycinoides	Forest Clematis	-
Coprosma quadrifida	Prickly Currant-bush	-
Cyathea australis	Rough Tree-fern	-
Dichondra repens	Kidney-weed	-
Dicksonia antarctica	Soft Tree-fern	-
Digitaria spp.	Summer Grass	-
Drosera auriculata	Tall Sundew	-

Scientific Name	Common Name	Notes
Duma florulenta	Tangled Lignum	-
Epacris impressa	Common Heath	-
Eucalyptus cypellocarpa	Mountain Grey-gum	-
Eucalyptus obliqua	Messmate Stringybark	-
Geranium spp.	Crane's Bill	-
Gonocarpus spp.	Raspwort	-
Goodenia ovata	Hop Goodenia	-
Grevillea spp.	Grevillea	-
Histiopteris incisa	Bat's Wing Fern	-
Hypericum gramineum spp. agg.	Small St John's Wort	-
Kunzea spp.	Kunzea	-
Lepidosperma elatius	Tall Sword-sedge	-
Lepidosperma laterale	Variable Sword-sedge	-
Lomandra longifolia	Spiny-headed Mat-rush	-
Microlaena stipoides var. *stipoides*	Weeping Grass	-
Olearia argophylla	Musk Daisy-bush	-
Olearia lirata	Snowy Daisy-bush	-
Oxalis corniculata s.l.	Yellow Wood-sorrel	-
Pandorea pandorana subsp. *pandorana*	Wonga Vine	-
Phyllanthus gunnii	Shrubby Spurge	-
Pimelea axiflora	Bootlace Bush	-
Platylobium formosum spp. agg.	Handsome Flat-pea	-
Polystichum proliferum	Mother Shield-fern	-
Pomaderris aspera	Hazel Pomaderris	-
Pteridium esculentum	Austral Bracken	-
Pterostylis spp.	Greenhood	-
Pultenaea juniperina s.l.	Prickly Bush-pea	-
Rubus parvifolius	Native Raspberry	-
Sambucus gaudichaudiana	White Elderberry	-
Schoenus spp.	Bog Sedge	-
Sigesbeckia spp.	Sigesbeckia	-
Spyridium parvifolium	Dusty Miller	-
Stackhousia monogyna s.l.	Creamy Stackhousia	-
Syzygium smithii	Lilly Pilly	-
Tetrarrhena juncea	Forest Wire-grass	-
Thelymitra spp.	Sun Orchid	-

Scientific Name	Common Name	Notes
Viola hederacea sensu Entwisle (1996)	Ivy-leaf Violet	-
Walwhalleya proluta	Rigid Panic	-
Xanthorrhoea minor	-	-
NON-INDIGENOUS OR INTRODUCED SPECIES		
Avena fatua	Wild Oat	-
Camellia spp.	Camellia	-
Cenchrus clandestinus	Kikuyu	-
Cirsium vulgare	Spear Thistle	*
Elymus repens	Couch Grass	-
Hedra Helix	English Ivy	-
Hypochaeris radicata	Flatweed	-
Ilex aquifolium	English Holly	-
Jacobaea vulgaris	Ragwort	-
Platycerium bifurcatum	Elkhorn Fern	-
Prunella vulgaris	Self-heal	-
Ranunculus spp.	Buttercup	-
Rubus fruticosus spp. agg.	Blackberry	*,w
Tradescantia fluminensis	Wandering Jew	-
Zantedeschia aethiopica	Arum Lily	-

Appendix 1.2 – Habitat Hectare Assessment

Table A1.2. Habitat Hectare Assessment Table.

Bioregion		Highlands_Southern_Fall	Highlands_Southern_Fall	Highlands_Southern_Fall
EVC / Tree		Damp Forest	Riparian Forest	Shrubby Foothill Forest
EVC Number		29	18	45
EVC Conservation Status		Least Concern	Least Concern	Least Concern
Patch Condition	Large Old Trees /10	9	9	9
	Canopy Cover /5	4	4	4
	Under storey /25	20	15	15
	Lack of Weeds /15	13	13	15
	Recruitment /10	3	3	1
	Organic Matter /5	5	5	5
	Logs /5	5	5	5
	Treeless EVC Multiplier	1.00	1.00	1.00
	Subtotal =	59.00	54.00	54.00
Landscape Value /25		20	20	20
Habitat Points /100		79	74	74
Habitat Score		**0.79**	**0.74**	**0.74**

Appendix 1.4 – Significant Flora Species

Significant flora within 10 kilometres of the study area is provided in the Table A1.4.3 at the end of this section, with Tables A1.4.1 and A1.4.2 below providing the background context for the values in Table 1.4.3.

Table A1.4.1 Conservation status of each species for each Act. The values in this table correspond to Columns 5 and 6 in Table A1.4.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):		FFG (*Flora and Fauna Guarantee Act 1988*):	
EX	Extinct	ex	Extinct
CR	Critically endangered	cr	Critically endangered
EN	Endangered	en	Endangered
VU	Vulnerable	vu	Vulnerable
#	Listed on the Protected Matters Search Tool		

Table A1.4.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 7 in Table A1.4.3.

1	Known Occurrence	• Recorded within the study area recently (i.e. within ten years).
2	High Likelihood	• Previous records of the species in the local vicinity; and/or, • The study area contains areas of high-quality habitat.
3	Moderate Likelihood	• Limited previous records of the species in the local vicinity; and/or • The study area contains poor or limited habitat.
4	Low Likelihood	• Poor or limited habitat for the species, however other evidence (such as lack of records or environmental factors) indicates there is a very low likelihood of presence.
5	Unlikely	• No suitable habitat and/or outside the species range.

