ecology & heritage partners

Final Report

Ecological Assessment: Bacchus Marsh Development Project, Victoria

Prepared for

Bacchus Marsh Developments Pty Ltd

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Ecology and Heritage Partners Pty Ltd

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SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Bacchus Marsh Developments Pty Ltd to conduct a detailed ecological assessment within 16 properties that are within the proposed Bacchus Marsh Development Project, Victoria.

The properties are within an area identified for potential future urban development as part of the expansion of Bacchus Marsh, and Moorabool Council and the Victorian Planning Authority (VPA) have jointly prepared the draft Bacchus Marsh Urban Growth Framework (UGF).

Methods

Ecological Assessment

A series of field assessments were undertaken between 15 August and 8 December 2017, and 3 July 2018 to obtain information on terrestrial flora and fauna values within the study area. A habitat hectare assessment was undertaken in conjunction with the flora survey. Vegetation within the study area was assessed according to the habitat hectare methodology, which is described in the Vegetation Quality Assessment Manual.

Targeted Spiny Rice-flower Survey

A targeted survey for the nationally significant Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* was undertaken on 17, 21, 24 and 31 August, and 4 and 5 September 2017, and 3 July 2018, with the surveys on each of the respective days undertaken by up to four qualified ecologists familiar with the target species.

Areas identified as supporting suitable habitat were traversed, with surveys conducted along transect lines approximately five metres apart, or as dictated by the density of existing grasses and weeds. The location of all plants was recorded during the survey with a handheld GPS (accuracy of +/- 3 metres).

Results

Flora

Remnant native vegetation in the study area is representative of four EVCs: *Low Rainfall* Plains Grassland (EVC 132_63), Grassy Woodland (EVC 175), Rocky Chenopod Woodland (EVC 64) and Plains Grassy Wetland (EVC 125).

A summary of the breakdown of native vegetation recorded in the study area is provided below (Table S1).

TableS1. Summary of native vegetation within the study area

Native Vegetation	Properties 1-15	Property 16	Total
Scattered Trees	60	0	60
Grassy Woodland	4.776	0	4.776
Plains Grassland	19.358	15.095	34.453
Plains Grassy Wetland	0.069	0	0.069
Rocky Chenopod Woodland	0.371	27.799	28.170
Current Wetland	5.323	0	5.323
Remnant Patch (total)	**29.897**	**42.894**	**72.791**

The nationally significant Spiny Rice-flower, and State significant Fragrant Saltbush *Rhagodia parabolica*, Black Roly-poly *Sclerolaena muricata* var. *muricata*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis* and Bacchus Marsh Wattle *Acacia rostriformis* were recorded within the study area.

Targeted surveys have been undertaken for Spiny Rice-flower at an appropriate time of year within suitable habitat to ascertain its presence within the study area (Section 3.5). Based on the landscape context and proximity of precious records, surveys for other nationally significant species are not considered to be required.

Based on habitat condition and the proximity of previous records, there is suitable habitat within the study area for the State-significant Buloke *Allocasuarina luehmannii*, Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*, Small Scurf-pea *Cullen parvum*, Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra), and Austral Tobacco *Nicotiana suaveolens.*

Fauna

Targeted surveys have commenced for the nationally significant Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar* to ascertain their presence within the study area. The survey methodology for Striped Legless Lizard is also suitable for the detection of the Fat-tailed Dunnart *Sminthopsis crassicaudata* (and other small mammals). Based on the landscape context and proximity of precious records, surveys for other nationally significant species are not considered to be required

Based on habitat condition, and the proximity of previous records, there is also potential habitat within the study area for the State-significant Speckled Warbler *Chthonicola sagittatus*, Barking Owl *Ninox connivens connivens* and Crested Bellbird Oreoica *gutturalis gutturalis* as well as the Regionally significant Fat-tailed Dunnart and Spotted Harrier *Circus assimilis.*

Communities

Remnants of habitat zone PG4 and all of PG7, PG8 and PG9 meet the thresholds that define the nationally significant *Natural Temperate Grasslands of the Victorian Volcanic Plain* (NTGVVP) ecological community. Patches PG8 and PG9 were of the highest quality, were contiguous with each other and other larger remnants of vegetation in Property 16, and supported high native species diversity.

No other nationally significant communities are present.

Two FFG Act-listed ecological communities are present in the study area:

- Western (Basalt) Plains Grassland Community; and,
- Rocky Chenopod Open Scrub Community.

Legislative and Policy Implications

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

The proposed development will impact upon two MNES listed under the EPBC Act; 22.197 hectares of confirmed habitat for Golden Sun Moth, and 1.78 hectares of the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community. A referral to the Commonwealth Environment Minister for assessment under the EPBC Act is currently in preparation.

No impacts to Spiny Rice-flower will occur due to the individuals recorded being located outside of the impact area.

