ECOLOGY AUSTRALIA

Ecological Assessment - 69 Barton Road, Moyston

Prepared for: Darren House

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Cover photo: Sand Forest, Barton Rd, Moyston

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Summary

Ecology Australia was engaged by Darren House to undertake a native vegetation clearing and ecological assessment at 69 Barton Road, Moyston. A sand quarry is proposed for part of the site and the proponent is currently in the process of applying for a work plan under the *Mineral Resources (Sustainable Development) Act 1990*. The following report presents the findings of both a desktop and site assessment. This includes an assessment under the *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017b), and an ecological assessment of potential impacts, based on a desktop review, field assessments and targeted surveys for selected threatened species.

Ecological values

Flora

Three vegetation communities (Ecological Vegetation Classes, EVCs) were identified onsite, they included:

- Sand Forest (EVC 134) – the dominant vegetation type onsite, this EVC includes a canopy dominated by Rough-barked Manna-gum (*Eucalyptus viminalis* subsp. *cygnetensis*, scattered understorey trees and large shrubs comprising wattles (*Acacia* spp.) and Prickly Tea-tree (*Leptospermum continentale*). The ground layer is dominated by Bracken (*Pteridium esculentum*), but also supports indigenous grasses and a diversity of other herbs.
- Sedgy Riparian Woodland (EVC 198) - Sedgy Riparian Woodland occurs within a low-lying area in the south-west section of the site. It supports an open canopy of Swamp Gums (*Eucalyptus ovata*) and Red Gums (*E. camaldulensis*), and an understorey dominated by sedges, rushes and ephemeral herbs. This vegetation is in relatively good condition.
- Plains Grassy Woodland (EVC 55) - Plains Grassy Woodland is confined to relatively small patches in the northern section of the study area. It comprises a canopy of Red Gum and an understorey dominated by exotic grasses and other herbs, with some native grasses scattered throughout.

A total of 75 flora taxa were recorded during the site assessment, of which 23% (17) were exotic. No species recorded during the initial site survey or seasonal targeted surveys (in spring) are listed under the EPBC Act 1999, FFG Act 1988 or classified as rare or threatened in Victoria.

A total of 24 rare or threatened flora species have been previously recorded or predicted to occur within 5 km of the site, and an additional nine species listed under the EPBC Act and/or FFG Act have been recorded within 10 km. Seven threatened species were given a moderate likelihood of occurrence within the site, prior to undertaking targeted flora surveys. These included Trailing Hop-bush (*Dodonaea procumbens*) which is listed under the EPBC Act 1999. Additional flora species were included for targeted survey at the request of DELWP; these included Spiny Rice-flower (*Pimelea spinescens*), Clover Glycine (*Glycine latrobeana*), Swamp Diuris (*Diuris palustris*) and Annual Buttons (*Leptorhynchos orientalis*). None of these species or other threatened flora species were recorded during targeted surveys. Consequently their likelihood of occurrence has been revised to low or unlikely to occur.

Fauna

The property supports two main fauna habitat types: woodland / forest habitats and open pasture:

- The woodland and forest habitats within the study area retain a relatively simple habitat structure, comprising a eucalypt-dominated canopy over an open mid-storey of wattles and Prickly Tea-tree, with a dense ground layer of Bracken or sedges. These habitats provide foraging and nesting resources for a diversity of bird species, and small mammals. Low-lying areas that support wet depressions also provide potential habitat for amphibians.
- Areas of open pasture are dominated by introduced grasses and support relatively few fauna habitat values. These areas predominantly provide foraging habitat for open-country, ground-feeding bird species, raptors and large macropods.

A total of 59 vertebrate fauna species were recorded during the field surveys, including 42 bird, 12 mammal, three amphibian and two reptile species, of which six were exotic. None of these species are listed as threatened under the EPBC Act 1999 or the FFG Act 1988.

A total of eight threatened fauna species have previously been recorded within 5 km the study area, and another 12 threatened fauna species have previously been recorded within 10 km of the study area. The EPBC Act Protected Matters Search Tool identified a further 16 species listed under the EPBC Act which may occur, or for which potential habitat may occur, within 5 km of the study area. Of these species, three were considered to have moderate likelihood of occurrence within the study area; they included the EPBC-Act listed Southern Brown Bandicoot *Isoodon obesulus obesulus*; and the FFG Act-listed Barking Owl *Ninox connivens connivens* and Brown Toadlet *Pseudophryne bibronii*. Targeted surveys for these species were undertaken in accordance with Federal and Victorian survey guidelines. None of these species, or any other species listed as threatened under the EPBC Act 1999 or the FFG Act 1988, was recorded; their likelihood of occurrence has been revised to low based on the results of the surveys and habitat suitability.

Policy and legislation

***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Flora and Fauna Guarantee Act 1988* (FFG Act)**

No ecological communities listed under the EPBC or FFG Acts have been recorded or are considered likely to occur within the study area.

No flora or fauna species listed under the EPBC or FFG Acts are considered to have a moderate or higher likelihood of occurrence within the site. Targeted surveys were undertaken for Trailing Hop-bush, Spiny Rice-flower, Clover Glycine, Swamp Diuris and Annual Buttons, however none of these species were detected within the extraction area (or adjoining offset area). Targeted surveys were also undertaken for the Southern Brown Bandicoot, Barking Owl and Brown Toadlet. These species were not recorded within the property.

Environment Effects Act 1978

The current clearing proposal would result in the loss of greater than 10 ha of native vegetation, which is has a conservation status of Endangered. No threatened or FFG Act listed species has been identified within the study area.

A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred. The removal of 10 ha of an endangered vegetation community is one of the criteria for referral, and therefore an EES referral is recommended. This referral will also needs to consider all ecological as well as other non-ecological referral criteria.

Planning and Environment Act 1987

In relation to biodiversity, the following Clauses of the Ararat planning scheme are relevant to the site with consideration to permit requirements:

- Clause 52.17 Native Vegetation
- Clause 42.02 Vegetation Protection Overlay – Schedule 1 (VPO1)
- Clause 42.03 Significant Landscape Overlay – Schedule 1 (SLO1)

An exemption for mineral exploration is available for planning consideration under all of the above Clauses:

Native vegetation that is to be removed, destroyed or lopped to the minimum extent necessary to enable the carrying out of stone extraction in accordance with a work plan approved under the Mineral Resources (Sustainable Development) Act 1990 (MRSD Act) and authorised by a work authority under that Act (DELWP 2017b).

The purpose of this exemption is to avoid duplicative approval processes by not requiring a planning permit for native vegetation removal that occurs with approval under the MRSD Act. To rely on this exemption (i.e. to remove native vegetation), an agreement between Department of Economic, Development, Jobs, Transport (DEDJT) and Earth Resources (the department responsible for administering the MRSD Act) and DEWLP requires that the approval process for a work plan involve assessment of offsetting of native vegetation removal in accordance with the *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017b).

Assessment of native vegetation removal

The proposal involves the removal of c. 12.1 ha of Sand Forest EVC, which has a conservation status of Endangered in the Greater Grampians bioregion.

An offset area proposed adjacent to the extraction area provided 2.894 general habitat units and all of the large tree requirements for the offset. An additional offset area will be required for the difference of 5.571 general habitat units.

A summary of the native vegetation loss and offset requirements is as follows:

Losses	
Assessment pathway:	Detailed
Location category:	2
Extent of proposed removal:	12.116 ha
Native vegetation to be cleared	Patch
Extent of past removal (in last 5 years):	0 ha
No of large trees proposed for removal:	47
Strategic Biodiversity Value Scores:	0.612 – 0.634
Offsets	
Offset type	General

Offset amount (units)	8.465 general habitat units
Vicinity	Wimmera Catchment Management Authority or Ararat Rural City Council
Minimum strategic biodiversity value score	0.507
Large old trees	47

1 Introduction

Ecology Australia was engaged by Darren House to undertake a native vegetation clearing and ecological assessment at 69 Barton Road, Moyston. A sand quarry is proposed for part of the site and the proponent is currently in the process of applying for a work plan under the *Mineral Resources (Sustainable Development) Act 1990*. The site has been previously assessed by Ecology and Heritage Partners (EHP 2018). This report was reviewed by Ecology Australia, and Ecology Australia was subsequently engaged to undertake a formal site assessment and prepare the following report.

This report presents the findings of both a desktop and site assessment, and includes:

- A summary of the biodiversity values;
- Figures showing the location of remnant vegetation;
- Potential policy and legislation implication associated with the proposed works;
- An assessment under the *Guidelines for the removal, destruction and lopping of native vegetation* (the Guidelines) (DELWP 2017a);
- Summary of the proposed onsite offset area and potential gains that can be achieved within the area; and
- Recommendations for avoiding and minimising impacts to biodiversity.

Information within this report can be used to assist with development of the Work Plan.

1.1 Study area

The subject site is approximately 46 ha and located 5.6 km southwest of the township of Moyston and 2 km east of the Grampians National Park (Figure 1).

The site is located in the Greater Grampians bioregion, the Wimmera Catchment Management Authority (CMA) and the Ararat Rural City Council municipality. It is zoned Farming and subject to a number of overlays, including:

- Bushfire Management Overlay
- Significant Landscape Overlay – Schedule 1 (SLO1)
- Vegetation Protection Overlay – Schedule 1 (VPO1).

Within the VPO1 the site is identified as Site of Biological Significance Site 61 – which is noted for its 'Sand Forest and Plains Grassy Woodland, Endangered Ecological Vegetation Classes' (DELWP 2018e).

Parts of the site are also recognised as areas of aboriginal cultural heritage sensitivity and maybe subject to approvals under the *Aboriginal Heritage Act 2006* (DELWP 2018f).

The site has a history of grazing.