Table A1.4.3 Significant flora recorded within 10 kilometres of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE							
Amphibromus fluitans #	River Swamp Wallaby-grass, Floating Swamp Wallaby-grass	-	-	VU	-	4	Low quality habitat with only few preferred habitat characteristics. Largely confined to permanent swamps and not found during targeted surveys.
Astelia australiana #	Tall Astelia	-	-	VU	en	3	Only known from few populations in Victoria, the closest being Bunyip State Park. However the preferred shaded, moist, high humidity, woodland habitat is present on site.
Asterolasia asteriscophora subsp. *albiflora #*	White Star-bush	-	-	CR	cr	5	Preferred damp sclerophyll habitat not present on site, and only known population is far from the study area (>10km).
Dianella amoena	Matted Flax-lily	6	2020	EN	cr	5	Preferred habitat not present. Largely confined to drier grasslands and grassy woodlands.
Eucalyptus crenulata #	Silver Gum, Buxton Gum	-	-	EN	en	5	No recent records within vicinity. Only preferred swampy habitat not present.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Eucalyptus strzeleckii #	Strzelecki Gum	-	-	VU	cr	5	Restricted to western section of Strzelecki Ranges.
Glycine latrobeana #	Clover Glycine, Purple Clover	-	-	VU	vu	4	Some characteristics of preferred grassy woodland habitat present on site. However not detected during targeted surveys.
Lepidium aschersonii #	Spiny Peppercress	-	-	VU	en	5	Prefers lake margins and shallow marshes on heavy clay soils with most records in western Victoria.
Pomaderris vacciniifolia #	Round-leaf Pomaderris	-	-	CR	cr	3	Preferred damp forest habitat present within study area and known to occur within Yarra Ranges National Park, however not detected during targeted surveys.
Pterostylis chlorogramma #	Green-striped Greenhood	-	-	VU	en	3	No recent records nearby the study area however exact range uncertain. Preferred moist shrubby forest habitat present within study area, however not detected during targeted surveys.
Senecio psilocarpus #	Swamp Fireweed, Smooth-fruited Groundsel	-	-	VU	-	5	Preferred herb-rich wetland habitat does not occur on site.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Thelymitra orientalis #	Hoary Sun-orchid	-	-	CR	cr	5	Grows in heathy flats usually on sandy soils. None present on site.
Thesium australe #	Austral Toadflax, Toadflax	-	-	VU	en	4	Often grows in damp grasslands and woodlands. Some characteristics of preferred habitat present on site, however all recent records from highland Victoria.
Xerochrysum palustre #	Swamp Everlasting, Swamp Paper Daisy	-	-	VU	cr	5	Occurs in lowland swamps and wetlands. Preferred habitat is not present on site and no records within the vicinity.
STATE SIGNIFICANCE							
Acacia howittii	Sticky Wattle	2	2019	-	vu	3	Some recent records just outside 10km radius of the study area. Species preferred habitat of moist forest occurs on site.
Acacia leprosa var. *uninervia*	Large-leaf Cinnamon-wattle	49	2011	-	en	3	Known population in ranges near Healesville. Preferred dry forest habitat present on site.
Acacia nanodealbata	Dwarf Silver-wattle	1	1972	-	vu	3	Few recent records in vicinity of the study area, however known to occur in forests between Healesville and Warburton.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Acacia stictophylla	Dandenong Wattle	2	2018	-	en	3	Few recent records within vicinity of study area, however locally common within Dandenong Ranges. Preferred habitat of hilly and riparian forests occurs on site.
Austrostipa rudis subsp. *australis*	Veined Spear-grass	4	2005	-	en	4	No recent records within study area vicinity and prefers sandy or sandstone derived soils which are not present on site.
Billardiera scandens s.s.	Velvet Apple-berry	2	1987	-	en	4	Prefers dry forest, woodland and heath. Some characteristics of preferred habitat present however no recent records within 10km of the study area.
Bossiaea cordigera	Wiry Bossiaea	5	2007	-	en	4	Some characteristics of preferred habitat present. Prefers moist heathland and heathy woodland. No recent records near study area.
Caladenia flavovirens	Christmas Spider-orchid	6	2017	-	cr	3	Occurs in montane grassy forest. Some characteristics of preferred habitat present on site and some recent records from Yarra Ranges National Park.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Calochilus imberbis	Naked Beard-orchid	3	2008	-	cr	4	Rare in Victoria with no recent records nearby the study area. Prefers dry forests and woodlands, little habitat present within study area.
Carex alsophila	Forest Sedge	2	1980	-	en	3	Preferred mountain gullies and swamps. No recent records within vicinity of study area however some suitable habitat present on site.
Chiastocaulon biserialis	Olive Featherwort	1	1953	-	cr	4	Poorly understood species, however primarily Tasmanian distribution. One historic record within 10km of the study area.
Chiloglottis jeanesii	Mountain Bird-orchid	2	2016	-	vu	3	Primarily known from fern gullies and wet scleropyll forests of the Dandenong Ranges, however some records within 10km of the study area and some characteristics of preferred habitat present.
Corybas aconitiflorus	Spurred Helmet-orchid	7	2008	-	en	4	Some characteristics of preferred habitat present. However prefers sandy soils and no recent records within the vicinity of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Corybas grumulus	Mountain Helmet-orchid	2	2020	-	en	3	Grows in wet sclerophyll forests and fern gullies often in rotting logs. Some preferred habitat is present on site and one population known within the Yarra Ranges National Park.
Corymbia maculata	Spotted Gum	1	1991	-	vu	5	Preferers open forests and has almost no records within the vicinity of the study area. Large conspicuous species unlikely to be missed during surveys.
Cyathea cunninghamii	Slender Tree-fern	3	1989	-	cr	4	Only known in deep gullies within Dandenong Ranges. Little suitable habitat present on site and no recent records within 10km of the study area.
Dicranoloma platycaulon	Wavy Fork-moss	7	2011	-	en	3	Occurs in wet forests with some known records in Yarra Ranges National Park. Some potential habitats within Riparian Forest EVC.
Distichophyllum crispulum	Crisped Mitre-moss	18	2011	-	en	3	Occurs in wet forests with some records in Yarra Ranges National Park. Some potential habitats within Riparian Forest EVC.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Diuris punctata var. *punctata*	Purple Diuris	1	1892	-	en	5	No preferred habitat present. Prefers grasslands and open grassy woodlands.
Eucalyptus fulgens	Green Scentbark	90	2019	-	en	4	Occurs east of Healesville with some recent records within 10km of the study area. However little preferred habitat present.
Eucalyptus sideroxylon subsp. *sideroxylon*	Mugga	1	1991	-	en	5	No recent records within 10km of the study area. Prefers infertile shallow soils.
Eucalyptus yarraensis	Yarra Gum	12	2000	-	cr	4	few records within 10km of the study area, few characteristics of preferred woodland slopes present on site.
Fimbristylis velata	Veiled Fringe-sedge	2	1990	-	en	4	Almost no records within 10km of the study area. Prefers seasonally wet depressions beside lakes and rivers. Some low quality habitat present within Riparian Forest EVC.
Goodia pubescens	Silky Golden-tip	8	2011	-	en	4	Few records within 10km of the study area. Some characteristics of preferred sclerophyll forest present on site.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Grevillea repens	Creeping Grevillea	3	1906	-	en	4	No recent records within 10km of the study area. Known population within forests north of Healesville.
Hypocreopsis amplectens	Clasping Hypocreopsis	9	2021	-	cr	4	Few records within 10km of the study area. Only one known host plant (Kunzea) present within the study area.
Isolepis wakefieldiana	Tufted Club-sedge	1	1979	-	en	4	Only historic records within 10km of the study area. Prefers cool moist soils, some potential low quality habitat present in Riparian Forest EVC.
Lindsaea microphylla	Lacy Wedge-fern	1	1993	-	en	4	Few characteristics of preferred heath and open forest present within the study area. Closest recent records near Gembrook approximately 20km from the study area.
Mitrasacme polymorpha	Varied Mitrewort	1	1979	-	en	5	Prefers coastal heaths. No recent records and no preferred habitat present.
Oxalis magellanica	Snowdrop Wood-sorrel	1	1972	-	en	5	Found within the flood zone of rivers and around waterfalls within mountain forests. No preferred habitat present.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Persoonia arborea	Tree Geebung	10	2021	-	en	3	Prefers wet, montane, tall open Eucalypt forests. Some potential habitat present within the study area and known populations within wider Yarra Ranges forests.
Phebalium squamulosum subsp. *squamulosum*	Forest Phebalium	5	1998	-	en	4	Prefers foothill to montane forests historically with populations east of Healesville. However only few historic records within the study area.
Platylobium reflexum	Victorian Flat-pea	2	2020	-	en	3	Prefers tall wet forest. Some suitable habitat present within the study area. No recent records within 10km of study area however some within wider Yarra Ranges forests.
Pterostylis X ingens	Sharp Greenhood	1	1974	-	vu	4	Prefers moist areas around swamps and stream banks. Little suitable habitat present. No recent records however Natural hybrid between *P. nutans* and *P. falcata* and some records of both parent plants within 10km of study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Senecio campylocarpus	Floodplain Fireweed	1	2008	-	en	4	Prefers loam and clay soils in seasonally inundated areas of woodland. Some suitable habitat present within Riparian Forest EVC however no recent records within 10km of the study area.
Tetratheca stenocarpa	Long Pink-bells	1	1978	-	en	4	Grows in open and montane forests. No recent records within 10km of the study area however some characteristics of preferred habitat present on site and locally common between Yarra Junction and Gembrook
Thismia rodwayi	Fairy Lanterns	1	2002	-	en	5	Restricted to deep leaf litter in harshly shaded tall forests and gullies. No suitable habitat present.
Tmesipteris ovata	Oval Fork-fern	1	1982	-	en	5	Prefers wet rainforests and streams. No suitable habitat present on site and no recent records within 10km of the study area.
Utricularia gibba	Floating Bladderwort	2	2007	-	en	5	Occurs in lakes and lake edges, only ephemeral water sources on site. No recent records within 10km of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Westringia senifolia	Alpine Westringia	6	2006	-	en	5	Prefers rocky mountains at high altitude. No suitable habitat present within the study area.
Wittsteinia vacciniacea	Baw Baw Berry	2	1980	-	vu	5	No recent records within 10km of the study area. Prefers rainforests and subalpine woodland, no suitable habitat present in the study area.