No other impacts to MNES are expected to occur.

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

There is suitable habitat within the study area for several species listed or protected under the FFG Act (Section 3.4). However, the study area is privately owned, as such a permit under the FFG Act is not required, unless impacts to FFG Act listed matters are impacted on public land (i.e. road reserves). If required, the proponent should allow up to six weeks to obtain a FFG Act permit through DELWP.

Planning and Environment Act 1987

A Planning Permit from Moorabool Shire Council is required to remove, destroy or lop any native vegetation. In this instance, the application will be referred to DELWP as the application will be assessed under the Detailed Assessment Pathway (i.e. greater than 0.5 hectares of native vegetation removed).

Other Legislation and Policy

Implications relating to other local and State policy (*Wildlife Act 1975*, *Catchment and Land Protection Act 1994*, local government authorities) as well as additional studies or reporting that may be required (Conservation Management Plan, Weed Management Plan, Construction Environment Managements Plan) are provided in Section 6.

Table S1. Application requirements for a permit to remove native vegetation (*Victoria Planning Provisions* Clause 52.17 -3; DELWP 2017a)

No.	Application Requirement	Response
Application requirements under the Detailed Assessment Pathway		
1	Information about the native vegetation to be removed, including: • The assessment pathway and reason for the assessment pathway. • A description of the native vegetation to be removed: • Maps showing the native vegetation and property in context: • The offset requirement that will apply if the native vegetation is approved to be removed.	Details provided in Section 3 and NVR report in Appendix 4.
2	Topographic and land information relating to the native vegetation to be removed, showing ridges, crests and hilltops, wetlands and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion, as appropriate.	Details provided in Section 1.3 and Figure 2.
3	Recent, dated photographs of the native vegetation to be removed.	Details provided in Section 3.
4	Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or on contiguous land in the same ownership as the applicant, in the five year period before the application for a permit is lodged.	Not Applicable.
5	An avoid and minimise statement. The statement describes any efforts to avoid the removal of,and minimise the impacts on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	Details provided in Section 5.1.
6	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* that applies to the native vegetation to be removed.	Not applicable.
7	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This statement must have regard to other available bushfire risk mitigation measures. This statement is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay.	Not applicable.
8	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations at decision guideline 8.	Not applicable.
9	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified, and can be secured in accordance with the Guidelines.	Details provided in Section 5.3
10	A site assessment report of the native vegetation to be removed, including: • A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status. • The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches. • The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	See Section 3.3; Appendix 2.3.
11	Information about impacts on rare or threatened species habitat, including: • The relevant section of the Habitat importance map for each rare or	Details provided in Section 3.4 and Appendix 4.

No.	Application Requirement	Response
	threatened species requiring a species offset. • For each rare or threatened species that the native vegetation to be removed is habitat for, according to the Habitat importance maps: - the species' conservation status - the proportional impact of the removal of native vegetation on the total habitat for that species - whether their habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat	

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Bacchus Marsh Developments Pty Ltd to conduct an Ecological Assessment within the 16 properties that are proposed to comprise the Bacchus Marsh Development Project, Victoria.

Ecology and Heritage Partners understand that Bacchus Marsh Developments Pty Ltd has acquired interests in the properties, which are currently used for agriculture. The properties are within an area identified for potential future urban development as part of the expansion of Bacchus Marsh, and Moorabool Council and the Victorian Planning Authority (VPA) have jointly prepared the draft Bacchus Marsh Urban Growth Framework (UGF).

1.1.1 Amendment C81 – Bacchus Marsh Urban Growth Framework

With the population of Bacchus Marsh expected to double from 20,000 today to 40,000 residents by 2041, the draft UGF is crucial to guide growth. It is expected that the Urban Growth Framework Plan will be incorporated into the planning scheme in 2018 (Amendment C81), and that a Precinct Structure Plan will thereafter be prepared in relation to the land.

Amendment C81 affects land in the urban and rural areas of Bacchus Marsh, Darley, Maddingley and Pentland Hills, together with the rural fringe areas of Merrimu, Parwan, Hopetoun Park, Coimadai (part), Long Forest (part) and Rowsley (part).

Amendment C81 promotes coordinated, master-planned development of identified areas in and around Bacchus Marsh, by identifying a need to:

- Contain short to medium term residential development within the existing settlement boundary (infill and greenfield);
- Prepare for medium to long term residential growth within the investigation areas at Merrimu, Parwan Station and Hopetoun Park;
- Require precinct structure plans for any urban growth precincts at Merrimu and Parwan Station, and a development plan for any growth precinct at Hopetoun Park, and ensure that such plans provide for appropriate community and social infrastructure, activity centres, schools, integrated transport, reticulated services and local job opportunities;
- Prepare a precinct structure plan for Parwan Employment Precinct, to address key infrastructure and land use priorities that will deliver value-added and vertically or horizontally integrated agribusiness/industries; and
- Work with State Government and other relevant servicing authorities towards the servicing of Parwan Employment Precinct, with particular emphasis on the provision of reticulated water and gas.