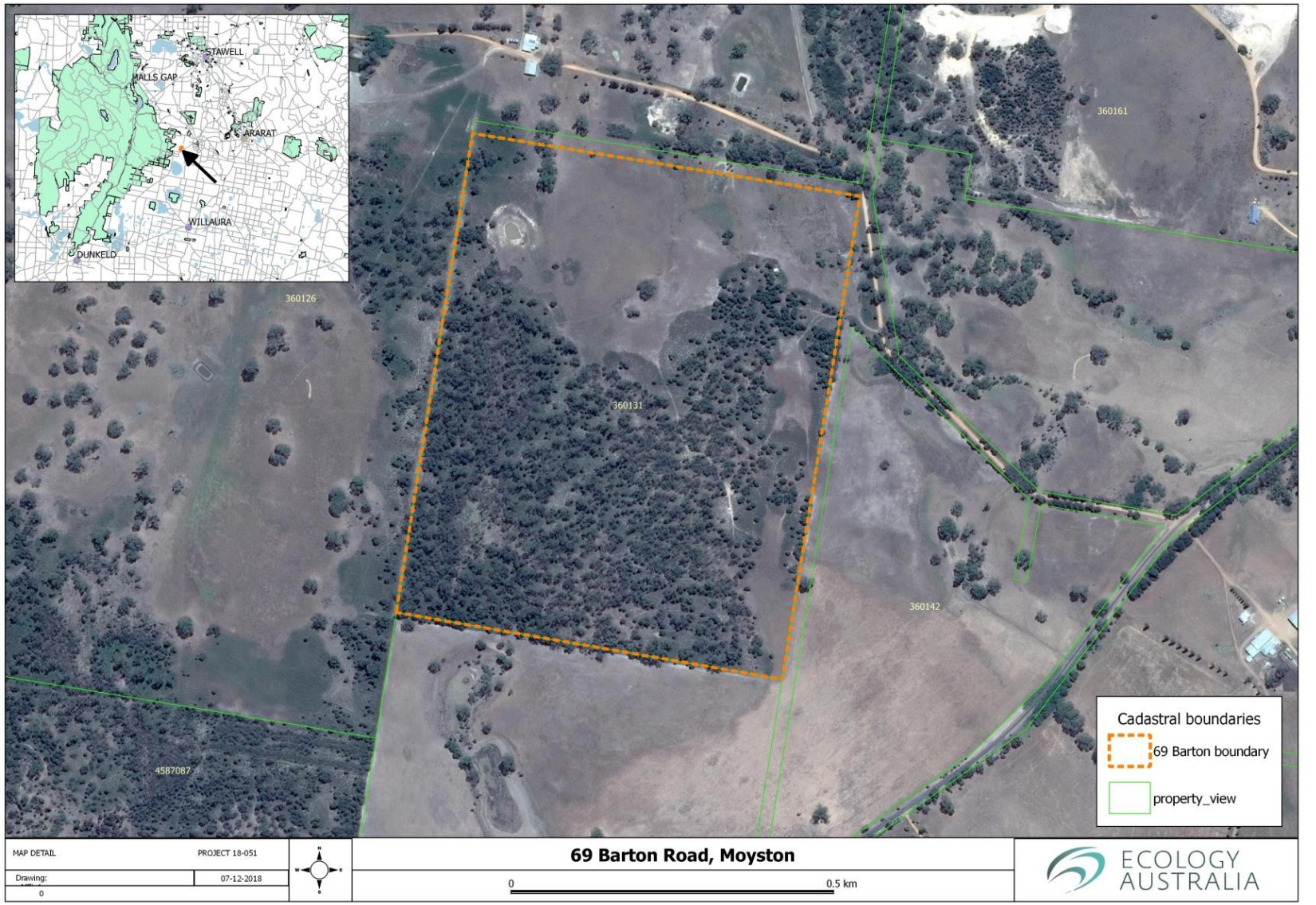

Figure 1 Study area, 69 Barton Road, Moyston

2 Methods

2.1 Data review

Data and information were reviewed from relevant databases pertaining to the study site and surrounds including:

- Flora and fauna records within 5 and 10 km of the study area (referred to as the Data Review Area) held in the Victoria Biodiversity Atlas (VBA), a state-wide database maintained by the Department of Environment, Land, Water and Planning (DELWP 2018a) which includes species listed under the EPBC Act, FFG Act 1988, the Advisory list of rare or threatened plants in Victoria 2014 (DEPI 2014), the Advisory List of Threatened Vertebrate Fauna (DSE 2013) and the Advisory List of Threatened Invertebrate Fauna Victoria 2009 (DSE 2009);
- Species or communities listed under the EPBC Act 1999, which may occur, or for which suitable habitat may occur, within 5 km of the study area using the EPBC Protected Matters Search Tool (DoEE 2018);
- Ecological Vegetation Class (EVC) mapping/modelling (extant and pre-1750) using NatureKit (DELWP 2018b) of the area and associated benchmarks (DELWP 2018c);
- DELWPs online Native Vegetation Information Management tool (NVIM) (DELWP 2018d);
- The Victorian Planning Schemes online (DELWP 2018e);
- Planning maps online (DELWP 2018f);
- Aerial photography; and
- Previous reports for the site and surrounds (EHP 2018).

2.2 Field surveys

An initial survey of the site to assess and map the vegetation and fauna habitat was conducted on 20 August 2018. Large tree mapping was undertaken on 22 November 2018. Targeted surveys for selected threatened species were undertaken between 24 October 2018 and 16 April 2019.

2.2.1 Flora surveys

The site was surveyed to identify and record indigenous vascular plant species and plant communities (EVCs) occurring within the study area. An inventory of (non-planted) indigenous and exotic plant species occurring within the study area and immediate surrounds was also compiled.

Remnant patches were assigned an EVC by reference to DSE's vegetation modelling (DELWP 2018b) and EVC benchmarks (DELWP 2018c). Vegetation quality assessments and mapping of the remnant patches followed Vegetation Quality Assessment Manual (DSE 2004). The assessment was completed by a DELWP accredited native vegetation assessor (Matt Dell, Ecology Australia).

Following the definitions in the Guidelines, native vegetation was classified as either a patch or scattered tree (DELWP 2017a):

- Patch
    - An area of vegetation where at least 25% of total perennial understorey plant cover is native[1]
    - Any area with three or more native canopy trees[2] where the 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.
- Scattered tree
    - A native canopy tree that does not form part of a remnant patch.

Targeted surveys

Targeted surveys for threatened flora species were undertaken on 25 October and 22 November 2018. The proposed extraction area was searched in 5 m wide transects throughout. Searching within the proposed offset area was limited to areas of highest likely habitat suitability for target species included for consideration (refer Section 3.1.2).

2.2.2 Fauna survey

The study area was assessed for its fauna habitat values and potential to support threatened fauna species. The assessment involved a review of aerial photographs and other maps, to gain an appreciation of the vegetation cover and landscape context, followed by a site inspection.

The site inspection focused on the extent of native vegetation cover, composition and structure of the vegetation, as well as other features important in determining habitat quality; for example, the presence of nectar-producing and hollow-bearing trees, the level of disturbance (e.g. weed invasion) and ground-layer characteristics including leaf litter and logs. Other habitat attributes assessed, included the:

- size and shape of remnant vegetation patches and connectivity;
- presence of specific habitat features (e.g. wetlands); and
- structural heterogeneity of the vegetation.

All vertebrates either directly observed or heard calling (e.g. birds and amphibians) during field surveys were recorded to compile an inventory of terrestrial fauna species utilising the study area. Searches for sheltering amphibians were undertaken by raking leaf litter, searching among fallen clumps of bark and overturning rocks and fallen branches throughout the study area. Observers also searched for indirect evidence used to detect the presence of animals, including bird nests, possum dreys, scats (droppings), diggings, tracks or burrows.

[1] Native plants are species that are indigenous to Victoria, including trees, shrubs, herbs and grasses

[2] A canopy tree is a mature tree >3 m high and normally found in the upper layer of the relevant vegetation type

Owl survey

Targeted surveys for threatened owl species, in particular the Barking Owl, were undertaken using call playback. During these surveys, a standard recording with the calls of large forest owl species were broadcast through a 10-watt megaphone, at 110% of the owls' natural volume level, in order to elicit a response from owls that may be present, or to draw-in owls from the surrounding area. Each survey involved broadcasting the calls of the Powerful Owl, followed by the Barking Owl and Masked Owl. Each call broadcast was followed by a two-minute listening period, for the reply calls of any owls. At the completion of call playback, 30 minutes of spotlighting was undertaken on foot, to detect any owls that had flown in silently.

Three repeat surveys were undertaken by two observers (24th October 2018, 26th March and 16th April 2019), commencing approximately 1 hour after sunset, on nights with little or no wind or rain.

Small mammal survey

Motion-sensing cameras were used to survey ground-dwelling mammals, but specifically targeting the Southern Brown Bandicoot. Twelve Reconyx™ infrared cameras were deployed in areas of suitable habitat across the property. Cameras were secured to a tree with a cable and padlock, and were oriented to the south to reduce the incidence of false triggers resulting from direct sunlight and heat differentials in the area of focus. An attractant consisting of peanut butter, rolled oats and golden syrup was secured c. 2 m in front of the camera in a purpose-built bait holder. All cameras were deployed with the following settings:

- High sensitivity;
- Three photos per trigger event;
- 30 second delay between trigger events.

The images were downloaded to a computer for analysis and identification of any fauna species photographed. Fauna were identified to species level wherever possible. In some instances, species could not be fully identified; for example, as a consequence of fast-moving individuals resulting in poor image quality, or individuals being only partially photographed.

In accordance with the EPBC Act 1999 survey guidelines for the Southern Brown Bandicoot (DSEWPC 2011), two repeat surveys of approximately 21 days duration were undertaken, one in spring (24th October to 15th November 2018) and one in autumn (26th March to 16th April 2019).

Brown Toadlet

Surveys for the Brown Toadlet were undertaken on 26 March and 16 April 2019, in conjunction with the owl surveys, and involved quite listening for calling males and a visual search. Surveys commenced approximately one hour after dark, and were undertaken between 19:45 and 21:30 AEST. Conditions during the surveys were largely suitable (i.e. little to no wind, > 15°C); however, rainfall for March and April 2019 were below average (Ararat weather station; Bureau of Meteorology Data, 2019). Rainfall was recorded within 24 hours of the first survey, but no rainfall was recorded in the 72 hours preceding the second survey, and there was no standing water on the property.

2.3 Assessment of proposed native vegetation removal

The site assessment has followed the current native vegetation policy - *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017a); (refer Section 4.4.1 for more detail). This assessment considered the three-step approach of: avoid, minimise and offset native vegetation removal, as required by the Guidelines.

A permit application to remove native vegetation involving the Guidelines needs to be accompanied by an assessment which following the appropriate assessment pathway—basic, intermediate or detailed—as defined under the Guidelines (DELWP 2017a). The pathway is based on the extent, type and location of the native vegetation to be removed.

The Native Vegetation Information Management (NVIM) tool[3] was used to determine the assessment pathway and to quantify native vegetation losses and offsets.

2.4 Limitations

The seasonality of some plant species may prove to be a limitation of the field survey. Some species may have been overlooked because they were inconspicuous (when the survey was conducted), or have been identified to genus level only due to the absence of fertile material. However, these limitations are unlikely to alter the major findings regarding overall quality and significance of the vegetation.

The fauna survey was brief and some species that occur within or utilise the study area may not have been recorded. In particular, the rare and cryptic species that are often the focus of threatened species legislation cannot always be expected to be detected during the brief surveys.

2.5 Conservation status

Species significance was determined according to their conservation status as listed in DELWP's advisory lists (DEPI 2014, DSE 2013, DSE 2009) and separately under the FFG Act 1988 and the EPBC Act 1999.

2.6 Criteria for assessment of threatened species occurrence

The occurrence of threatened species and listed ecological communities is considered in relevant planning for the project (Table 1).

Listed ecological communities have separate qualitative and sometimes also quantitative descriptors which are used to determine the presence of the communities. The assessment process generally has low subjectivity and is bound by the level of detail provided in each descriptor.

Listed rare or threatened species are assessed using the following criteria. Planning requires the consideration of the presence of habitats for these species but also an assessment of their occurrence as it relates to potential impacts posed by the project. Habitat extent and quality is considered and contributes to the outcome of the assessment. The assessment requires subjective evaluation by experts and is independent of mitigation of impacts to each species.

An assessment of threatened species occurrence considers:

- Site attributes, including size, shape and landscape context;

[3] This is an online tool run by DELWP which is designed to assess Victoria's native vegetation information.

- Number, age and distribution of previous records, taking into account the likely survey history, in terms of intensity and frequency;
- Documented habitats and ecological requirements for the taxon in question; and
- Presence of suitable habitat within the study area, based on the site assessment.