Data Sources: Victorian Biodiversity Atlas (DEECA 2024d); Protected Matters Search Tool (DCCEEW 2024).

APPENDIX 2 – FAUNA

Appendix 2.1 – Significant Fauna Species

Significant fauna within 10 kilometres of the study area is provided in the Table A2.1.3 at the end of this section, with Tables A2.1.1 and A2.1.2 below providing the background context for the values in Table 2.1.3.

Table A2.1.1 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 8 in Table A2.1.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):				FFG (*Flora and Fauna Guarantee Act 1988*):			
EX	Extinct	VU	Vulnerable	ex	Extinct	vu	Vulnerable
CR	Critically endangered	CD	Conservation Dependent	cr	Critically endangered	cd	Conservation Dependent
EN	Endangered	#	Listed on the Protected Matter Search Tool	en	Endangered		

Table A2.1.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 9 in Table A2.1.3.

1	Known Occurrence	• Recorded within the project area recently (i.e. within 10 years).
2	High Likelihood	• Likely resident in the study area based on site observations, database records, or expert advice; and/or, • Recent records (i.e. within five years) of the species in the local area (DEECA 2024a); and/or, • The study area contains the species' preferred habitat.
3	Moderate Likelihood	• The species is likely to visit the study area regularly (i.e. at least seasonally); and/or, • Previous records of the species in the local area (DEECA 2024a); and/or, • The study area contains some characteristics of the species' preferred habitat.
4	Low Likelihood	• The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or, • There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, • The study area contains few or no characteristics of the species' preferred habitat.
5	Unlikely	• No previous records of the species in the local area; and/or, • The species may fly over the study area when moving between areas of more suitable habitat; and/or,

		• Out of the species' range; and/or, • No suitable habitat present.

Table A2.1.3 Significant fauna recorded within 10 kilometres of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE							
Antechinus minimus maritimus #	Swamp Antechinus (mainland)	-	-	VU	vu	5	Outside species known range
Anthochaera phrygia	Regent Honeyeater	1	1909	CR	cr	4	Few nearby records
Botaurus poiciloptilus	Australasian Bittern	1	2005	EN	cr	5	No suitable habitat
Calidris acuminata	Sharp-tailed Sandpiper	1	1977	VU	-	5	No suitable habitat
Calidris ferruginea #	Curlew Sandpiper	-	-	CR	cr	5	No suitable habitat
Callocephalon fimbriatum	**Gang-gang Cockatoo**	**184**	**2020**	**EN**	**en**	**1**	**Detected during habitat surveys**
Climacteris picumnus	Brown Treecreeper	5	2019	VU	-	2	Suitable habitat. Likely to visit study area on occasion
Dasyurus maculatus maculatus	Spot-tailed Quoll	1	1994	EN	en	4	Edge of species range, not detected during camera trapping event
Delma impar #	Striped Legless Lizard, Striped Snake-lizard	-	-	VU	en	5	Outside species known range
Falco hypoleucos #	Grey Falcon	-	-	VU	vu	5	Outside species known range

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Gallinago hardwickii	Latham's Snipe	9	2019	VU	-	3	Limited suitable habitat for the species. May visit the study area opportunistically when moving between areas of higher quality habitat
Grantiella picta #	Painted Honeyeater	-	-	VU	vu	4	Few nearby records. Edge of species known range
Gymnobelideus leadbeateri	Leadbeater's Possum	26	2021	CR	cr	3	Some suitable habitat, not detected during camera trapping event
Hirundapus caudacutus	White-throated Needletail	30	2019	VU	vu	4	Likely to only use site opportunistically during migration – flyover
Isoodon obesulus obesulus	Southern Brown Bandicoot	18	2020	EN	en	4	Edge of species range
Lathamus discolor	Swift Parrot	5	1978	CR	cr	4	Limited foraging eucalypt species within study area. May occasionally use site opportunistically during migration
Lichenostomus melanops cassidix	Helmeted Honeyeater	148	1997	CR	cr	5	Outside species known range
Liopholis montana #	Mountain Skink	-	-	EN	en	4	Edge of species range
Lissolepis coventryi	Swamp Skink	2	1995	EN	en	5	No suitable habitat
Litoria raniformis	Growling Grass Frog	13	2000	VU	vu	5	Outside species known range
Maccullochella peelii	Murray Cod	6	1982	VU	en	4	Edge of species range

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Macquaria australasica	Macquarie Perch	11	2015	EN	en	4	Limited suitable habitat
Mastacomys fuscus mordicus #	Broad-toothed Rat (mainland), Tooarrana	-	-	EN	vu	4	Not detected during camera trapping event
Melanodryas cucullata cucullata #	South-eastern Hooded Robin, Hooded Robin (south-eastern)	-	-	EN	vu	5	No suitable habitat
Nannoperca obscura #	Yarra Pygmy Perch	-	-	EN	vu	5	No suitable habitat
Neophema chrysostoma #	Blue-winged Parrot	-	-	VU	-	4	Limited suitable habitat
Pedionomus torquatus #	Plains-wanderer	-	-	CR	cr	5	Outside species known range
Petauroides volans	**Southern Greater Glider**	**104**	**2021**	**EN**	**en**	**1**	**Detected during spotlighting surveys**
Petaurus australis	Yellow-bellied Glider	78	2020	VU	vu	2	Moderate quality habitat, likely to use site opportunistically, not detected during surveys
Potorous tridactylus trisulcatus #	Long-nosed Potoroo (southern mainland)	-	-	VU	vu	5	Outside species known range
Prototroctes maraena	Australian Grayling	8	2015	VU	en	4	Poor quality habitat, unsuitable water body flow regime
Pseudemoia cryodroma #	Alpine Bog Skink, Alpine Bog-skink	-	-	EN	en	5	No suitable habitat due to low altitude
Pseudomys fumeus #	Smoky Mouse, Konoom	-	-	EN	en	3	Edge of species range, not detected during camera trapping event
Pseudomys novaehollandiae #	New Holland Mouse, Pookila	-	-	VU	en	5	Outside species known range