It is important to note that Amendment C81 does not rezone any land. It provides a strategic framework for determining where future urban growth precincts and employment growth precincts will occur. A future, separate planning scheme amendment will be required, to identify exact boundaries for these precincts and to rezone land to facilitate master-planned urban development (Moorabool Shire 2017).

1.2 Objectives

The purpose of the assessment was to identify the extent and type of remnant native vegetation present within the properties of which Bacchus Marsh Developments has an interest in, and to determine the presence, or otherwise, of significant flora and fauna species and/or ecological communities. This report presents the results of the ecological assessments and discusses the potential ecological and legislative implications associated with any future proposed development.

The objectives of the ecological assessment were to:

- Review the relevant flora and fauna databases and available literature;
- Conduct detailed field assessment to identify flora and fauna values within the study area;
- Provide maps showing any areas of remnant native vegetation and locations of any significant flora and fauna species, and/or fauna habitat (if present);
- Classify any flora and fauna species and vegetation communities identified or considered likely to occur within the study area in accordance with Commonwealth and State legislation;
- Document relevant environmental legislation and policy;
- Document any opportunities and constraints associated with the proposed works; and,
- Advise whether any additional flora and/or fauna surveys are required prior to works commencing (e.g. targeted surveys for significant flora and fauna species).

Where areas of remnant vegetation were present, the following tasks were completed to address requirements under the 'Guidelines for the removal, destruction or lopping of native vegetation (The Guidelines) (DELWP 2017a):

- A habitat hectare assessment of any areas of remnant native vegetation within the study area;
- Quantify the presence of scattered trees and Large Trees in patches (LOTs) and habitat for rare or threatened species that may be impacted as a result of the proposed development.

1.3 Study Area

The study area covers approximately 435 hectares, and is comprised of 16 properties bound by Gisborne Road to the west, and Bences Road to the east (Table 1) approximately 50 kilometres north-west of Melbourne's CBD (Figure 1). It should be noted that Property 16 is ultimately proposed to be secured and managed as an offset site, and will not be subject to any proposed development.

Table 1. Properties within the study area

Property Number *	Address	Title details
1	2621 Gisborne Road	Proposed lots 1 and 2 on PS724534Y
2	Gisborne Road	Lot 1 PS124024
3	146 Bences Road	PS124024
4a	2677 Gisborne Road	Lot 1 TP578035R
4b	152 Bences Road	Lot 1 TP159956
5	Gisborne Road	Lots 1,2,3&4 TP567257J
6	Buckleys Road	Lot 1 on TP958042C
7	268 Bences Road	Lot 1 PS125141
8	139 O'Connell Road	Lots 1&2 TP408175C
9	332 Bences Road	Lot 2 PS125141
10	372 Bences Road	Lot 2 PS432900C
11	376 Bences Road	Lot 2 PS411883S
12	Lerderderg Park Road	Lot 1 TP97760S
13	Lerderderg Park Road	Lot 1 TP111405 (part)
14	345 Bences Road	Lot 2 PS139808
15	295 Bences Road	Lot 1 LP139808
16*	289 Bences Road	Allot E, Sec 18\PP3095

Note. See Figure 2 for location of properties within the study area. * Property 16 is not proposed for development, and is proposed to be secured and protected as an offset site.

The land within and surrounding the study area predominantly supports agricultural activities in the form of grazing, cropping, market gardens, orchards, and vineyards. Two operating quarries are located immediately opposite the study area on the west of Gisborne Road, while the Long Forest Flora and Fauna Reserve is located to the east of Bences road in close proximity to the study area (Figure 1).

The study area is generally flat, with several escarpments located to the west and south of the study area. The headwaters of several designated waterways commence within the study area and follow the escarpments into lower lying areas to the east and west.

Erosion is evident throughout all observed escarpments, and has resulted in a shallow soil profile at both the top and mid-slope of these the escarpments. The location of waterways, escarpments, steep slopes and erosion within the study area is shown in Figure 1 and Figure 2.

According to the Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) Tool (DELWP 2017b), the study area occurs within the Victorian Volcanic Plain and Central Victorian Uplands bioregions. It is located within the jurisdiction of the Port Philip and Westernport Catchment Management Authority (CMA) and the Moorabool Shire Council municipality. Section 4.3.1 discusses zoning and overlays relevant to the study area.