A description of occurrence assessment categories is provided below.

Species that are listed under the EPBC Act or FFG Act are afforded the most comprehensive assessment of occurrence. The planning implications for Victorian advisory listed species are generally attached only to Clauses 52.16 and 52.17 of the planning scheme [through the *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017a)]. The impacts of a proposal to habitat for these species, as modelled by DELWP, influences the assessment outcome and offset requirements as stipulated in relevant State policy. Occurrence ratings are applied to all advisory listed species considered for the project, although their modelled habitat may vary depending on the outcome of site surveys (DELWP 2013). Species that were observed during current assessments are noted as such in Section 3 below.

All threatened species records were reviewed in detail for their relevance to the study area.

Table 1 Criteria for assessment of threatened species occurrence

Occurrence	Definition
Not Likely	Study area is located outside the known geographic range for the taxon or does not contain necessary landscape features and/or habitats documented for that taxon.
Low	Study area lies within, or on the edge, of the geographic range for the taxon, and supports major habitat elements, but is lacking in one or more critical features, or is located within a landscape that will most likely preclude occupancy or regular use. Historical records may be supported by more recent records within the same catchment (aquatic fauna) or within 5 km of the study area.
Moderate	The location and geographic features of the study area match that which is known for the taxon. Habitat shares numerous floristic, structural or physical similarities with documented habitats, but may be limited with regard to one or more known ecological requirements (e.g. size, landscape context or critical resources). Historical and contemporary records occur within the same catchment (aquatic fauna) or within 5 km of the study area and/or the broader region.
High	Location of the study area lies within the known range and distribution for the taxon. Habitats present within the study area match that documented for the taxon with regard to floristics and/or structure and satisfy the known ecological requirements. Multiple historical and recent records within the surrounding landscape indicate occurrence or regular use of the area.
Recorded	Taxon recorded within the study area during the current assessment or other recent assessment.

2.7 Nomenclature and taxonomy

Plant taxonomy and the use of common names follow the online Victorian Biodiversity Atlas (DELWP 2018a).

The scientific names, common names, and systematic orders of fauna species follow the Victorian Biodiversity Atlas (DELWP 2018a). In general, common names are used in the text.

Where an asterisk (*) precedes a plant or animal name, it is used to indicate those which are not indigenous to Victoria. A hash (#) is used to denote a Victorian indigenous plant species that is generally accepted as not indigenous i.e. outside of its natural range where recorded within the study area.

3 Values

3.1 Flora

3.1.1 Vegetation communities

Three vegetation types (Ecological Vegetation Classes, EVCs) are modelled to occur within the study area – largely Plains Grassy Woodland (EVC 155), Sand Forest (EVC 134), as well as a small area of Creekline Grassy Woodland (EVC 68) in the northwest. Vegetation mapping for the current assessment revealed some different EVCs compared with the modelled mapping, with the majority of the study area comprising Sand Forest and a smaller area of Sedgy Riparian Woodland in the western part of the property. Some small patches of Plains Grassy Woodland occur near the norther boundary (Figure 2).

EVC 134 Sand Forest (Bioregional Conservation Status: Endangered)

Sand Forest is the dominant EVC within the study area (Figure 2). It includes a canopy dominated by Rough-barked Manna-gum (*Eucalyptus viminalis* subsp. *cygnetensis*, with scattered occurrences of Swamp Gum (*Eucalyptus ovata* var. *ovata*), Red Gum (*Eucalyptus camaldulensis*) and Yellow Box (*Eucalyptus melliodora*). Understorey trees and large shrubs comprise of wattles (Black Wattle *Acacia mearnsii,* Blackwood *Acacia melanoxylon* and Hedge Wattle (*Acacia paradoxa*) and Prickly Tea-tree (*Leptospermum continentale*). The ground layer is dominated by Bracken (*Pteridium esculentum*), but also supports indigenous grasses and a diversity of other herbs, including sundews (Scented Sun Dew *Drosera aberrans* and Branched Sundew *Drosera hookeri*) and orchids (Slaty Helmet-orchid *Corybas incurvus,* Nodding Greenhood *Pterostylis nutans*, and Sun Orchid *Thelymitra* sp.) (Plate 1).

Weed cover is variable, and largely comprises annual species. The vegetation quality (habitat) score for this vegetation was 0.57 (out of 1) (Table 2).

EVC 198 Sedgy Riparian Woodland (Bioregional Conservation Status: Least Concern)

Sedgy Riparian Woodland occurs within a low-lying area in the south-west section of the site (Figure 2). It supports an open canopy of Swamp Gums and Red Gums, and an understorey dominated by sedges, including Pithy Sword-sedge (*Lepidosperma longitudinale*), Tall Sedge (*Carex appressa*), and other graminoids including Spiny-headed Mat-rush (*Lomandra longifolia* subsp. *longifolia*, rushes (*Juncus* spp.) and Weeping Grass (*Microleana stipoides* var. *stipoides*) (Plate 2). Annual herbs including Parsley Piert (*Aphanes arvensis*) and Spreading Crassula (*Crassula decumbens*) were also common.

The Sedgy Riparian Woodland is in good condition, and supports a relatively low cover (< 5%) of weed species comprising mostly flatweed (**Hypochaeris* spp.) and other herbs. It had a habitat score of 0.60 (Table 2).

EVC 55 Plains Grassy Woodland (Bioregional Conservation Status: Vulnerable)

Plains Grassy Woodland is confined to relatively small patches in the northern section of the study area Figure 2). It comprises a canopy of Red Gum and an understorey dominated by exotic grasses and herbs, with some native grasses also present (largely wallaby grasses *Rytidosperma* spp.).

The habitat score for Plains Grassy Woodland was 0.44 (Table 2).

Table 2 69 Barton Road, Moyston – habitat hectare assessment

Habitat Zone			HZ1	HZ2	HZ3
Bioregion			Greater Grampians	Greater Grampians	Greater Grampians
EVC Name			Sand Forest	Sedgy Riparian Woodland	Plains Grassy Woodland
EVC Bioregional Conservation Status			Endangered	Least concern	Vulnerable
		Max Score	Score	Score	Score*
Site Condition	Large Old Trees	10	6	6	8
	Canopy Cover	5	3	3	5
	Understorey	25	15	15	10
	Lack of Weeds	15	9	13	4
	Recruitment	10	5	5	3
	Organic Litter	5	3	3	5
	Logs	5	4	3	5
	Total Site Score	**75**	**45**	**48**	**40**
	EVC standardiser		1	1	1
	Adjusted site score		**45**	**48**	**40**
Landscape value	Landscape score	25	12	12	4
Habitat Score		**100**	**57**	**60**	**44**
Habitat Score /100		1	**0.57**	**0.60**	**0.44**

* Taken from EHP 2018

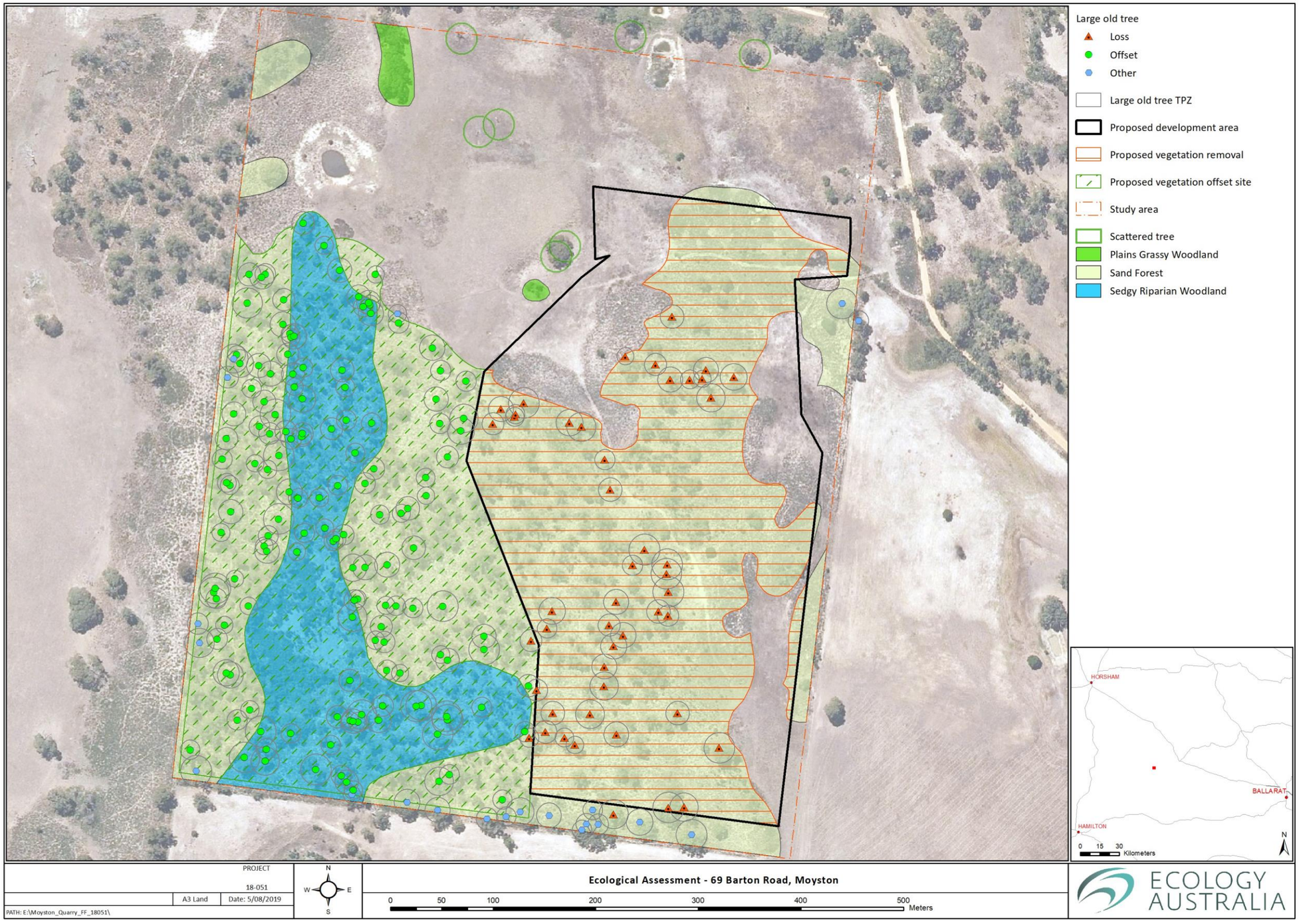

Figure 2 Ecological Vegetation Classes and Large Trees within the extraction area and offset area

Plate 1 Barton Rd, Moyston – Sand Forest

Plate 2 Barton Road, Moyston – Sedgy Riparian Woodland

3.1.2 Flora taxa

A total of 75 flora taxa were recorded during the site assessment, of which 23% (17) were exotic. No species recorded are listed under the EPBC Act 1999, FFG Act 1988 or classified as rare or threatened in Victoria.

Significant species

A total of 24 rare or threatened flora species have been previously recorded or predicted to occur within 5 km of the site, and an additional nine species listed under the EPBC Act and/or FFG Act have been recorded within 10 km (Table 2).