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Pteropus poliocephalus #	Grey-headed Flying-fox	-	-	VU	vu	3	No nearby known roosting sites
Pycnoptilus floccosus	Pilotbird	26	2019	VU	vu	2	Moderate quality habitat, likely to use site opportunistically, not detected during surveys
Rostratula australis #	Australian Painted Snipe	-	-	EN	cr	5	No suitable habitat
Stagonopleura guttata	Diamond Firetail	1	1980	VU	vu	5	No suitable habitat
Synemon plana #	Golden Sun Moth	-	-	VU	vu	5	No suitable habitat
Tringa nebularia #	Common Greenshank, Greenshank	-	-	EN	en	5	No suitable habitat
STATE SIGNIFICANCE							
Accipiter novaehollandiae	Grey Goshawk	27	2020	-	en	3	Likely to only use site opportunistically when moving between areas of preferred habitat
Acrodipsas myrmecophila	Small Ant Blue Butterfly	8	1921	-	en	5	No suitable habitat
Ardea alba modesta	Eastern Great Egret	18	2019	-	vu	4	Limited suitable aquatic habitat
Ardeotis australis	Australian Bustard	1	1847	-	cr	5	No suitable habitat
Aythya australis	Hardhead	55	2019	-	vu	4	Limited suitable aquatic habitat
Biziura lobata	Musk Duck	22	2019	-	vu	4	Limited suitable aquatic habitat
Canis lupus dingo	**Dingo**	**1**	**2015**	**-**	**vu**	**1**	**Recorded during remote camera surveys**

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Egretta garzetta	Little Egret	1	1994	-	en	4	Limited suitable aquatic habitat
Falco subniger	Black Falcon	3	1999	-	cr	4	Likely to only use site opportunistically on occasion
Geopelia cuneata	Diamond Dove	1	1981	-	vu	5	Outside species known range
Haliaeetus leucogaster	White-bellied Sea-Eagle	10	2017	-	en	3	Likely to only use site opportunistically – flyover
Hemiphlebia mirabilis	Ancient Greenling Damselfly	3	1959	-	en	5	No suitable habitat
Hieraaetus morphnoides	Little Eagle	9	2020	-	vu	3	Likely to only use site opportunistically when moving between areas of preferred habitat
Hyridella narracanensis	Narracan Corrugated Mussel	7	2016	-	en	4	Poor quality habitat
Lewinia pectoralis	Lewin's Rail	2	1997	-	vu	4	No suitable habitat
Lophoictinia isura	Square-tailed Kite	8	2019	-	vu	3	Likely to only use site opportunistically when moving between areas of preferred habitat
Miniopterus orianae oceanensis	Eastern Bent-winged Bat	6	1999	-	cr	4	Limited suitable habitat
Ninox connivens	Barking Owl	4	2001	-	cr	3	Few nearby records, not detected during spotlighting surveys
Ninox strenua	**Powerful Owl**	**63**	**2022**	**-**	**vu**	**1**	**Recorded during spotlighting**

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Ornithorhynchus anatinus	Platypus	82	2021	-	vu	2	Some nearby recent records and suitable habitat present
Oxyura australis	Blue-billed Duck	11	2019	-	vu	4	Minimal suitable aquatic habitat
Pasma tasmanica	Two-spotted Grass-skipper Butterfly	1	1941	-	en	4	Few nearby records, low quality habitat
Phascogale tapoatafa	Brush-tailed Phascogale	5	1998	-	vu	3	Some habitat present, not detected during camera trapping event
Plectrotarsus gravenhorstii	Caddisfly	2	1953	-	en	4	Poor quality habitat
Pomatostomus temporalis	Grey-crowned Babbler	1	1958	-	vu	5	Outside of species known range
Pseudemoia pagenstecheri	Tussock Skink	1	1964	-	en	5	No suitable habitat
Pseudemoia rawlinsoni	Glossy Grass Skink	1	1976	-	en	5	No suitable habitat
Pseudophryne bibronii	Brown Toadlet	3	1962	-	en	4	Edge of species range, poor quality habitat
Pseudophryne semimarmorata	Southern Toadlet	31	1978	-	en	2	Edge of species range. Some suitable habitat in the form of forested areas containing ephemeral drainage lines and gullies.
Pyrrholaemus sagittatus	Speckled Warbler	1	1896	-	en	4	Poor quality habitat, edge of species range
Rhinolophus megaphyllus megaphyllus	Eastern Horseshoe Bat	1	1998	-	en	5	Outside species known range
Sminthopsis leucopus	White-footed Dunnart	2	1978	-	vu	5	No suitable habitat

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Spatula rhynchotis	Australasian Shoveler	7	2019	-	vu	4	Minimal suitable aquatic habitat
Synoicus chinensis	King Quail	2	1981	-	en	5	No suitable habitat
Tyto novaehollandiae	Masked Owl	1	1983	-	cr	3	Few nearby records, not detected during spotlighting surveys
Tyto tenebricosa	Sooty Owl	38	2020	-	en	2	Moderate quality habitat, likely to use site opportunistically, not detected during surveys
Varanus varius	**Lace Monitor**	**24**	**2019**	**-**	**en**	**1**	**Recorded during camera trapping**

Data Sources: Victorian Biodiversity Atlas (DEECA 2024d); Protected Matters Search Tool (DCCEEW 2024).

Appendix 2.2 – Fauna Recorded within the Study Area

Table A2.2. Fauna recorded within the study area.

Common name	Scientific name	Present survey
MAMMALS		
Agile Antechinus	*Antechinus agilis*	RC
Bare-nose Wombat	*Vombatus ursinus*	RC
Brown Rat*	*Rattus norvegicus*	RC
Bush Rat	*Rattus fuscipes*	RC
Common Brushtail Possum	*Trichosurus vulpecula*	RC / SP
Common Ringtail Possum	*Lepus europeaus*	RC / SP
Dingo	*Canis lupus dingo*	RC
Feral Cat*	*Felis catus*	RC
Greater Glider	*Petauroides volans*	SP
Mountain Brushtail Possum	*Trichosurus cunninghami*	RC
Red Fox*	*Vulpes vulpes*	RC
Sambar Deer*	*Rusa unicolor*	Incidental / RC
Short-beaked Echidna	*Tachyglossus aculeatus*	RC
Sugar Glider	*Petaurus breviceps*	RC
Swamp Wallaby	*Wallabia bicolor*	RC / SP
BIRDS		
Golden Whistler	*Pachycephala pectoralis*	Incidental
Australian Wood Duck	*Chenonetta jubata*	RC
Brown Thornbill	*Acanthiza pusilla*	RC / Incidental
Spotted Pardalote	*Pardalotus punctatus*	Incidental
Little Raven	*Corvus mellori*	Incidental
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	Incidental
Grey Fantail	*Rhipidura albiscapa*	Incidental
Superb Lyrebird	*Menura novaehollandiae*	RC / Incidental
Eastern Whipbird	*Psophodes olivaceus*	RC / Incidental
Grey Shrike Thrush	*Colluricincla harmonica*	RC / Incidental
Eastern Yellow Robin	*Eopsaltria australis*	RC / Incidental
Bassian Thrush	*Zoothera lunulata*	RC
White-browed Scrubwren	*Sericornis frontalis*	RC / Incidental
Common Blackbird*	*Turdus merula*	RC
Crimson Rosella	*Platycercus elegans*	RC / Incidental
Eastern Rosella	*Platycercus eximius*	Incidental