2 METHODS

2.1 Desktop Assessment

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

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

- The DELWP NVIM Tool (DELWP 2017b) and NatureKit Map (DELWP 2017c) for:
    - Modelled data for location risk, remnant vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current EVCs.
- Ecological Vegetation Class (EVC) benchmarks (DELWP 2017d) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2017e);
- The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017) for assistance with the distribution and identification of flora species;
- The Commonwealth Department of the Environment (DoEE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoEE 2018);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened and Protected Lists (DELWP 2017f; DELWP 2016);
- The Planning Maps Online (DELWP 2017g) and Planning Schemes Online (DELWP 2017h) to ascertain current zoning and environmental overlays in the study area;
- Other relevant environmental legislation and policies as required;
- Aerial photography of the study area; and,
- Previous ecological or other relevant assessments within and adjacent to the study area, including:
    - Bences Road Habitat Hectare Assessment (Brett Lane and Associates [BL&A] 2010);
    - Flora and Fauna Assessment, Long Forest Estate (Ecology and Heritage Partners 2013a);
    - 289 Bences Road Offset Assessment (BL&A 2012);
    - Targeted Flora and Fauna Surveys for Long Forest Estate (Ecology and Heritage Partners 2013b); and,
    - Bacchus Marsh Site Assessments (Paul Kelly & Associates 2014).

2.2 Field Assessment

2.2.1 Flora Assessment

The flora assessment was undertaken on 15 -17 August, 10 September, 25 October, 8 December 2017 and 3 July 2018 to obtain information on flora values within the study area. The study area was walked and/or driven, with all observed vascular flora species recorded, any significant records mapped and the overall condition of vegetation noted. Remnant vegetation in the local area was also investigated to assist in determining the pre-European vegetation within the study area. EVCs were determined with reference to DELWP pre-1750 and extant EVC mapping and their published descriptions (DELWP 2017d). The significance assessment criteria of taxa and vegetation communities are presented in Appendix 1.

Where remnant vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (DSE 2004).

2.2.1.1 Spiny Rice-flower Targeted Survey

A targeted survey for the nationally significant Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* was undertaken on 17, 21, 24 and 31 August, and 4 and 5 September 2017, and 3 July 2018 with the survey on each of the respective days undertaken by up to four qualified ecologists familiar with the target species. Areas identified as supporting suitable habitat (Properties 4b, 5, 9, 10, 11, 15 and 16) were traversed, with surveys conducted along transect lines approximately five metres apart, or as dictated by the density of existing grasses and weeds. The location of all plants was recorded during the survey with a handheld GPS (accuracy of +/- 3 metres).

The survey methodology adhered to the survey guidelines for Spiny Rice-flower outlined in the Biodiversity Precinct Structure Planning Kit (DSE 2010a) and in the Significant Impact Guidelines for the species (DEWHA 2009). A summary of the survey effort compared with the survey guidelines is provided in Table 2.

Spiny Rice-flower is a perennial sub-shrub listed as Critically Endangered under the Commonwealth EPBC Act, as threatened under the Victorian FFG Act, and as endangered under the Advisory List of Rare and Threatened Plants in Victoria (DEPI 2014). The species is endemic to Victoria, and is found between the south-west and north-central parts of the State. It occurs in grassy EVC such as Plains Grassland (EVC 132), Plains Grassy Woodland (EVC 55), Plains Woodland (EVC 803) and Plains Grassland/Grassy Woodland Mosaic (EVC 897) (DEWHA 2009). Spiny Rice-flower is typically found in small populations (<500 individuals).

The species is slow-growing and reaches up to 30 cm in height (Plate 1; Plate 2). Plants are mostly dioecious (male and female flowers on separate plants) but some plants are monoecious (male and female flower on same plant). It bears small yellow flowers between April and August (DEWHA 2009).

Table 2. Survey effort compared with the Biodiversity Precinct Structure Planning Kit (DSE 2010a) and the Significant Impact Guidelines for the species (DEWHA 2009).

Survey Guidelines	Comment
Targeted surveys should be done by people familiar with recognising the subspecies.	Yes. Surveys were completed by assessors familiar with the appearance and ecology of the subspecies.
Multiple surveys may be required to identify the species and provide adequate survey effort.	Given that the species was known to be flowering at the time of the assessments, and biomass was generally low across areas of suitable habitat, specimens were easily identifiable, a single survey effort across most of the properties was considered appropriate to accurately record the species. Multiple surveys were undertaken in Property 11 and 16 where large populations were identified.
Surveys should not be conducted for at least six months after fires and for at least three months after the cessation of grazing (DEWHA Survey Guidelines).	Yes. The assessors are not aware of any fires or grazing within the specified timeframes.
Survey Spiny Rice-flower between April and August (easily overlooked when not in flower).	Yes. The assessments were conducted within the flowering period for the species by ecologists familiar with the species in and out of flower. Given the survey effort within areas of suitable habitat, there is reasonable assurance that individuals were not overlooked.
The targeted survey effort should be directed to all potential habitat areas i.e. remnant grassland including degraded grassland.	Yes. The entire study area was visually surveyed and traversed in linear transects (i.e. targeted survey areas).
Walk through transects at less than 5m grid intervals are required for all potential habitat.	Yes. Transects of five metres apart were utilised throughout the entire targeted survey areas.
Record the number of plants per land parcel.	Yes. Any observed plants were recorded.