Habitat at the site is unsuitable for a number of these species:

- Button Wrinklewort, Large-fruit Fireweed, Spiny Rice-flower– largely known from volcanic soils
- River Swamp Wallaby-grass, Swamp Everlasting – permanent or ephemeral wetlands and other waterbodies
- Adamson's Blown-grass – saline depressions, mostly on the volcanic plain
- Rough Eyebright – damp grassy forests or subalpine woodlands
- Grampians Bitter-pea – montane gullies within the Grampians National Park
- Twisting Scale-rush – peaty soils or margins of creeks
- Cut-leaf Daisy – heavy soils prone to waterlogging
- Inland Leek-orchid and Rigid Spider-orchid – typically associated with Cypress pine (*Callitris*) woodlands and/or Brown Stringybark (*Eucalyptus baxteri*) Forests.

Some of the species (Grampians Bossiaea, Grampians Bitter-pea, Grampians Rice-flower, Slender Swainson-pea and Grampians Globe-pea) have not been recorded outside of the Grampians National Park. Clover Glycine, Swamp Diuris and Annual Buttons are typically associated with Grasslands or Grassy Woodlands. The Plains Grassy Woodland remnants onsite are considered too degraded to support these species.

The remaining species are discussed in more detail below:

Species classified as rare or threatened in Victoria

Grampians Goodenia (rare) **–** known from heathland on sandy soils with the majority of records from the Grampians National Park (RBGV 2018). Habitat with the site is potentially suitable for this species, however, given a low-moderate likelihood of occurrence due to its limited distribution and records.

Hoary Rapier-sedge, Small-flower Mat-rush and Parsley Xanthosia (all rare) – all have been recorded from within 5 km of the study area and occur in sand heathland and heathy woodlands. Habitat at the site is suitable for these species (moderate likelihood of occurrence).

Austral Crane's-bill (vulnerable) – known to occur within grasslands and Grassy Woodlands, often along drainage lines (RBGV 2018). This species can be tolerant to disturbance and therefore is given a moderate likelihood of occurring within the site.

Tiny Bog-sedge (rare) **–** known from seasonally wet soils (RBGV 2018). This species has a moderate likelihood to occur within the Sedgy Riparian Woodland.

EPBC Act-listed species

Green-striped Greenhood (vulnerable) – occurs in heathy or shrubby woodlands and open forests on grey sandy-loam to clay-loam soils (Backhouse et al. 2016). Habitat is potentially suitable at the site for this species and there are relatively recent records (1989) from just north of Ararat, however it is not typically associated with sandy soils of Sand Forest or seasonally inundated soils of Sedgy Riparian Woodland. Taking into consideration the level of disturbance at the site and habitat differences, this species is given a low likelihood of occurrence.

Trailing Hop-bush (vulnerable) – Victorian populations have been recorded in various plant communities including grassy woodland dominated by River Red Gum in western Victoria, heathy dry forest in central Victoria, damp heath in far-western Victoria and sedge wetland, healthy woodland and damp heathland in eastern Victoria (DoE 2018). Habitat is potentially suitable for this species at the site and there are a number of records from north of the site between Stawell and the Grampians. This species was not recorded onsite during the targeted survey and is given a low likelihood of occurrence.

Spiral-leaved Sun-orchid (vulnerable) – typically a coastal or near coastal species, however there are a number of populations from within and around the Grampian National Park. This species is known to occur in heath and heathy woodlands on sandy loam – heavy clay loam soils (Backhouse et al. 2016). This orchid is known to colonise disturbed sites. This species is given a low likelihood of occurrence within the site due to inconsistencies with documented habitat types and distance to known records.

Metallic Sun-orchid (endangered) – similar to the Spiral-leaved Sun-orchid, this species is also often coastal or near coastal, extending inland in the western part of the state. There are a number of records within and around the Grampians. It is known to occur in heath, grasslands, heathy-shrubby woodlands and sometimes swamp margins, on sandy – clay loam soils (Backhouse et al. 2016). This species is given a low likelihood of occurrence within the site due to inconsistencies with documented habitat types and distance to known records.

Fragrant Leek-orchid (endangered) – this species has not been recorded from within 5 km of the study area. It typically occupies grassland and occasionally grassy woodland on the basalt plain. This species is unlikely to occur within the property due to an absence of suitable habitat.

Survey and further discussion were required by DELWP on Spiny Rice-flower and Clover Glycine.

Spiny Rice-flower (critically endangered) – this species has not been recorded from within 5 km of the study area. It is a small winter-flowering shrub usually found on basalt soils; but also occurs in eucalypt forests and woodland on sedimentary (clay) soils in the north central and central west of the state (TSCC 2016). The predominantly sandy or alluvial clay soils within the property are not typical habitat for this species. Spring targeted surveys did not reveal presence of this species.

Clover Glycine (vulnerable) – this species has not been recorded from within 5 km of the study area. It typically occupies grassland and grassy woodland on a range of different soil types (Carter and Sutter 2010). It has previously been recorded on the basalt plain to the south of the Grampians and in scattered location within the Grampians. The most likely habitat for this species within the property is areas of Sedgy Riparian Woodland, within the proposed offset area. Targeted surveys did not reveal presence of this species.

Table 3 Barton Rd, Moyston – threatened flora records from the data review area

Key:
EPBC Act listings: CR = Critically Endangered; EN = Endangered; VU = Vulnerable
FFG = Victorian *Flora and Fauna Guarantee Act 1988.*
L = Listed under the FFG Act.
DELWP = Advisory list (DSE 2013) classifications: cr = critically endangered; en = endangered; vu = vulnerable; nt = near threatened.
Nos. records = number of records of the species listed under the VBA within the 5 km or 10 km search area.
Last Record = data of last record of the species in the VBA

Species	Common name	status			No. of records	Last record	Likelihood of Occurrence
		EPBC	FFG	DELP			
VBA records – 5 km search area							
Bossiaea rosmarinifolia	Grampians Bossiaea			r	1	1969	Unlikely
Encalypta vulgaris	Common Extinguisher-moss			r	1	1882	Moderate
Eucalyptus sabulosa	Wimmera Scentbark			r	1	1980	Low
Geranium solanderi var. *solanderi* s.s.	Austral Crane's-bill			vu	1	2011	Moderate
Goodenia lineata	Grampians Goodenia			r	1	1967	Low - Moderate
Lepidosperma canescens	Hoary Rapier-sedge			r	1	2002	Low
Lepyrodia flexuosa	Twisting Scale-rush			r	1	1967	Low
Lomandra micrantha subsp. *tuberculata*	Small-flower Mat-rush			r	1	1969	Moderate
Prasophyllum maccannii	Inland Leek-orchid		L	vu	2	2005	Low
Schoenus nanus	Tiny Bog-sedge			r	3	2011	Moderate
Xanthosia leiophylla	Parsley Xanthosia			r	1	2011	Moderate
VBA records - additional EPBC Act and FFG Act listed species (10 km search area)							
Calotis anthemoides	Cut-leaf daisy		L		3	1879	Low
Daviesia laevis	Grampians Bitter-pea	V	L	vu	2	1896	Unlikely
Diuris palustris	Swamp Diuris	L	L	vu	1	1882	Unlikely
Euphrasia scabra	Rough Eye-bright	L	L	en	1	1876	Unlikely
Leptorhynchos orientalis	Annual Buttons	L	L	en	2	1879	Unlikely
Pimelea pagophila	Grampians Rice-flower	V	L	vu	10	2005	Unlikely
Ptilotus erubescens	Hairy Tails		L	vu	3	1903	Unlikely
Sphaerolobium acanthos	Grampians Globe-pea	CE	L	r	3	1983	Unlikely
Swainsona brachycarpa	Slender Swainson-pea		L	vu	2	1985	Unlikely
Protected Matters Search Tool - additional species listed under EPBC Act (5 km search area)							

Amphibromus fluitans	River Swamp Wallaby-grass	V			-	-	Low
Caladenia tensa	Rigid Spider-orchid	E		vu	-	-	Unlikely
Dodonaea procumbens	Trailing Hop-bush	V		vu	-	-	Low
Glycine latrobeana	Clover Glycine	V	L	vu	-	-	Low
Lachnagrostis adamsonii	Adamson's Blown-grass	E	L	vu	-	-	Unlikely
Leucochrysum albicans subsp. *tricolor*	Hoary Sunray	E	L	en	-	-	Unlikely
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CE	L	en	-	-	Unlikely
Prasophyllum suaveolens	Fragrant Leek-orchid	E	L	en	-	-	Low
Pterostylis chlorogramma	Green-striped Greenhood	V	L	vu	-	-	Low
Rutidosis leptorhynchoides	Button Wrinklewort	E	L	en	-	-	Unlikely
Senecio macrocarpus	Large-fruit Fireweed	V	L	en	-	-	Unlikely
Thelymitra epipactoides	Metallic Sun-orchid	E	L	en	-	-	Low
Thelymitra matthewsii	Spiral-leaved Sun-orchid	V	L	vu	-	-	Low
Xerochrysum palustre	Swamp Everlasting	V	L	vu	-	-	Unlikely

3.2 Fauna

3.2.1 Fauna habitats

The property supports two main fauna habitat types: woodland and forest habitats and open pasture.

Woodland and forest

The woodland and forest habitats within the study area retain a relatively simple habitat structure, comprising a eucalypt-dominated canopy over an open mid-storey of wattles and Prickly Tea-tree, with a dense ground layer of Bracken or sedges.

The eucalypt canopy provides foraging resources for a diversity of bird species, including nectarivorous and insectivorous birds such as honeyeaters, pardalotes and thornbills, which forage amongst the canopy on eucalypt blossoms, psyllids, lerps and insects. Insectivorous birds, such as the White-throated Treecreeper *Corombates leucophaeus* also forage on the trunks and branches of the eucalypts. Small tree hollows, which were present in a number of the eucalypts, also provide nesting sites for hollow-dependent birds such as the Southern Boobook *Ninox novaeseelandiae*, as well as mammals, such as the Common Brushtail Possum *Trichosurus vulpecula* and small, insectivorous bats.

Areas of Sand Forest and Plains Grassy Woodland support a dense ground cover, dominated by Bracken, with abundant fallen timber and leaf litter, interspersed with small, open grassy patches. These areas provide habitat for small mammal species such as the Yellow-footed Antechinus *Antechinus flavipes*, which was recorded on-site, and for large macropods, such as the Black-tailed Wallaby *Wallabia bicolor* and Eastern Grey Kangaroo *Macropus giganteus.*

The Sedgy Riparian Woodland, which occurs within low-lying areas, supports a ground layer dominated by sedges and rushes, with abundant leaf litter and fallen timber. This area supports shallow depressions along a minor drainage line that was identified as potential habitat for the terrestrial-breeding Brown Toadlet *Pseudophryne bibronii*; however, these do not appear to retain standing water during the toadlet breeding season, and may only fill in years of exceptional rainfall.