Common name	Scientific name	Present survey
Australian Owlet Nightjar	*Aegotheles cristatus*	SP
Southern Boobook	*Ninox boobook*	SP
Powerful Owl	*Ninox strenua*	SP
Willie Wagtail	*Rhipidura leucophrys*	Incidental
King Parrot	*Alisterus scapularis*	Incidental
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Incidental
Silvereye	*Zosterops lateralis*	Incidental
Grey Currawong	*Strepera versicolor*	RC / Incidental
Eastern Spinebill	*Acanthorhynchus tenuirostris*	Incidental
Yellow-faced Honeyeater	*Lichenostomus chrysops*	Incidental
Rose Robin	*Petroica rosea*	Incidental
Red Wattlebird	*Anthochaera carunculata*	Incidental
Sulphur-crested Cockatoo	*Cacatua galerita*	Incidental
Grey Butcherbird	*Cracticus torquatus*	Incidental
White-throated Treecreeper	*Cormobates leucophaea*	Incidental
Pied Currawong	*Strepera graculina*	Incidental
Laughing Kookaburra	*Dacelo novaeguineae*	Incidental
Scarlet Robin	*Petroica boodang*	Incidental
White-naped Honeyeater	*Melithreptus lunatus*	Incidental
Flame Robin	*Petroica phoenicea*	Incidental
Superb Fairywren	*Malurus cyaneus*	Incidental
Red Wattlebird	*Anthochaera carunculata*	Incidental
REPTILES		
Lace Monitor	*Varanus varius*	RC
Southern Water Skink	*Eulamprus tympanum tympanum*	Incidental
Tiger Snake	*Notechis scutatus*	Incidental
AMPHIBIANS		
Eastern Banjo Frog	*Limnodynastes dumerilii*	SP
Southern Brown Tree Frog	*Litoria ewingii*	SP
FISH / AQUATIC INVERTEBTRATES		
Burrowing Crayfish spp.	*Engaeus spp.*	SP

Notes: * = Introduced Species, SP = Spotlighting, RC = Remote Cameras.

Data Sources: Number and Date of records = Victorian Biodiversity Atlas (DEECA 2024a), Hollow Use: Victorian Fauna Database (Viridans 2014b), Migratory and Marine: *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Taxonomic order: Mammals (Strahan 1995 in Menkhorst and Knight 2004); Birds (Christidis and Boles, 2008); Reptiles and Amphibians (Cogger et al. 1983 in Cogger 1996); Fish (Nelson 1994); Mussels and Crustaceans (Alphabetical); Invertebrates (Alphabetical).

Appendix 2.3 – Weather Conditions

Table A2.3 Weather conditions during the field surveys.

Date	Survey Event	Temperature			9:00 AM			3:00 PM		
		Min (°C)	Max (°C)	Rain (mm)	Temp. (°C)	Relative humidity (%)	Wind speed (km/h)	Temp. (°C)	Relative humidity (%)	Wind speed
12/10/2020	Terrestrial Fauna Surveys, Incidental Observations, Spotlighting, Nocturnal Call Playback, Active Searching	2.3	22.6	0	7.5	100	0	22.0	48	17
15/10/2020		11.2	22.4	0	21.5	54	13	19.7	72	6
16/10/2020		8.6	18.8	5.0	11.8	72	13	18.0	61	6
16/11/2020		18.3	24.8	0.2	21.8	47	20	24.1	31	30
17/11/2020		5.9	21.9	0	14.0	72	4	20.2	48	9
18/11/2020		4.6	27.6	0	15.8	66	4	26.6	27	9
19/11/2020		9.4	32.7	0	22.4	52	6	31.6	24	22
26/11/2020		12.2	21.9	0	17.5	76	17	20.9	60	13
23/12/2020		12.4	21.0	6.8	12.8	99	9	19.0	53	9
14/01/2021		13.9	23.6	0	15.8	88	7	22.8	41	19

Source: Australian Bureau of Meteorology - Temperature, humidity, wind, and rainfall observations from Coldstream, Victoria (Station 086383).

APPENDIX 3 – NATIVE VEGETATION REMOVAL REPORT

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 07/06/2024 10:38 **Report ID: 24794**

What was searched for?

Species offset

Common Name (*Scientific name*)	**Species habitat units**
Brickmaker's Sedge *(Gahnia grandis)*	34.58
Round-leaf Pomaderris *(Pomaderris vacciniifolia)*	34.765
Long Pink-bells *(Tetratheca stenocarpa)*	34.765
Mountain Bird-orchid *(Chiloglottis jeanesii)*	28.074
Silky Golden-tip *(Goodia pubescens)*	34.765
Green Scentbark *(Eucalyptus fulgens)*	34.765
Powelltown Correa *(Correa reflexa var. lobata)*	34.765
with number of large trees 186	

Details of available native vegetation credits on 07 June 2024 10:38

These sites meet all your requirements for species offsets.

Credit Site ID	**LT**	**CMA**	**LGA**	**Land owner**	**Trader**	**Fixed price**	**Broker(s)**

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements.

These sites meet some of your requirements for species offsets, you may be able to meet all your requirements across multiple sites.

Credit Site ID	**LT**	**CMA**	**LGA**	**Land owner**	**Trader**	**Fixed price**	**Broker(s)**
BBA-0678	2599	Melbourne Water	Nillumbik Shire	No	Yes	No	VegLink

Species common name	**Species scientific name**	**SHU**
Round-leaf Pomaderris	Pomaderris vacciniifolia	44.665
Green Scentbark	Eucalyptus fulgens	44.663

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no potential sites listed in the Native Vegetation Credit Register that meet your offset requirements.

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

For more information contact the DEECA Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au

APPENDIX 4 – OFFSET CREDIT REGISTER

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **06/06/2024**
Time of issue: **1:34 pm**

Report ID: EHP_2024_097

Project ID	EHP14246_LaunchingPlace_VG94v8

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	25.558 ha
Extent of past removal	0.000 ha
Extent of proposed removal	25.558 ha
No. Large trees proposed to be removed	186
Location category of proposed removal	Location 1 The native vegetation is not in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map), sensitive wetland or coastal area. Removal of less than 0.5 hectares in this location will not have a significant impact on any habitat for a rare or threatened species