Plate 1. Spiny Rice-flower within the study area (Ecology and Heritage Partners Pty Ltd 2017).

Plate 2. Spiny Rice-flower within the study area (Ecology and Heritage Partners Pty Ltd 2017).

2.2.2 Fauna Assessment

A fauna assessment was undertaken on 15 and 16 August 2017 to obtain information on terrestrial fauna values within the study area. The study area was visually assessed and active searching under and around ground debris for reptiles, frogs and small mammals was undertaken. Binoculars were also used to scan the area for birds, and observers listened for calls and searched for other signs of fauna such as nests, remains of dead animals, droppings and footprints. Potential habitat for fauna was assessed, with a particular emphasis on habitats that may provide shelter, food or other resources for significant species.

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

Under the *Planning and Environment Act 1987,* Clause 52.17 of the Planning Schemes requires a planning permit from the relevant local Council to remove, destroy or lop native vegetation. The assessment process for the clearing of vegetation follows the 'Guidelines for the removal, destruction or lopping of native vegetation' (the Guidelines) (DELWP 2017a). The 'Assessor's handbook – Applications to remove, destroy or lop native vegetation' (the Handbook) provides clarification regarding the application of the Guidelines (DELWP 2017j).

2.3.1 Assessment Pathway

The Guidelines manage the impacts on biodiversity from native vegetation removal using an assessment pathway approach. Two factors – extent risk and location category – are used to determine the risk associated with an application for a permit to remove native vegetation. The location category (1, 2 or 3) has been determined for all areas in Victoria and is available on DELWP's Native Vegetation Information Management (NVIM) Tool (DELWP 2017b). Determination of assessment pathway is summarised in Table 3.

Table 3. Application pathways for applications to remove native vegetation (DELWP 2017a)

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

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

2.3.2 Vegetation Assessment

Native vegetation (as defined in Table 4) is assessed using two key parameters: extent (in hectares) and condition. For the purposes of this assessment, both extent and condition were determined as part of the flora assessment using the habitat hectare methodology (DSE 2004).

Table 4. Determination of remnant native vegetation (DELWP 2017a)

Category	Definition	Extent	Condition
Remnant patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; OR An area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuus canopy; OR any mapped wetland included in the *Current Wetlands map*, available in DELWP systems and tools.	Measured in hectares. Based on hectare area of the remnant patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.
Scattered tree	A native canopy tree that does not form part of a remnant patch.	Measured in hectares. Each Large scattered tree is assigned an extent of 0.071 hectares (30m diameter). Each Small scattered tree is assigned a default extent of 0.31 hectares (10 metre diameter)	Scattered trees are assigned a default condition score of 0.2 (outside a patch).

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

2.3.3 Mapped Wetlands (DELWP)

Wetlands can be difficult to map and assess accurately as they respond quite quickly to changes in environmental condition, especially rainfall. After a period of no or low rainfall they can disappear or appear very degraded. They do, however, recover rapidly after periods of increased rainfall. As a result, under the Guidelines all mapped wetlands (based on 'Current Wetlands' layer in the DELWP Biodiversity Interactive Map) that are to be impacted must be included as native vegetation, with the modelled condition score assigned to them (DELWP 2017b).

Note that mapped wetlands do not apply if they are covered by a hardened, man-made surface, for example, a roadway. If covered by any vegetation including crops, bare soil, a mapped wetland must be treated as a remnant patch.

2.3.4 Impact Avoidance and Minimisation

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

2.3.5 Offsets

Offsets are required to compensate for the permitted removal of native vegetation.

The offset requirements for native vegetation removal are calculated by DELWP, based on the vegetation condition scores determined during the biodiversity assessment. Details regarding the offset requirements are provided in Section 3.3 and Appendix 4.

2.4 Assessment Qualifications and Limitations

Data and information held within the ecological databases and mapping programs reviewed in the desktop assessment (e.g. VBA, PMST, Biodiversity Interactive Maps etc.) are unlikely to represent all flora and fauna observations within, and surrounding, the study area. It is therefore important to acknowledge that a lack of documented records does not necessarily indicate that a species or community is absent.

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

The 'snap shot' nature of a standard biodiversity assessment means that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent. Targeted flora or fauna surveys were not undertaken, as this was beyond the preliminary scope of the project. Nevertheless, the terrestrial flora and fauna data collected during the field assessment and information obtained from relevant desktop sources is considered adequate to provide an accurate assessment of the ecological values present within the study area.