Open pasture

The remainder of the study area supports improved pasture, comprising predominantly exotic pasture grasses (see Plate 3). This area supports few habitat values relative to the woodland and forest habitat within the study area, predominantly providing foraging habitat for open-country, ground-feeding bird species, such as the Little Corella *Cacatua sanguinea*, Galah *Eolophus roseicapilla,* Australian Magpie *Cracticus tibicen* and Emu *Dromaius novaehollandiae*. Raptors, such as the Brown Falcon *Falco berigora* and Whistling Kite *Haliastur sphenurus* are also likely to forage over areas of pasture, as well as adjoining areas of woodland and forest. The Eastern Grey Kangaroo, which shelters within woodland and forest habitats during the day, is likely to move out into open pasture to feed between dawn and dusk. A small turkey-nest farm dam is located in the north-west of the property in areas of pasture. This dam supports bare banks and no aquatic vegetation, and is therefore of limited value for native fauna species.

Plate 3 Barton Rd, Moyston — Open pasture adjoining Sand Forest

3.2.2 Fauna species

Fifty-nine vertebrate fauna species were recorded during the field surveys, including 42 bird, 12 mammal, three amphibian and two reptile species (Appendix 2). None of these species are listed as threatened under the EPBC Act 1999, the FFG Act 1988, or are considered to be threatened in Victoria. One species, the Black-chinned Honeyeater *Melithripterus gularis gularis,* is classified as near-threatened in Victoria under the Advisory List of Threatened Vertebrate Fauna (DSE 2013), and is generally uncommon. However, most of the other species recorded are locally common and are typical of the forest and woodland habitats of western Victoria.

Significant species

Eight fauna species (seven vertebrate and one invertebrate species) which are considered rare or threatened have been previously recorded within 5 km of the study area (Table 4). A further 12 threatened fauna species (11 vertebrate and one invertebrate species) have been previously recorded from within 10 km of the study area (Table 4). These include:

- Seven species listed as threatened under the EPBC Act 1999;
- Eleven additional species listed as threatened under the FFG Act 1988; and
- Two additional species classified as vulnerable on the Victorian Advisory List of Threatened Vertebrate Fauna (DSE 2013).

Many of these species have been recorded within nearby parks and reserves, predominantly the Grampians National Park, and have a low likelihood of occurrence within the study area, due to an absence of suitable habitat or critical habitat features.

The EPBC Act Protected Matters Search Tool has identified an additional 16 species which may occur, or for which habitat may occur, within 5 km of the study area; none of these species have been previously recorded from within 10 km of the study area in the VBA. The search tool predicts the occurrence of these species on the basis of broad drainage basins and Bioclim modelling. Thus, the predicted occurrences for some species highlighted in the data search extend well beyond their actual range. For example, the Regent Honeyeater *Anthochaera phrygia* has suffered a significant contraction in range and distribution, and Bendigo is now considered western limit of its range (DoE 2016). A number of wetland bird species, such as the Australasian Bittern *Botaurus poiciloptilus* and Australian Painted Snipe *Rostratula* australis, which occupy densely-vegetated wetlands, and fish species, including the Dwarf Galaxias *Galaxiella pusilla* have also been predicted to occur, for which there are no wetland habitats or waterways on-site. The small farm dam in the north-west corner of the property does not support suitable habitat for these species.

Three EPBC Act-listed fauna species were identified by EHP (2018) as having a low-moderate likelihood of occurrence within the study area, and for which further surveys were recommended. These species are known from the Grampians National Park, but have a highly restricted distribution, and are considered unlikely to occur within the study area, or have a low likelihood of occurrence, based on: the habitat characteristics of the site, habitat requirements of the species, and the distance of the study site from known populations. These species are discussed briefly, below.

Smoky Mouse: The Smoky Mouse inhabits species-rich heathland and dry, sclerophyll forest with a dense, heathy understorey; the key habitat characteristics of this species are linked to their dietary requirements (Ford 2008). A floristically diverse understorey and mid-storey, often comprising

representatives of the Epacridaceae, Fabaceae and Mimosaceae families which provide fruits, flowers and seeds (Cockburn 1981, Jurskis et al. 1997, Ford et al. 2003), is an important component of Smoky Mouse habitat (Ford 2008). Other characteristics of suitable habitat include a ground cover of low, dense vegetation, logs and rocks, and soil conducive to burrowing and the growth of hypogeal fungi (Menkhorst and Broom 2006). The Smoky Mouse was recorded from Mount William in the 1970s, but the currently known population is restricted to an 8 km radius area of the eastern escarpment of Victoria Range, where it has persisted for four decades. Most recently, Smoky Mouse was detected from six sites at Victoria Range between 2012 and 2014 (Burns et al. 2015). All sites where the species was detected were within drainage systems of the east of the range, were steep and supported screes of small rocks and large boulders, and complex understorey (Burns et al. 2015).

Heath Mouse: The Heath mouse occupies dry, species-rich and structurally complex heathland and open forest or woodland with a heathy understorey. In Victoria, it is most frequently recorded in heathland that has been burnt in the past 5 to 15 years. The Heath Mouse was first recorded at the Grampians National Park in 1961, and has since been recorded at a number of localities in the Wannon region of south-western Victoria; populations in the Grampians and south-west Victoria are now separated by large tracts of cleared land (Menkhorst et al. 2008). In the Victoria Valley, Grampians National Park, the Heath Mouse has been found to prefer young, floristically rich and low heath; such sites provide a year-round food supply (Menkhorst et al. 2008).

Long-nosed Potoroo: The Long-nosed Potoroo inhabits coastal heath, dry and wet scleorphyll forests with a dense understorey and ground cover over light, sandy soils (Johnston 2008). The Long-nosed Potoroo (SE Mainland) historically occupied the Victoria Range in the Grampians National Park, where it was recorded in heath-woodland associates with *Eucalyptus obliqua* and *E. aromaphloia*, and a 2 m-tall shrub layer consisting of *Acacia* spp., *Banksia marginata* and *Leptospermum juniperinum* (Seebeck 1981). More recently, four Long-nosed Potoroos were detected during a fox control monitoring project, between 2004 and 2007, the first records at the Grampians in nearly 30 years (Robley et al. 2008). Other contemporary records are from a small area around Pomonal, and a few sightings around Lake Fyans.

The Golden Sun Moth is discussed briefly below, at the request of DELWP.

Golden Sun Moth: The Golden Sun Moth *Synemon plana* is a small, diurnal moth which inhabits native grasslands and grassy woodlands in temperate south-eastern Australia, typically dominated by native grasses, such as Wallaby-grasses *Rytidosperma* spp. and Spear-grasses *Austrostipa* spp., and/or supporting exotic Chilean Needle-grass **Nassella neesiana*. These species provide a food source for larval Golden Sun Moth, and form an open tussock structure, which are important for breeding and recruitment (Bainbridge et al. 2006, Gilmore et al. 2008, Gibson and New 2007, DEWHA 2009). Female moths are relatively sedentary and use inter-tussock spaces to display their golden hindwings to attract males. After mating, females deposit eggs at the base of grass tussocks, and the larvae burrow into the base of the host plant to feed on the roots of food plants; pupation occurs below ground and may last for 2-3 years (Richter et al. 2013).

The Golden Sun Moth has not been recorded from within 10 km of the property in the Victorian Biodiversity Atlas, although there are a number of records north of Ararat. The property does not support suitable habitat for the Golden Sun Moth. Areas of pasture are dominated by exotic grasses and do not support recognised food plants for this species, or an open tussock structure, which are characteristic of Golden Sun Moth habitats.

Based on the habitat characteristics of the study area, three threatened species were initially considered to have a moderate likelihood of occurrence within the property. They included:

- One species listed under the EPBC Act 1999 – Southern Brown Bandicoot; and
- Two species listed as threatened under the FFG Act 1988 – Brown Toadlet *Pseudophryne bibronii* and Barking Owl *Ninox connivens connivens*;

Southern Brown Bandicoot (SE Mainland) *Isoodon obesulus obesulus*

The Southern Brown Bandicoots inhabit a variety of native and exotic vegetation types with low dense vegetation cover, including woodlands, forests and heathlands, often over well-drained, sandy soils. Vegetation structure is considered to be more important than floristics in determining suitable habitat, the most important habitat requirement being understorey vegetation up to c. 1 m in height and with an average foliage density of 50–80% (Paull 1995, Claridge and Barry 2000, Sanderson and Kraehenbuehl 2006). A low, dense shrub layer provides the optimal structure, reducing detection by aerial predators and access by terrestrial predators, whilst allowing sufficient room to move at the ground level (Claridge and Barry 2000, Sanderson and Kraehenbuehl 2006, Paull et al. 2013). In modified habitats, where native vegetation has diminished in extent or quality, woody weeds, such as Blackberry, can provide alternative cover. Bandicoots rarely venture far from cover, typically foraging in open areas (e.g. pastures or clearings) adjacent to dense cover (Heinsohn 1966, Quin 1985, FitzGibbon et al. 2007).

The Grampians region supports one of the five regional populations of Southern Brown Bandicoot in Victoria, where it is known from the Grampians National Park east to Pomonal, Stawell and Great Western (Robley et al. 2008, DELWP 2018a). The study area supports a dense cover of Bracken, interspersed with open grassy areas, over sandy soils, which provides suitable shelter and foraging habitat. However, two targeted surveys failed to detect the species on-site, and therefore Southern Brown Bandicoot is given a low likelihood of occurrence.

Brown Toadlet *Pseudophryne bibronii*

The Brown Toadlet is a ground dwelling, terrestrial breeding species that occupies moist microhabitats in both dry and wet sclerophyll forest as well as woodland, shrubland, heathland, and grasslands that are likely to be inundated following rain (Cogger 2018). It generally occurs within the lowlands, but may also occur in alpine grasslands and mossy bogs (Cogger 2018). This species relies heavily on moist conditions, and adults are often found sheltering in moist soaks and depressions, under cover in the form of dense grasses, sedges, fallen logs, leaf litter and other woody debris. Breeding congregations often form in inundated grassy areas, beside small creeks, drainage lines or gutters and dams (Cogger 2018). Eggs are spawned in shallow burrows under litter and in low lying areas and depressions near water, that are later flooded, providing an aquatic environment for tadpoles. There are 11 records of the Brown Toadlet within 10 km of the study area, the most recent from 2014. Most of these records are located around Reservoir Creek, c. 7 km west of Moyston (DELWP 2018a).

Areas of Sedgy Riparian Woodland within the study area were initially identified as supporting potential habitat for the species. On-ground surveys during the Brown Toadlet breeding season failed to detect the species; although one of the surveys was conducted immediately after rainfall, areas of potential habitat were dry during both surveys and the region experienced low rainfall (well below-average) in March and April 2019 (Ararat Prison, Bureau of Meteorology data). Notwithstanding below-average rainfall in March and April 2019, it appears that the minor drainage line and depressions on-site are

rarely inundated and/or do not retain water for long. These areas were also found to be dry during field work undertaken in August 2018, despite average rainfall recorded for June and July 2018 and above-average rainfall in August 2018 (Ararat Prison, Bureau of Meteorology data). The site therefore, appears to rarely retain standing water and unlikely to retain water during the Brown Toadlet breeding season, following dry conditions during summer. On this basis, the Brown Toadlet may be considered to have a low likelihood of occurrence on-site, although the surveys are not definitive.