1. Location map

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

Species offset amount[1]	34.580 species units of habitat for Brickmaker's Sedge, *Gahnia grandis* 34.765 species units of habitat for Round-leaf Pomaderris, *Pomaderris vacciniifolia* 34.765 species units of habitat for Long Pink-bells, *Tetratheca stenocarpa* 28.074 species units of habitat for Mountain Bird-orchid, *Chiloglottis jeanesii* 34.765 species units of habitat for Silky Golden-tip, *Goodia pubescens* 34.765 species units of habitat for Green Scentbark, *Eucalyptus fulgens* 34.765 species units of habitat for Powelltown Correa, *Correa reflexa var. lobata*
Large trees	186 trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
4-LT	Scattered Tree	hsf_0045	Least Concern	1	no	0.200	0.070	0.063	0.560	0.806	0.023	501390 Brickmaker's Sedge *Gahnia grandis*
										0.806	0.023	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.806	0.023	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.806	0.023	504600 Silky Golden-tip *Goodia pubescens*
										0.806	0.023	505175 Green Scentbark *Eucalyptus fulgens*
										0.806	0.023	505404 Powelltown Correa *Correa reflexa var. lobata*
11-LT	Scattered Tree	hsf_0029	Least Concern	1	no	0.200	0.070	0.070	0.620	0.790	0.025	501390 Brickmaker's Sedge *Gahnia grandis*
										0.790	0.025	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.790	0.025	503354 Long Pink-bells *Tetratheca stenocarpa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.443	0.025	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.790	0.025	504600 Silky Golden-tip *Goodia pubescens*
										0.790	0.025	505175 Green Scentbark *Eucalyptus fulgens*
										0.790	0.025	505404 Powelltown Correa *Correa reflexa var. lobata*
2-C	Patch	hsf_0045	Least Concern	30	no	0.740	4.831	4.831	0.538	0.802	6.440	501390 Brickmaker's Sedge *Gahnia grandis*
										0.806	6.456	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.806	6.456	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.069	6.454	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.806	6.456	504600 Silky Golden-tip *Goodia pubescens*
										0.806	6.456	505175 Green Scentbark *Eucalyptus fulgens*
										0.806	6.456	505404 Powelltown Correa *Correa reflexa var. lobata*
3-C	Patch	hsf_0045	Least Concern	33	no	0.740	4.752	4.752	0.558	0.804	6.342	501390 Brickmaker's Sedge *Gahnia grandis*
										0.803	6.341	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.803	6.341	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.803	6.341	504600 Silky Golden-tip *Goodia pubescens*
										0.803	6.341	505175 Green Scentbark *Eucalyptus fulgens*
										0.803	6.341	505404 Powelltown Correa *Correa reflexa var. lobata*
4-B	Patch	hsf_0018	Least Concern	9	no	0.740	2.142	2.142	0.574	0.792	2.840	501390 Brickmaker's Sedge *Gahnia grandis*
										0.796	2.846	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.796	2.846	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.132	2.749	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.796	2.846	504600 Silky Golden-tip *Goodia pubescens*
										0.796	2.846	505175 Green Scentbark *Eucalyptus fulgens*
										0.796	2.846	505404 Powelltown Correa *Correa reflexa var. lobata*
6-A	Patch	hsf_0029	Least Concern	86	no	0.790	9.813	9.813	0.562	0.775	13.760	501390 Brickmaker's Sedge *Gahnia grandis*
										0.796	13.923	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.796	13.923	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.172	13.563	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.796	13.923	504600 Silky Golden-tip *Goodia pubescens*
										0.796	13.923	505175 Green Scentbark *Eucalyptus fulgens*
										0.796	13.923	505404 Powelltown Correa *Correa reflexa var. lobata*
7-C	Patch	hsf_0045	Least Concern	8	no	0.740	0.613	0.613	0.550	0.794	0.814	501390 Brickmaker's Sedge *Gahnia grandis*
										0.794	0.814	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.794	0.814	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.022	0.731	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.794	0.814	504600 Silky Golden-tip *Goodia pubescens*
										0.794	0.814	505175 Green Scentbark *Eucalyptus fulgens*
										0.794	0.814	505404 Powelltown Correa *Correa reflexa var. lobata*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
8-C	Patch	hsf_0045	Least Concern	1	no	0.740	0.139	0.139	0.410	0.554	0.160	501390 Brickmaker's Sedge *Gahnia grandis*
										0.554	0.160	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.554	0.160	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.015	0.138	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.554	0.160	504600 Silky Golden-tip *Goodia pubescens*
										0.554	0.160	505175 Green Scentbark *Eucalyptus fulgens*
										0.554	0.160	505404 Powelltown Correa *Correa reflexa var. lobata*
9-C	Patch	hsf_0045	Least Concern	0	no	0.740	0.000	0.000	0.416	0.384	0.000	501390 Brickmaker's Sedge *Gahnia grandis*
										0.384	0.000	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.384	0.000	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.384	0.000	504600 Silky Golden-tip *Goodia pubescens*
										0.384	0.000	505175 Green Scentbark *Eucalyptus fulgens*
										0.384	0.000	505404 Powelltown Correa *Correa reflexa var. lobata*
10-C	Patch	hsf_0045	Least Concern	0	no	0.740	0.002	0.002	0.550	0.810	0.002	501390 Brickmaker's Sedge *Gahnia grandis*
										0.810	0.002	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.810	0.002	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.810	0.002	504600 Silky Golden-tip *Goodia pubescens*
										0.810	0.002	505175 Green Scentbark *Eucalyptus fulgens*
										0.810	0.002	505404 Powelltown Correa *Correa reflexa var. lobata*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
11-C	Patch	hsf_0045	Least Concern	0	no	0.740	0.011	0.011	0.540	0.820	0.015	501390 Brickmaker's Sedge *Gahnia grandis*
										0.820	0.015	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.820	0.015	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.820	0.015	504600 Silky Golden-tip *Goodia pubescens*
										0.820	0.015	505175 Green Scentbark *Eucalyptus fulgens*
										0.820	0.015	505404 Powelltown Correa *Correa reflexa var. lobata*
5-A	Patch	hsf_0029	Least Concern	17	no	0.790	3.121	3.121	0.581	0.686	4.158	501390 Brickmaker's Sedge *Gahnia grandis*
										0.686	4.158	502675 Round-leaf Pomaderris *Pomaderris vacciniifolia*
										0.686	4.158	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.274	4.413	504499 Mountain Bird-orchid *Chiloglottis jeanesii*
										0.686	4.158	504600 Silky Golden-tip *Goodia pubescens*
										0.686	4.158	505175 Green Scentbark *Eucalyptus fulgens*
										0.686	4.158	505404 Powelltown Correa *Correa reflexa var. lobata*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Long Pink-bells	*Tetratheca stenocarpa*	503354	Rare	Dispersed	Habitat importance map	0.0145
Powelltown Correa	*Correa reflexa var. lobata*	505404	Rare	Dispersed	Habitat importance map	0.0137
Mountain Bird-orchid	*Chiloglottis jeanesii*	504499	Rare	Dispersed	Habitat importance map	0.0116
Brickmaker's Sedge	*Gahnia grandis*	501390	Vulnerable	Dispersed	Habitat importance map	0.0102
Green Scentbark	*Eucalyptus fulgens*	505175	Rare	Dispersed	Habitat importance map	0.0079
Round-leaf Pomaderris	*Pomaderris vacciniifolia*	502675	Endangered	Dispersed	Habitat importance map	0.0071
Silky Golden-tip	*Goodia pubescens*	504600	Rare	Dispersed	Habitat importance map	0.0056
Eastern Horseshoe Bat	*Rhinolophus megaphyllus megaphyllus*	11303	Vulnerable	Dispersed	Habitat importance map	0.0044
Large-leaf Cinnamon-wattle	*Acacia leprosa var. uninervia*	505141	Rare	Dispersed	Habitat importance map	0.0044
Smoky Mouse	*Pseudomys fumeus*	11458	Endangered	Dispersed	Habitat importance map	0.0041
Forest Sedge	*Carex alsophila*	500622	Rare	Dispersed	Habitat importance map	0.0039
Leafless Pink-bells	*Tetratheca subaphylla*	503355	Rare	Dispersed	Habitat importance map	0.0034
Lacy Wedge-fern	*Lindsaea microphylla*	502015	Rare	Dispersed	Habitat importance map	0.0032
Tufted Club-sedge	*Isolepis wakefieldiana*	501789	Rare	Dispersed	Habitat importance map	0.0031
Forest Phebalium	*Phebalium squamulosum subsp. squamulosum*	504817	Rare	Dispersed	Habitat importance map	0.0031
Oval Fork-fern	*Tmesipteris ovata*	503404	Rare	Dispersed	Habitat importance map	0.0019
Parsley Xanthosia	*Xanthosia leiophylla*	504562	Rare	Dispersed	Habitat importance map	0.0017
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	11008	Endangered	Dispersed	Habitat importance map	0.0016

Sooty Owl	*Tyto tenebricosa tenebricosa*	10253	Vulnerable	Dispersed	Habitat importance map ; special site	0.0016
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0015
Nunniong Everlasting	*Ozothamnus rogersianus*	501623	Rare	Dispersed	Habitat importance map	0.0011
Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0011
Greater Glider	*Petauroides volans*	11133	Vulnerable	Dispersed	Habitat importance map ; special site	0.0009
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0009
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0006
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0006
Small Fork-fern	*Tmesipteris parva*	503405	Rare	Dispersed	Habitat importance map	0.0006
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0005
Floodplain Fireweed	*Senecio campylocarpus*	507136	Rare	Dispersed	Habitat importance map	0.0001
White Star-bush	*Asterolasia asteriscophora subsp. albiflora*	505647	Endangered	Dispersed	Habitat importance map	0.0001
Veined Spear-grass	*Austrostipa rudis subsp. australis*	504940	Rare	Dispersed	Habitat importance map	0.0000
Varied Mitrewort	*Mitrasacme polymorpha*	502211	Rare	Dispersed	Habitat importance map	0.0000
Jungle Bristle-fern	*Cephalomanes caudatum*	502094	Rare	Dispersed	Habitat importance map	0.0000