Where appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of habitat, if suitable, and the implications under legislation and policy are considered accordingly.

3 RESULTS

3.1 Vegetation Condition

3.1.1 Remnant Patches

Remnant native vegetation in the study area is representative of four EVCs: *Low Rainfall* Plains Grassland (EVC 132_63), Grassy Woodland (EVC 175), Rocky Chenopod Woodland (EVC 64) and Plains Grassy Wetland (EVC 125). The presence of these EVCs is generally consistent with the modelled pre-1750s native vegetation mapping (DELWP 2017b).

The remainder of the study area comprises introduced and planted vegetation, present as crop, pasture, windrows and ornamental plantings. Specific details relating to observed EVCs are provided below.

3.1.1.1 Plains Grassland

Low-rainfall Plains Grassland (EVC 132_63) typically consists of treeless vegetation mostly less than one metre in height, and dominated by a mixture of grasses and herbs. This EVC usually occupies cracking basalt soils prone to seasonal waterlogging in areas receiving less than 500 millimetres of annual rainfall (DELWP 2017d).

Plains Grassland was recorded along the north-west boundary, and in scattered patches to the south and east of the study area (Figure 2). Dominant native grasses recorded throughout most patches included Spurred Spear-grass *Austrostipa gibbosa*, Rough Spear-grass *Austrostipa scabra* subsp. *falcata*, Common Wallaby-grass *Rytidosperma caespitosa*, Bristly Wallaby-grass *Rytidosperma setaceum*, and Kneed Wallaby-grass *Rytidosperma geniculatum* (Plate 3). Commonly observed shrubs and herbs within this vegetation type comprised Berry Saltbush *Atriplex semibaccata*, Sheep's Burr *Acaena echinata*, Wingless Bluebush *Maireana enchylaenoides*, Nodding Saltbush *Einadia nutans*, Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa*, Native Flax *Linum marginale* and occasional specimens of Lemon Beauty-heads *Calocephalus citreus*, Fuzzy New Holland Daisy *Vittadinia cuneata*, and Golden Billy-buttons *Pycnosorus chrysanthes* (Plate 4).

A total of 10 habitat zones comprising 34.453 hectares were recorded within the study area (PG1 – PG10) (Figure 2), with habitat zones differing in quality predominantly due to the diversity and/or of native species present, and the type and extent of weeds present in the habitat zone (Appendix 2.3). A total of 15.095 hectares of Plains Grassland is located in Property 16.

Some remnants of habitat zone PG4, and all of PG7, PG8 and PG9 met the thresholds that define the nationally significant *Natural Temperate Grasslands of the Victorian Volcanic Plain* (NTGVVP) ecological community.

Patches PG8 and PG9 were of the highest quality, were contiguous with each other and other larger remnants of vegetation in Property 16 and supported high native species diversity.

Plate 3. Plains Grassland (PG2) within the study area (Ecology and Heritage Partners Pty Ltd 17/08/2017).

Plate 4. Fuzzy New Holland Daisy-dominated Plains Grassland (PG8) within the study area (Ecology and Heritage Partners Pty Ltd 10/09/2017).

Lower quality remnants were located elsewhere throughout the study area, and due to former or ongoing land practices, exhibited a lower species diversity, with PG2, PG3 and PG6 often being defined by only one or two native species, and high cover of exotic flora.

Exotic flora was dominant throughout most areas within and adjacent to Plains Grassland vegetation. The most commonly observed weeds were the declared noxious weeds African Box-thorn *Lycium ferocissimum*, Artichoke Thistle *Cynara cardunculus*, Horehound *Marrubium vulgare* and Serrated Tussock *Nassella trichotoma*. Other common environmental weeds present throughout included Galenia *Galenia pubescens*, Cape Weed *Arctotheca calendula*, Wild Turnip *Brassica* spp., Perennial Rye-grass *Lolium perenne*, Barley *Hordeum* spp., Rat's-tail Fescue *Vulpia myuros*, Ribwort *Plantago lanceolata* and Soft Brome *Bromus hordeaceus* (Plate 5; Plate 6).

Plate 5. Galenia and African Box-thorn within the study area (Ecology and Heritage Partners Pty Ltd 15/08/2017).

Plate 6. Serrated Tussock-dominated grassland (Ecology and Heritage Partners Pty Ltd 25/10/2017).

3.1.1.2 Grassy Woodland

Grassy Woodland is described as a variable open eucalypt woodland over a diverse ground layer of grasses and herbs, with a sparse shrub component. The EVC usually occurs on sites with moderate fertility over a range of geologies, often on undulating hillsides or slopes (DELWP 2017d).

Within the study area, Grassy Woodland was recorded in several small, scattered remnants adjacent to Gisborne Road, along with one large remnant immediately north of O'Connell Road (Figure 2).