Barking Owl *Ninox connivens connivens*

The Barking Owl, listed as threatened under the FFG Act 1988 and is classified as Endangered in Victoria (DSE 2013), has been recorded from scattered localities throughout Victoria, where it occupies dry sclerophyll forests, open forests and woodlands such as Box-Ironbark, riparian River Red Gum habitats and foothill habitats on granitic slopes as well as remnant patches of forest and woodland, including clumped trees in partly-cleared land (Higgins 1999). This species is more frequently recorded from edge habitats, such as the interface between woodland and wooded farmland, than from forest interiors (Clemann and Loyn 2001). Suitable habitat for the Barking Owl must contain large trees which provide roosting and breeding sites. This species typically breeds in the tree hollows of eucalypts, in woodland and open forests, near watercourses or wetlands. Roosting sites are commonly situated in foliage or on the bare branches beneath the canopy of large trees with dense foliage (Higgins 1999). Therefore, the Barking Owl requires old forests with large, hollow bearing trees and so is typically not recorded in regenerating forests, less than 60 years old (Higgins 1999). The Barking Owl was not recorded during targeted call-playback surveys (low likelihood of occurrence).

Victorian Temperate Woodland Bird Community

The Victorian Temperate Woodland Bird Community is defined under the FFG Act, as a suite of 24 bird species, primarily associated with the drier woodlands on the slopes and plains north of the Great Dividing Range. While the distribution of each species varies, most are associated with open woodlands dominated by box, stringybark, ironbark, yellow gum or river red gum eucalypts (or by buloke or cypress-pine in northern Victoria), with a light shrubby understorey, a grassy ground cover, fallen timber, and an abundance of tree-hollows. Some species, such as the Superb Parrot *Polytelis swainsonii*, Apostlebirdand *Struthidea cinerea*, and Ground Cuckoo-shrike *Coracina maxima* are mainly found in habitats along or near the Murray River, while the Red-tailed Black-Cockatoo *Calyptorhynchis banksii graptogyne* is confined to the far south-west of the state. Most of these woodlands have been cleared for agricultural production, or are highly fragmented and degraded. As a result, the characteristic bird species have declined significantly in distribution and abundance.

Two species listed under the Victorian Temperate Woodland Bird Community were recorded on the property during field surveys undertaken between August 2018 and April 2019: Yellow-tufted Honeyeater *Lichenostomus melanops meltoni* and Black-chinned Honeyeater. A number of other species listed within this community have previously been recorded within 10 km of the property, but most of these have a low likelihood of occurrence on-site. The majority of the property supports Sand Forest EVC, which is dominated by Rough-barked Manna Gum, with only scattered occurrences of Red Gum and Yellow-box which are characteristic of habitats utilised by the Woodland Bird Community. The property is therefore not considered to provide important habitats for birds in the Victorian Temperate Woodland Bird Community.

Table 4 Barton Rd, Moyston – threatened fauna records from the data review area

Key:
EPBC Act listings: CR = Critically Endangered; EN = Endangered; V = Vulnerable; M = Marine; Mi = Migratory.
FFG = Victorian *Flora and Fauna Guarantee Act 1988.*
L = Listed under the FFG Act.
DELWP = Advisory list (DSE 2013) classifications: cr = critically endangered; en = endangered; vu = vulnerable; nt = near threatened.
Nos. records = number of records of the species listed under the VBA within the 5 km or 10 km search area.
Last Record = data of last record of the species in the VBA.

Species	Common name	status			No. of records	Last record	Likelihood of Occurrence
		EPBC	FFG	DELWP			
VBA records – 5 km search area							
Grus rubicunda	Brolga		L	vu	1	2011	Low
Biziura lobata	Musk Duck	M		vu	2	1986	Low
Lathamus discolor	Swift Parrot	M, CE	L	en	1	1999	Low-Moderate
Calamanthus pyrrhopygius	Chestnut-rumped Heathwren		L	vu	1	2000	Low
Stagonopleura guttata	Diamond Firetail		L	nt	2	2008	Low
Pogona barbata	Bearded Dragon			vu	3	2011	Low - Moderate
Pseudophryne bibronii	Brown Toadlet		L	en	11	2014	Low
Gramastacus insolitus	Western Swamp Cray		L	cr	1	1969	Low-Moderate
VBA records - additional EPBC Act and FFG Act listed species (10 km search area)							
Ninox connivens connivens	Barking Owl		L	en	1	2001	Low
Ninox strenua	Powerful Owl		L	vu	1	1976	Low-Moderate
Melanodryas cucullata cucullata	Hooded Robin		L	nt	10	2001	Low-Moderate
Pomatostomus temporalis temporalis	Grey-crowned Babbler		L	en	1	1978	Low
Chthonicola sagittatus	Speckled Warbler		L	vu	3	2000	Low
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	L	nt	5	1969	Low
Pseudomys fumeus	Smoky mouse	E	L	en	13	2008	Not Likely
Pseudomys shortridgei	Heath mouse	E	L	nt	28	2002	Not Likely
Delma impar	Striped Legless Lizard	V	L	en	1	1992	Not Likely
Litoria raniformis	Growling Grass Frog	V	L	en	2	1788	Not Likely

Isoodon obesulus obesulus	Southern Brown Bandicoot	E	L	nt	10	1979	Low
Hygrobia australasiae	Squeek Beetle		L	vu	1	1969	Low
Protected Matters Search Tool - additional species listed under EPBC Act (5 km search area)							
Anthochaera phrygia	Regent Honeyeater	CE	L	cr	-	-	Not Likely
Botaurus poiciloptilus	Australasian Bittern	E	L	en	-	-	Not Likely
Calidris ferruginea	Curlew Sandpiper	M, Mi, CE		en	-	-	Not Likely
Grantiella picta	Painted Honeyeater	V	L	vu	-	-	Low
Leipoa ocellata	Malleefowl	V	L	en	-	-	Not Likely
Numenius madagascariensis	Eastern Curlew	M, Mi, CE		vu	-	-	Not Likely
Pedionomus torquatus	Plains Wanderer	CE	L	cr	-	-	Low
Rostratula australis	Australian Painted Snipe	M, E	L	cr	-	-	Not Likely
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll	E	L	en	-	-	Not Likely
Petrogale penicillata	Brush-tailed Rock Wallaby	V	L	cr	-	-	Not Likely
Pteropus poliocephalus	Grey-headed Flying Fox	V	L	vu	-	-	Low
Synemon plana	Golden Sun Moth	CE	L	cr	-	-	Not Likely
Galaxias rostratus	Flat-headed Galaxias	CE		vu	-	-	Not Likely
Galaxiella pusilla	Dwarf Galaxias	V	L	vu	-	-	Not Likely
Maccullochella peelii	Murray Cod	V	L	vu	-	-	Not Likely
Prototroctes maraena	Australian Grayling	V	L	vu	-	-	Not Likely

4 Policy and legislation

4.1 Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) pertains to matters of national environmental significance, including world heritage properties, national heritage properties, listed threatened flora and fauna species and ecological communities, listed migratory fauna species, Ramsar Wetlands and Commonwealth marine areas. It applies to public and private land, and referral to the Federal Department of Environment and Energy is necessary when a proposed action is considered likely to have a significant impact on any matter of national environmental significance listed under the Act.

No ecological communities listed under the EPBC Act have been recorded or are considered likely to occur within the study area.

Targeted surveys were undertaken for two flora species listed under the EPBC Act; however, these species were not recorded (Spiny Rice-flower and Clover Glycine).

Targeted surveys were undertaken for the EPBC Act-listed Southern Brown Bandicoot within the study area; two surveys were undertaken, one in spring 2018 and a second in autumn 2019. These surveys failed to record the species on-site.

4.2 Victorian *Flora and Fauna Guarantee Act 1988*

The Flora and Fauna Guarantee Act 1988 (FFG Act) lists flora and fauna species and ecological communities that are recognised as threatened in Victoria. It also identifies threatening processes and flora that require protection. Protected flora includes those species listed as threatened under the Act, and plant taxa that belong to listed communities and plant taxa that are not threatened, but require protection for other reasons (e.g. over-collection). A permit is required to remove protected flora from public land.

While the FFG-Act largely pertains for public land, species and communities listed as threatened under the FFG Act can be considered under other legislation, such as the *Environmental Effects Act 1978* (refer below).

No threatened ecological communities listed under the FFG Act have been recorded or are considered likely to occur within the study area. Two of the 24 species listed under the Victorian Temperate Woodland Bird Community were recorded at the property, but the site is not considered to provide important habitat for this community.

No flora species listed under the FFG Act is considered to have a moderate or higher likelihood of occurrence within the site.

Targeted surveys were undertaken for two species listed under the FFG Act – the Barking Owl and Brown Toadlet. Neither species were detected during the surveys. Environmental conditions during the Brown Toadlet surveys were sub-optimal, due to below-average rainfall, but the site is not considered to support important or critical habitat for the species, based on the quality of habitat.

4.3 Victorian *Environment Effects Act 1978*

The *Environmental Effects Act 1978* is the primary legislative framework to assess environmental impacts for developments or projects where deemed necessary by the Minister for Planning. The production of an Environmental Effects Statement (EES) is used as a decision making tool to understand the environmental, economic and social impacts of a project and whether the approval of a proposal provides an acceptable outcome.

A proponent should ask the Minister administering the *Environment Effects Act* about whether an EES is required for projects that could have a significant effect on the environment. A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred. The criteria for referral are presented in Figure 3. The most relevant criteria relating to ecological or biodiversity considerations[4] to the current proposal include:

Referral criteria (individual potential environmental effects):

- Potential clearing of 10 ha or more of native vegetation from an area that:
    - Is of an ecological vegetation class identified by DELWP as endangered within the bioregion; or
    - Is, or likely to be, of very high conservation significance as defined in accordance with the Native Vegetation Framework; and
    - Is not authorised under an approved Forest Management Plan or Fire Protection Plan.
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria.

Referral criteria (two or more potential environmental effects):

- potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan; and
    - matters listed under the *Flora and Fauna Guarantee Act 1988*
        - potential loss of a significant area of a listed ecological community; or
        - potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
        - potential loss of critical habitat; or
        - potential significant effects on habitat values of a wetland supporting migratory bird species.

[4] There are a number of other considerations not related to biodiversity, refer Figure 3.

The 10 ha native vegetation removal criteria would be satisfied in the single or multiple criteria above. There is no critical habitat as per the FFG Act occurring within the property. There will be no impacts on a wetland supporting migratory bird species.

Based on above an EES referral is recommended. This referral will also need to consider other non-ecological referral criteria (e.g. cultural heritage; refer Figure 3). The referral should provide information on the following:

- General aspects of the project
- Preliminary environmental information – existing environment, potential effects, proposed mitigation measures and other activities in the vicinity
- Investigation program - including commissioned environmental studies (current and proposed) and consultation program (current and proposed) (refer DSE 2006, pages 8-9 for more detail).

The criterial for referral are focused on the potential for a significant effect on the environment (i.e. environmental effects of regional or state significance). The identification of potential significant effects does not indicate that an EES will necessarily be required. Other factors, including the likelihood of such effects, will be taken into account in the Minister's decision in response to a referral (DSE 2006).

Referral criteria: individual potential environmental 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 ha or more of native vegetation from an area that:
  - is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or
  - is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
  - is not authorised under an approved Forest Management Plan or Fire Protection Plan
- potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria
- potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'
- potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term
- potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences
- potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.