Habitat group

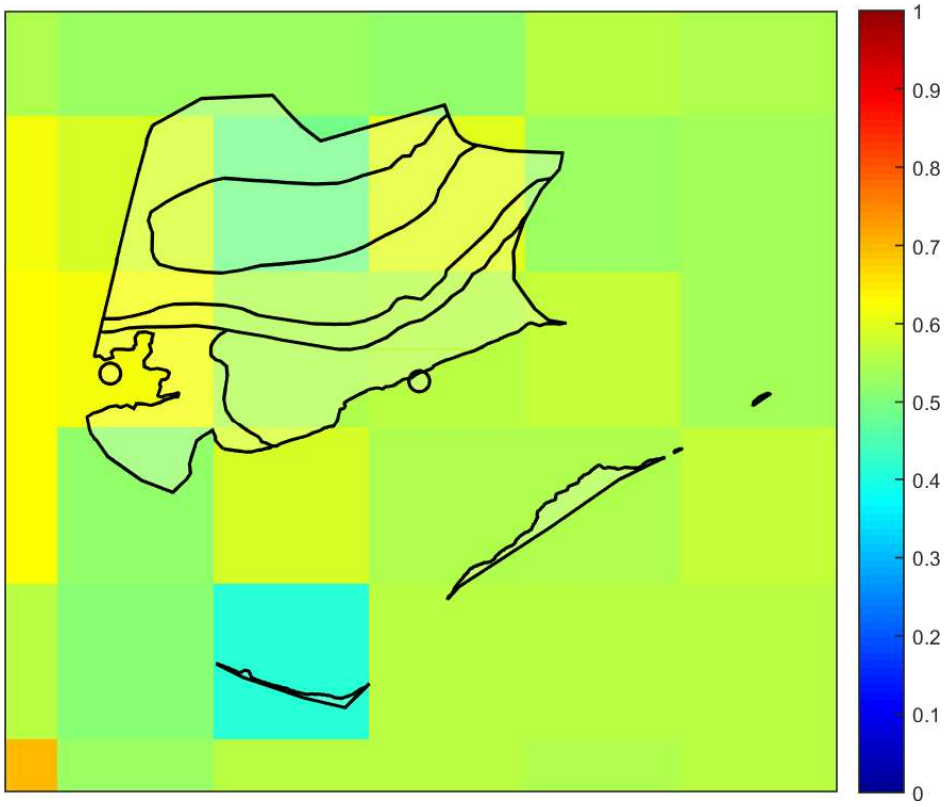
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

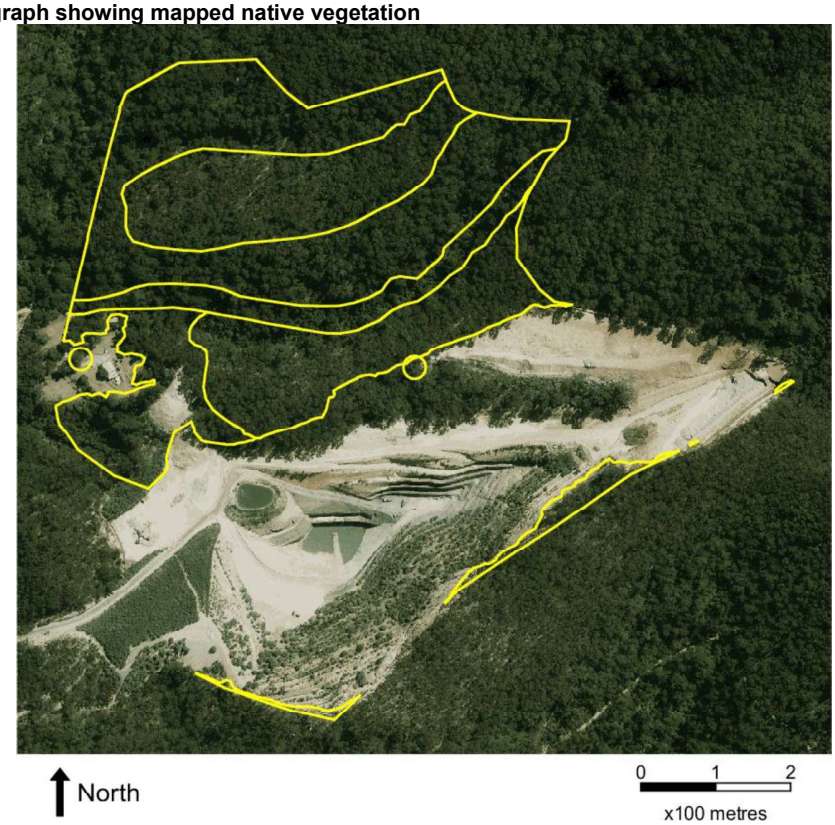
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

Appendix 3 – Images of mapped native vegetation

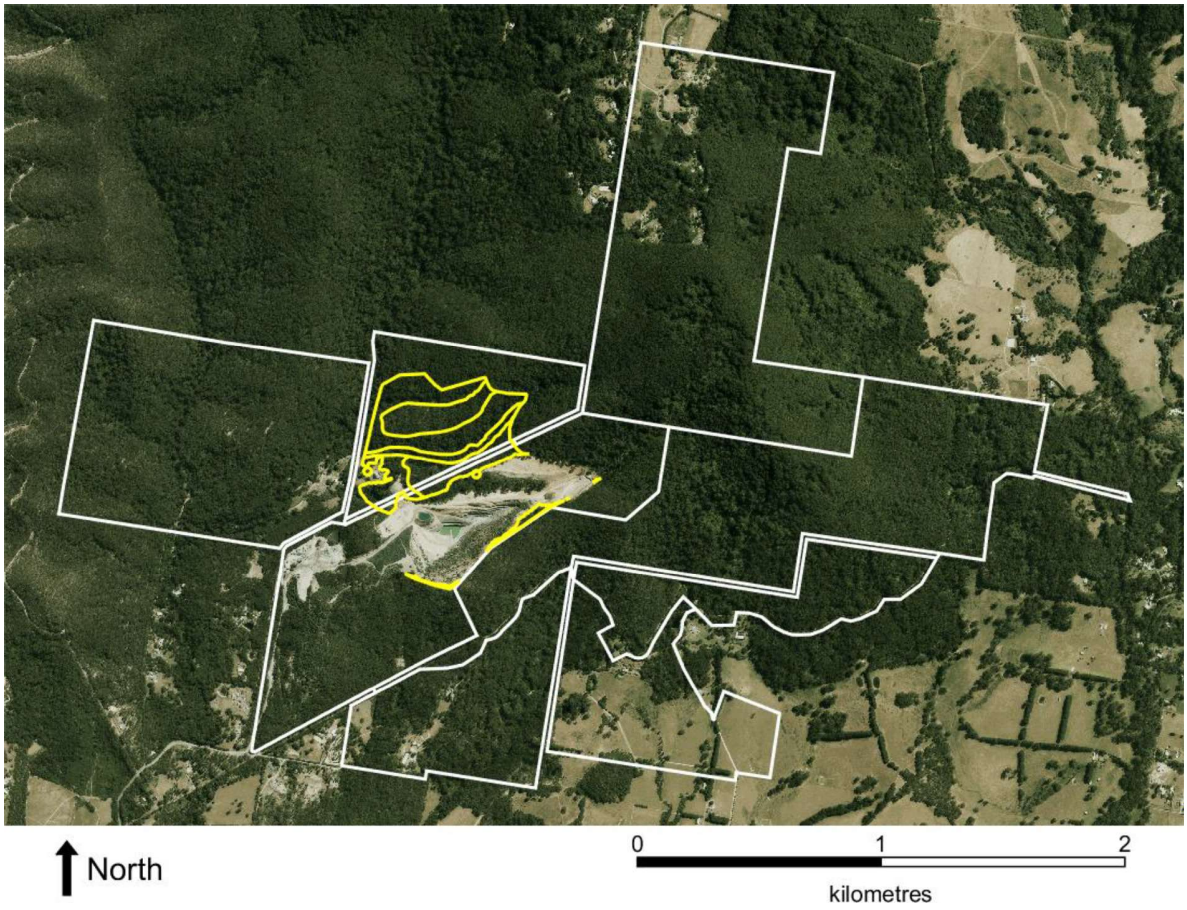
2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation



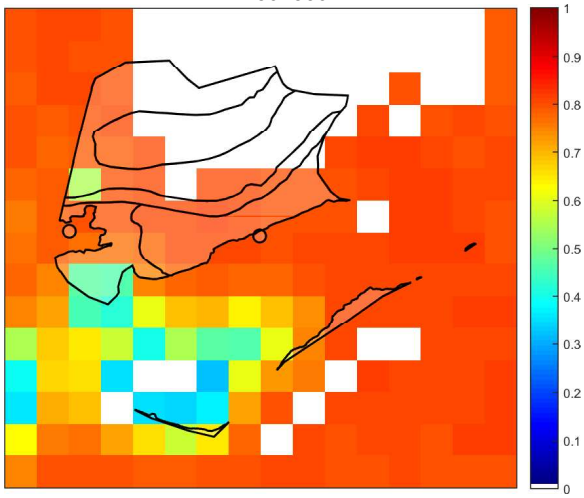
4. Map of the property in context



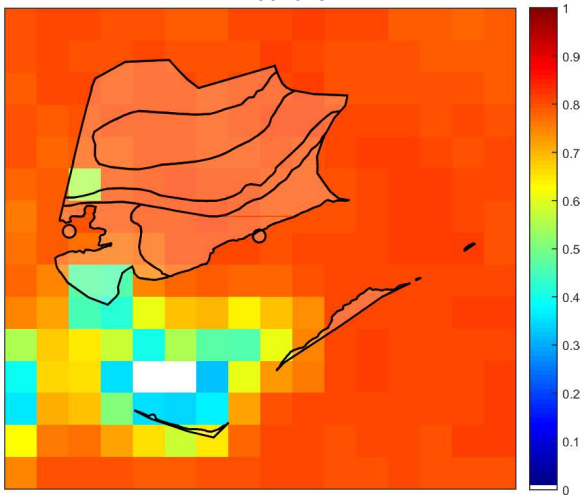
Yellow boundaries denote areas of proposed native vegetation removal.

4. Habitat importance maps

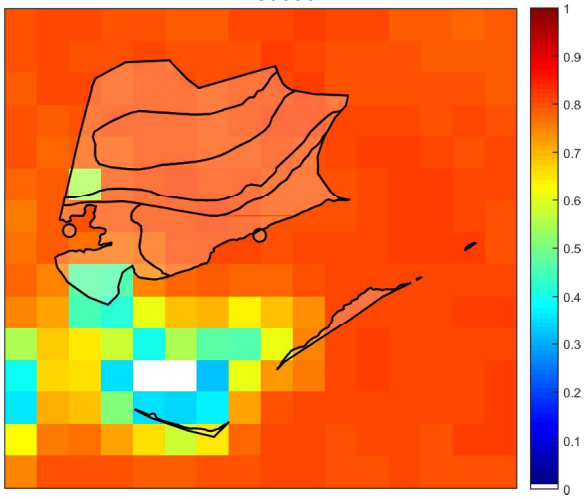
Brickmaker's Sedge
Gahnia grandis
501390



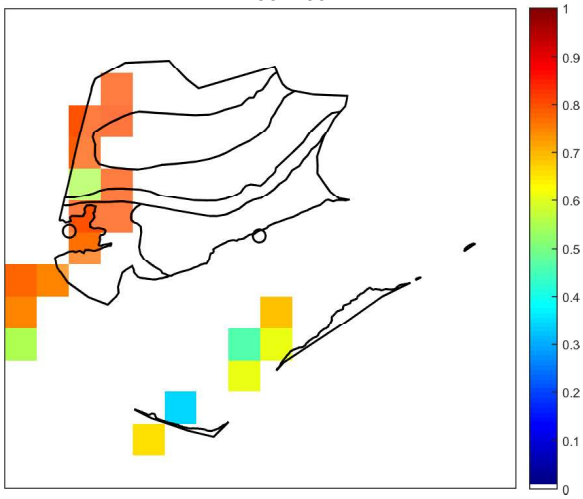
Round-leaf Pomaderris
Pomaderris vacciniifolia
502675



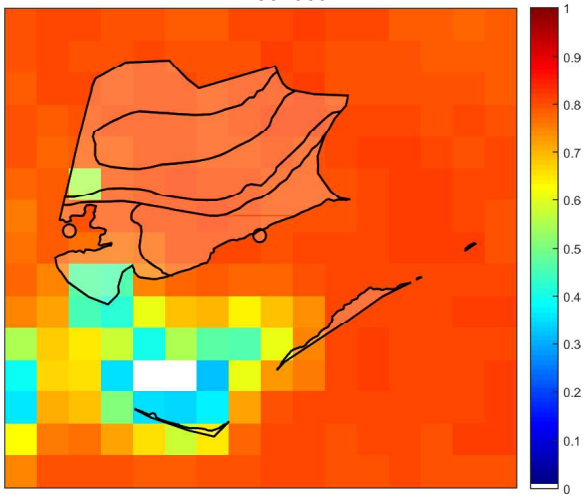
Long Pink-bells
Tetratheca stenocarpa
503354



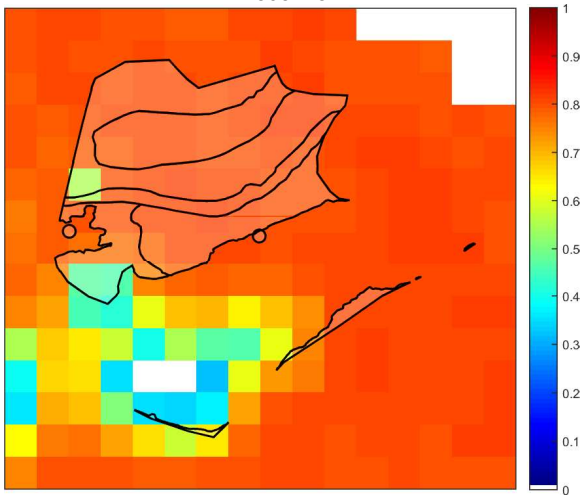
Mountain Bird-orchid
Chiloglottis jeanesii
504499



Silky Golden-tip
Goodia pubescens
504600



Green Scentbark
Eucalyptus fulgens
505175



Powelltown Correa
Correa reflexa var. lobata
505404