The overstorey was predominantly comprised of Grey Box *Eucalyptus microcarpa*, with occasional specimens of Yellow Box *Eucalyptus melliodora* and Yellow Gum *Eucalyptus leucoxylon* subsp. *pruinosa* also present.

The understory was in poor condition in all habitat zones, with only occasional occurrences of native grasses and shrubs present. The State significant Fragrant Saltbush *Rhagodia parabolica* was relatively common within and adjacent to several patches of Grassy Woodland. However, the dominant understory species comprised African Box-thorn, Serrated Tussock and Galenia (Plate 7; Plate 8).

A total of four habitat zones were recorded within the study area (GW1 – GW4) (Figure 2), comprising an area of 5.486 hectares, with habitat zones mostly defined by the number of Large Old Trees present, and the cover of weeds in the understory (Appendix 2.3).

Plate 7. Grassy Woodland (GW1) within the study area (Ecology and Heritage Partners Pty Ltd 25/10/2017).

Plate 8. Grassy Woodland (GW4) within the study area (Ecology and Heritage Partners Pty Ltd 16/08/2017).

3.1.1.3 Rocky Chenopod Woodland

Rocky Chenopod Woodland is a low open eucalypt woodland (often in mallee-form) with an understory dominated by chenopod (saltbush) species, with scattered grasses and herbs (DELWP 2017d).

Rocky Chenopod Woodland was recorded in small patches near north-west boundary adjacent to Gisborne Road, as well as in a large remnant to the east of the study area in Property 16 (Figure 2). The overstorey of this EVC was co-dominated by Grey Box and Bull Mallee *Eucalyptus behriana*, with the occasional Yellow Gum specimen also present. The understory was generally sparse, and comprised Fragrant Saltbush, Ruby Saltbush, Moonah *Melaleuca lanceolata*, Gold-dust Wattle *Acacia acinacea*, Variable Groundsel *Senecio pinnatifolius* and Saloop *Einadia hastata* (Plate 9 and 10).

Weed cover was high in habitat zones RCW1, RCW2 and RCW5, with African Box-thorn and Galenia dominating the understory in these habitat zones (Plate 11; Plate 12). Zones RCW3 and RCW4 were relatively weed free (Plate 9; Plate 10).

Five habitat zones (RCW1 – RCW5) were recorded comprising a total of 28.121 hectares, of which 27.788 hectares is situated in Property 16. Habitat zones were predominantly differentiated due to the cover of weeds and number of woody species exhibiting recruitment (Appendix 2.3).

Plate 9. Rocky Chenopod Woodland (RCW3) within the study area (Ecology and Heritage Partners Pty Ltd 08/12/2017).

Plate 10. Rocky Chenopod Woodland (RCW3) within the study area (Ecology and Heritage Partners Pty Ltd 08/12/2017).

Plate 11. High cover of African Box-thorn within RCW5 (Ecology and Heritage Partners Pty Ltd 08/12/2017).

Plate 12. High cover of African Box-thorn within RCW5 (Ecology and Heritage Partners Pty Ltd 08/12/2017).

3.1.1.4 Plains Grassy Wetland

Plains Grassy Wetland is usually treeless, although a sparse shrub component may be present. The ground cover is usually dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas (DELWP 2017d).

One patch of Plans Grassy Wetland (PGWe1) was recorded around an artificial water body along a designated waterway within Property 5, and was comprised of Cumbungi *Typha* spp., Common Spike-sedge *Eleocharis acuta*, Joint-leaf Rush *Juncus holoschoenus* and Pale Rush *Juncus pallidus* (Plate 13; Plate 14).

The exotic species Drain Flat-sedge *Cyperus eragrostis*, Lesser Quaking-grass *Briza minor* and Yorkshire Fog *Holcus lanatus* were common in this habitat zone.

Plate 13. PGWe1 within the study area (Ecology and Heritage Partners Pty Ltd 15/08/2017).

Plate 14. PGWe1 within the study area (Ecology and Heritage Partners Pty Ltd 15/08/2017).

3.1.2 Scattered Trees

Sixty (60) scattered trees, the majority being Grey Box, with occasional specimens of River Red-gum *Eucalyptus camaldulensis,* Yellow Box, and Messmate *Eucalyptus obliqua* occur throughout the study area with the majority estimated to be at least 200 years old. These trees would once likely have been part of the Grassy Woodland EVC, however the understorey vegetation consists of predominantly introduced species (mainly exotic pasture grasses) and the trees no longer form a patch of native vegetation (Plate 15; Plate 16).

Of the 60 scattered trees, a total of 32 are Large Old Trees (LOTs), with 28 Small Trees (STs) (Appendix 2.4).

Plate 15. Two scattered Grey Box within the study area (Ecology and Heritage Partners Pty Ltd 10/09/2017).