Referral criteria: a combination of potential environmental effects

A combination of *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 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan
- matters listed under the *Flora and Fauna Guarantee Act 1988*:
  - potential loss of a significant area of a listed ecological community; or
  - potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
  - potential loss of critical habitat; or
  - potential significant effects on habitat values of a wetland supporting migratory bird species
- 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*
- potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term
- 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
- potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities
- potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development
- 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
- 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 or chemical hazards or associated transport
- potential extensive or major effects on Aboriginal cultural heritage
- potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995*.

Figure 3 EES referral criteria (from DSE 2006)

4.4 Victorian *Planning and Environment Act 1987*

The *Planning and Environment (P&E) Act 1987* establishes a framework for planning the use, development and protection of land, including native vegetation retention controls. The P&E Act allows for the development of planning schemes in Victoria. In particular Clause 52.17 (Native Vegetation) and Clauses 42.01 - 42.03 (Environmental and Landscape Overlays) of the planning scheme identifies circumstances where a planning permit is required for native vegetation removal, and in some instances undertake works, within the Ararat Planning Scheme.

The site is subject to two environmental/landscape overlays:

- Clause 42.03 Significant Landscape Overlay – Schedule 1 (SLO1)
- Clause 42.02 Vegetation Protection Overlay – Schedule 1 (VPO1)

As a result of these overlays and Clause 52.17 a planning permit is required for the following:

- Removing native vegetation – Clauses 52.17, 42.03 and 42.02
- Constructing a building or carry out works – Clause 42.03

An exemption for mineral stone applies to all the above Clauses:

Native vegetation that is to be removed, destroyed or lopped to the minimum extent necessary to enable the carrying out of stone[5] *extraction in accordance with a work plan approved under the Mineral Resources (Sustainable Development) Act 1990 and authorised by a work authority under that Act* (DELWP 2017b).

The purpose of this exemption is to avoid duplicative approval processes by not requiring a planning permit for native vegetation removal that occurs with approval under the MRSD Act. To rely on this exemption (i.e. to remove native vegetation), an agreement between Department of Economic, Development, Jobs, Transport (DEDJT) and Earth Resources (the department responsible for administering the MRSD Act) and DEWLP requires that the approval process for a work plan involve assessment of offsetting of native vegetation removal in accordance with the *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017b). This is addressed in Section 5.

The planning scheme is regularly amended, therefore this exemption should be confirmed with DEDJT and/or DELWP before any native vegetation removal is undertaken. In addition, if this exemption applies, native vegetation can only be removed for the purpose of the specified exemption and to the minimum extent necessary.

The areas dominated by Bracken and exotic vegetation (largely exotic grasses) are also exempt under Clause 52.17 and from assessment under the Guidelines. This vegetation falls under the regrowth exemption in Table of exemptions (52.17-7) – i.e. native vegetation that is to be removed, destroyed or lopped that has naturally established or regenerated on land lawfully cleared of naturally established native vegetation and is Bracken *(Pteridium esculentum*).

[5] Stone is defined in planning schemes as: Basalt, freestone, granite, limestone, sandstone, or other building stone, or rock, ordinarily used for building, manufacturing, road making, or construction; or clay (not fine clay, bentonite, or kaolin), earth, gravel, quartz (not quartz crystals), sand, soil, slate, or other similar material.

4.5 Victorian *Mineral Resources (Sustainable Development Act) 1990*

The *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) provides the legislative framework for the development and regulation of mineral exploration and mining industry, as well as extractive industries (quarries). The Act seeks to encourage an economically viable mining industry which makes the best use of mineral resources in a way that is compatible with the economic, social and environmental objectives of the State. A series of regulations and guidelines also apply to mineral exploration and development activities (Earth Resources Victoria website, 2018).

Under section 77G(1) of the *Mineral Resources (Sustainable Development) Act 1990* a person who proposes to apply for a work authority to carry out an extractive industry must lodge a work plan with the Earth Resources Division of the Department of Economic Development, Jobs, Transport and Resources (DEDJTR).

Revised work plan guidelines for extractive industries are currently being developed. New Guidelines are available from Earth Resources (regulation) team of DEDJTR.

4.6 Victorian *Catchment and Land Protection Act 1994*

The *Catchment and Land Protection* (CaLP) *Act 1994* provides a legislative framework for the management of land, including the control of declared noxious weeds and pest animals. Each Catchment Management Authority (CMA) region within Victoria maintains a designated list of declared noxious weeds, control of which is enforceable. Consideration has also been given to special catchment areas in this assessment.

It sets out the responsibilities of landowners declaring that they must take all reasonable steps to:

- avoid causing or contributing to land degradation which causes or could cause damage to land of another landowner;
- protect water resources and conserve soil;
- eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds; and
- prevent the spread of and eradicate established pest animals.

One weed species (Spear thistle **Cirsium vulgare*) listed under the CaLP was recorded during the site assessment. Land owners must take all reasonable steps to prevent the growth and spread of these species on their land.

Management of weed and pest animal species may also need to be addressed as part of the Works Plan.

5 Native vegetation removal regulations

The native vegetation removal exemption for stone extraction under clause 52.17 of the planning scheme allows the removal of native vegetation to be permitted as part of the *Mineral Resources (Sustainable Development) Act 1990.* The requirement under this Act is that the assessment of native vegetation losses and offsets follow Victoria's native vegetation removal policy. The *Guidelines for the Removal, Destruction or Lopping of Native Vegetation* (DELWP 2017a) is the key policy concerning the removal of native vegetation in Victoria. It applies to all Victoria planning schemes and serves to guide how impacts on biodiversity should be considered when assessing an application for a planning permit to remove, lop or destroy native vegetation under Clauses 52.16 and 52.17.

The permit application requirements for the removal of native vegetation in relation to the proposed works are presented below.

5.1 Assessment pathway

The proposed clearing meets the requirements of a Detailed Pathway[6]. The key determinants are as follows (DELWP 2017a):

Location category:	Location 2
Type of vegetation:	Patch only
Extent of native vegetation:	Current proposal for clearing 12.116 ha of native vegetation belonging to an endangered EVC. No past removal in the last five years.
Number of large trees	47 trees within a patch

The attributes of the native vegetation to be removed include:

- areas are defined as a patch;
- the Ecological Vegetation Class is EVC 134 Sand Forest (refer Section 3.1.1 above);
- Bioregional Conservation Status is Endangered;
- total area is 12.116 ha (Figure 1)
- Habitat Condition Score of 0.57 (Table 5)
- 47 large trees (Table 6)
- Strategic Biodiversity Value Scores - 0.612 - 0.635 (refer also attached – NVR report)

[6] The assessment pathway - determines the information requirements and decision guidelines for the permit application. There are three pathways – basic, intermediate and detailed. The pathway is determined based on type, location and extent of be vegetation removed and (modelled) potential impacts to rare or threatened species.

The proposed clearing does not include scattered trees.

The native vegetation proposed for removal is not within a wetland designated under the Ramsar Convention, a wetland listed in the Directory of Important Wetlands of Australia or an internationally important site for Migratory Shorebirds of the East Asian-Australian Flyway.

Table 5 Barton Rd, Moyston – vegetation quality assessment for vegetation proposed for removal (August 2018)

Habitat Zone			SF1
Bioregion			Greater Grampians
EVC Name			Sand Forest
EVC Bioregional Conservation Status			Endangered
		Max Score	Score
Site Condition	Large Old Trees	10	6
	Canopy Cover	5	3
	Understorey	25	15
	Lack of Weeds	15	9
	Recruitment	10	5
	Organic Litter	5	3
	Logs	5	4
	Total Site Score	**75**	**45**
	EVC standardiser		1
	Adjusted site score		**45**
Landscape value	Landscape score	25	12
Habitat Score		**100**	**57**
Habitat Score /100		1	**0.57**

Table 6 Barton Rd, Moyston – large trees within patches proposed for removal

Zone ID	No. of trees	Size range	Species
SF1	43	70–159 cm dbh	*Eucalyptus viminalis* subsp. *cygnetensis*
SF1	4	114–156 cm dbh	*Eucalyptus camaldulensis*

5.2 Impacts to rare or threatened species

The DELWP Native Vegetation Removal (NVR) Report presents the percentage habitat value affected for 29 rare or threatened species.

Based on DELWA's Habitat Importance maps, the modelled results indicate that all 29 species occupy Dispersed habitat, and that the clearing would not require species specific offsets (see attached NVR report).

5.3 Photographs of the vegetation to be removed

Plate 4 Barton Rd, Moyston – Sand Forest proposed for removal (August 2018)

Plate 5 Barton Rd, Moyston – Sand Forest proposed for removal (August 2018)

5.4 Avoid and minimise statement

The site was not subject to any strategic planning process associated with the Planning Scheme. The proposal's response to avoid and minimise elements of the three-step approach is as follows:

Avoid: An extensive search for a sand resource was carried out in the Ballarat Supply Interest Areas and surrounding areas. The two major sources of sand and gravel at Bacchus Marsh and White Hills are running out and new sand resources are required for the new infrastructure projects for

west of Melbourne and regional Victoria. The sand resource at 69 Barton Road is well located away from residential areas, is above the water table and with no clay content, the sand will not require washing. For the proposed sand quarry to be economically viable, the removal of native vegetation cannot be avoided. Strategies for minimising the extent of vegetation removal are detailed below.

Minimise: the loss of native vegetation has been minimised by site level planning by limiting the extraction area to the eastern section of the property. This area supports cleared areas, bracken regrowth and moderate quality Sand Forest. There are also fewer large old trees within proposed the extraction area; 47 within the extraction area versus 143 within the offset area. Vegetation to the west is typically of higher quality.

The initial design of extraction and offset areas—detailed in EHP (2018)—has been amended to minimise the extent of native vegetation disturbance. The change to the design has resulted in the decrease of native vegetation removal from 14.191 ha to the current 12.116 ha and an increase of the vegetation offset area from 11.84 ha to 14.609 ha.

Vegetation losses have been further minimised by creating a wider buffer zone on the southern boundary i.e. from 20 m to 30 m. This has created a corridor of seven large trees and other vegetation that may be incorporated into site rehabilitation, and greater connectivity for wildlife movement between the offset and Barton Road roadside.

No additional native vegetation will be removed for stockpiles, screening and other amenities (i.e. they will be placed outside areas supporting patch vegetation or scattered trees).

Along the western extraction boundary, there may be potential to protect some mature trees which are close to extraction limit. Recommendations for further minimising impacts to biodiversity values are present in Section 6.

5.5 Offsets

Approval of the proposed clearing would include a condition to obtain an offset that meets the following requirements:

General offset amount	8.465 general habitat units
Vicinity	Wimmera Catchment Management Authority (CMA) or Ararat Rural City Council
Minimum strategic biodiversity value score[7]	0.507
Large trees	47 large trees

There is potential to achieve some offsets on-site within the western portion of the property. All of the large tree offset requirements can be met within the proposed offset area (Figure 2), noting that consideration of edge-effects (associated with the extraction site) must be taken into account when

[7] Minimum strategic biodiversity value score is 80% of the weighted average score across habitat zones where a general offset is required

formalising the offsets. A total of 5.571 additional general habitat units are required from a third party offset provider. For a permit to be approved an offset strategy needs to be provided that identifies and states how the offset will be secured. The proposed offsets must meet all the offset requirements presented above.

6 Recommendations

The following recommendations have been in relation to the project:

- Salvage of the top soil – investigate the potential for salvaging top soil for use in site rehabilitation. Salvage the top 10 – 15 cm of soil from areas supporting native vegetation prior to operations commencing in new areas. This soil could potentially be used for restoration if former mined areas are progressively restored during the mining operations. Viability of soil stored seeds diminishes with time. Therefore, if soil is not respread immediately, storage of top soil would ideally be for less than 12 months before being respread on rehabilitated areas to be rehabilitated. Topsoil should be not be stripped when the ground is saturated (leads to compaction and loss of soil structure) and must be kept separate from overburden, gravel and other materials.
- Prepare and offset management plan for the proposed offset on site.
- Prepare a brief offset strategy to identify the source and availability of the required offsets.

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8 Glossary

Biodiversity	The variety of all life-forms, plants, animals, fungi, protists (including algae) and bacteria, their encoded genes, and the ecosystems of which they form a part
Bioregion	Defined geographical regions of Australia with similar climatic and geophysical characteristics, and which generally contain a suite of distinct ecosystems and species
CaLP Act	Victorian *Catchment and Land Protection Act 1994*
Conservation status	Categorisation of the threat risk to biological assets (plant and animal species, EVCs or plant communities) at a defined scale (e.g. national, state), as determined by specific criteria
Ecological Vegetation Class (EVC)	A vegetation classification described through a combination of its floristic composition, life form and ecological characteristics, and its association with particular environmental attributes. EVCs may include one or more floristic communities that occur across a biogeographic range, and have similar habitat and ecological processes operating
Endemic	Naturally found only in a defined geographic area
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
Exotic	Plants, animals, fungi and other organisms that have been introduced (deliberately or accidentally) to Australia or a given area after European settlement
Exotic vegetation	Vegetation comprised wholly or substantially of exotic species
FFG Act	Victorian *Flora and Fauna Guarantee Act 1988*
Floristic	Of or pertaining to plant species, i.e. flora
GIS	Geographic Information System. A digital platform for creating, analysing and viewing maps and other spatially referenced data
Habitat Hectares	A measure of the quality and extent of native vegetation, incorporating attributes including presence of large trees, tree canopy health, understorey structure and diversity, weed cover and landscape context
High threat weeds	Introduced species (including non-indigenous 'natives') which, as invading species have highly deleterious impacts on indigenous vegetation and faunal habitats
Indigenous	Plant and animal species found naturally in pre-European Australia
Indigenous vegetation	Vegetation native to Australia or native to a specific geographic region
Introduced	Deliberately or accidentally brought to Australia or part of Australia, usually by human agency

Life form	An abbreviated description of the habit, growth form and longevity of a plant species (e.g. tree, shrub, vine, annual, submerged aquatic)
Native vegetation	Species occurring naturally in Australia as part of the pre-European flora or fauna
Vegetation community	Term for interacting plant populations forming vegetation. A vegetation community in formal classifications may have characteristic plant species, composition and structure
VROTS	Victorian Rare or Threatened Species
WONS	Weeds of National Significance

Appendix 1 Plant taxa recorded on-site, August–December 2018

*exotic; not native to Victoria

Origin	Scientific Name	Common Name
	Acacia dealbata subsp. *dealbata*	Silver Wattle
	Acacia mearnsii	Black Wattle
	Acacia melanoxylon	Blackwood
	Acacia paradoxa	Hedge Wattle
	Acaena echinata	Sheep's Burr
*	*Acetosella vulgaris*	Sheep Sorrel
*	*Aphanes arvensis*	Parsley Piert
*	*Arctotheca calendula*	Cape weed
	Arthropodium milleflorum s.s.	Pale Vanilla-lily
	Asperula conferta	Common Woodruff
*	*Avena* sp.	Oat
*	*Barbula unguiculata*	Bird's-claw Beard-moss
	Campylopus clavatus	Broody Swan-neck Moss
	Caladenia fuscata	Dusky Fingers
	Carex appressa	Tall Sedge
	Centella cordifolia	Centella
	Centrolepis strigosa	Hairy Centrolepis
*	*Cerastium glomeratum s.s.*	Sticky Mouse-ear Chickweed
	Ceratodon purpureus subsp. *convolutus*	Redshank Moss
*	*Cirsium vulgare*	Spear Thistle
	Corybas incurvus	Slaty Helmet-orchid
	Cotula australis	Common Cotula
	Crassula decumbens var. *decumbens*	Spreading Crassula
	Crassula sieberiana s.s.	Sieber Crassula
	Drosera aberrans	Scented Sundew
	Drosera hookeri	Branched Sundew
*	*Ehrharta erecta* var. *erecta*	Panic Veldt-grass
	Eucalyptus camaldulensis	River Red-gum
	Eucalyptus melliodora	Yellow Box
	Eucalyptus ovata subsp. ovata	Swamp Gum
	Eucalyptus viminalis subsp. *cygnetensis*	Rough-barked Manna-gum
	Euchiton japonicus s.s.	Creeping Cudweed
	Fossombronia intestinalis	Bubble Frillwort
	Geranium sp. 2	Variable Crane's-bill
	Geranium spp.	Crane's Bill
*	*Holcus lanatus*	Yorkshire Fog
	Hydrocotyle laxiflora	Stinking Pennywort
	Hypericum gramineum	Small St John's Wort
*	*Hypochaeris glabra*	Smooth Cat's-ear
*	*Hypochaeris radicata*	Flatweed
	Imperata cylindrica	Blady Grass
	Isolepis cernua	Nodding Club-sedge
	Juncus amabilis	Hollow Rush

	Juncus pallidus	Pale Rush
	Juncus subsecundus	Finger Rush
	Lagenophora stipitata	Common Bottle-daisy
	Lepidosperma longitudinale	Pithy Sword-sedge
	Leptospermum continentale	Prickly Tea-tree
	Lomandra longifolia subsp. *longifolia*	Spiny-headed Mat-rush
*	*Lotus corniculatus*	Bird's-foot Trefoil
*	*Lysimachia arvensis*	Pimpernel
*	*Medicago polymorpha*	Burr Medic
	Microlaena stipoides var. *stipoides*	Weeping Grass
	Oxalis exilis	Shade Wood-sorrel
	Pauridia vaginata	Yellow Star
	Pelargonium rodneyanum	Magenta Stork's-bill
	Pteridium esculentum	Austral Bracken
	Pterostylis nutans	Nodding Greenhood
	Ranunculus spp.	Buttercup
	Rosulabryum capillare	Capillary Thread-moss
	Rytidosperma geniculatum	Kneed Wallaby-grass
	Rytidosperma racemosum var. *racemosum*	Slender Wallaby-grass
	Rytidosperma setaceum	Bristly Wallaby-grass
	Senecio glomeratus	Annual Fireweed
	Senecio minimus	Shrubby Fireweed
	Senecio quadridentatus	Cotton Fireweed
*	*Sonchus asper s.s.*	Rough Sow-thistle
*	*Sonchus oleraceus*	Common Sow-thistle
	Stellaria sp.	Starwort
	Stuartina muelleri	Spoon Cudweed
	Thelymitra brevifolia	Sun Orchid
	Thelymitra spp.	Sun Orchid
*	*Vulpia bromoides*	Squirrel-tail Fescue
	Wahlenbergia stricta subsp. *stricta*	Tall Bluebell
	Wurmbea dioica	Common Early Nancy

Appendix 2 Fauna species recorded at 69 Barton Rd, Moyston (August 2018)

M = Listed under the Marine Schedule of the EPBC Act 1999
Mi = Listed under the Migratory Schedule of the EPBC Act 1999
nt = Classified as near threatened in Victoria (DSE 2013)
^ = Recorded from a dead specimen found on-site
* = Introduced species

Origin	Scientific Name	Common Name	Conservation Status
	Birds		
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	
	Acanthiza lineata	Striated Thornbill	
	Acanthiza pusilla	Brown Thornbill	
	Acanthorhynchus tenuirostris	Eastern Spinebill	
	Aegotheles cristatus	Australian Owlet-Nightjar	
	Anthochaera carunculata	Red Wattlebird	
	Cacatua galerita	Sulphur-crested Cockatoo	
	Cacatua sanguinea	Little Corella	
	Calyptorhynchus funereus	Yellow-tailed Black-cockatoo	
	Chenonetta jubata	Australian Wood Duck	
	Chrysococcyx basalis	Horsfield's Bronze-Cuckoo	M
	Colluricincla harmonica	Grey Shrike-thrush	
	Corcorax melanorhamphos	White-winged Chough	
	Cormobates leucophaeus	White-throated Treecreeper	
	Corvus coronoides	Australian Raven	
	Corvus mellori	Little Raven	M
	Cracticus tibicen	Australian Magpie	
	Dacelo novaeguineae	Laughing Kookaburra	
	Dromaius novaehollandiae	Emu	
	Eolophus roseicapilla	Galah	
	Eopsaltria australis	Eastern Yellow Robin	
	Falco berigora	Brown Falcon	
	Haliastur sphenurus	Whistling Kite	M
	Lichenostomus chrysops	Yellow-faced Honeyeater	
	Lichenostomus leucotis	White-eared Honeyeater	
	Lichenostomus melanops	Yellow-tufted Honeyeater	
	Malurus cyaneus	Superb Fairy-wren	
	Melithripterus gularis gularis	Black-chinned Honeyeater	nt
	Ninox novaeseelandiae	Southern Boobook	M
	Pachycephala rufiventris	Rufous Whistler	
	Pardalotus punctatus	Spotted Pardalote	
	Pardalotus striatus	Striated Pardalote	
	Petrochelidon neoxena	Welcome Swallow	M
	Phaps chalcoptera	Common Bronzewing	
	Platycercus elegans	Crimson Rosella	
	Pomatostomus superciliosus	White-browed Babbler	
	Rhipidura albiscarpa	Grey Fantail	
	Sericornis frontalis	White-browed Scrubwren	

Origin	Scientific Name	Common Name	Conservation Status
	Strepera graculina	Grey Currawong	
*	*Turdus merula*	Common Blackbird	
	Todiramphus sanctus	Sacred Kingfisher	M
	Zosterops lateralis	Silvereye	M
	Mammals		
	Antechinus flavipes	Yellow-footed Antechinus	
*	*Cervus elaphus*	Red Deer	
*	*Felis catus*	Cat	
*	*Lepus europeaus*	European Hare	
	Macropus giganteus	Eastern Grey Kangaroo	
	Macropus rufogriseus	Red-necked Wallaby	
*	*Oryctolagus cuniculus*	European Rabbit	
	Pseudocheirus peregrinus	Common Ringtail Possum	
	Tachyglossus aculeatus	Short-beaked Echidna	
	Trichosurus vulpecula	Common Brushtail Possum	
*	*Vulpes vulpes*	Red Fox	
	Wallabia bicolor	Black-tailed Wallaby	
	Amphibians		
	Crinia signifera	Common Froglet	
	Litoria ewingii	Southern Brown Tree Frog	
	Limnodynastes durmerilii	Southern Bullfrog	
	Reptiles		
	Amphibolurus muricatus	Tree Dragon	
	Tiliqua rugosa	Stumpy-tailed Lizard	