Plate 16. Scattered River Red-gum within the study area (Ecology and Heritage Partners Pty Ltd 16/08/2017).

3.1.3 Introduced and Planted Vegetation

3.1.3.1 Introduced Vegetation

Areas not supporting remnant native vegetation have a high cover (>80%) of exotic grass species, many of which have been direct-seeded for use as pasture. Scattered native grasses are generally present in these areas, however they did not have the required 25% cover to be considered a remnant patch. Removal of embedded rock has also been undertaken as part of historical agricultural activities throughout much of the study area.

Large areas of the study area have no native vegetation present, and are dominated by cereal crops (Plate 17).

Disturbed areas (not mapped as native vegetation) were mostly dominated by the environmental weeds Galenia, Rat's Tail Fescue, Ribwort, Wild Oat *Avena fatua,* Prairie Grass *Bromus catharticus*, Curled Dock *Rumex crispus*, Black Night-shade *Solanum nigrum*, Sticky Ground-cherry *Physalis hederifolia*, and Onion-grass *Romulea rosea*.

Noxious weeds are present throughout the study area, with common occurrences of Artichoke Thistle, Horehound and Spear Thistle *Cirsium vulgare* along with the Weeds of National Significance (WONS), African Boxthorn, Serrated Tussock, Prickly Pear *Opuntia* spp., Bridal Creeper *Asparagus asparagoides* and Blackberry *Rubus fruticosus* sp. agg. (Plate 18; Plate 19)

Plate 17. Cropped area within the study area (Ecology and Heritage Partners Pty Ltd 16/08/2017).

Plate 18. Artichoke Thistle within the study area (Ecology and Heritage Partners Pty Ltd 16/08/2017).

3.1.3.2 Planted Vegetation

Planted vegetation in the study area consists of native and non-native Victorian tree and shrub species. A Sugar Gum *Eucalyptus cladocalyx* plantation is located to the north of the study area (Plate 20).

Aside from Sugar Gum, commonly planted species include Peppercorn *Shoenus molle*, Southern Mahogany *Eucalyptus botryoides*, and specimens of Grey Box and Yellow Gum. Most planted vegetation is situated in windrows, or around dwellings, sheds and laneways. A variety of ornamental shrubs have also been planted around sheds and dwellings.

Plate 19. Artichoke Thistle within the study area (Ecology and Heritage Partners Pty Ltd 08/12/2017).

Plate 20. Planted vegetation within the study area (Ecology and Heritage Partners Pty Ltd 11/02/2017).

3.2 Fauna Habitat

3.2.1 Native and Introduced Grasslands

The majority of the study area consists of paddocks which contain improved exotic pastures, likely to be used as a foraging resource by common generalist bird species which are tolerant of modified open areas. Fauna observed using this habitat included; Australian Magpie *Cracticus tibicen*, Common Blackbird *Turdus merula*, Little Raven *Corvus mellori*, Magpie-lark *Grallina cyanoleuca*, House Sparrow *Passer domesticus*, Willie Wagtail *Rhipidura leucophrys* Red Fox *Vulpes vulpes* and European Rabbit *Oryctolagus cuniculus*.

Patches of native grassland occur throughout the study area. These vary in quality and floristic composition according to grazing regimes and historical land use. Habitat attributes of the native grassland are suitable for an array of common native fauna, including snakes, lizards and skinks, and grassland birds. Diurnal and nocturnal raptors are also likely to forage across these areas, with Wedge-Tailed Eagle *Aquila audax* and Black-shouldered Kite *Elanus axillaris* observed during the field assessment. Several Eastern Grey Kangaroos *Macropus giganteus* was also observed foraging in grassland areas.

Areas of native grassland, particularly those with a high cover of Wallaby-grasses *Rytidosperma* spp. may provide habitat for the nationally significant Golden Sun Moth *Synemon plana*. Some of these areas have cracking soils which may provide sheltering habitat for reptiles and small mammals including Striped Legless Lizard and Fat-tailed Dunnart.

3.2.2 Woodland and Scattered Trees

Woodland and scattered remnant trees occur throughout the study area and provide an important resource for arboreal fauna. The majority of the eucalypts are mature, providing an array of small, medium and large, bark fissures and crevices. These are likely to be used for shelter and nesting by a range of hollow-dependent fauna including parrots, microbats, possums, gliders and owls. Scattered trees provide habitat for more mobile fauna species, vantage points and nesting areas for diurnal and nocturnal raptors, as well as stepping stones for more mobile fauna moving through the study area, enhancing landscape permeability for native fauna.

Species observed utilising woodland and scattered trees within the study area included Nankeen *Kestrel Falco cenchroides*, White-plumed *Honeyeater Lichenostomus penicillatus,* Red Wattlebird *Anthochaera carunculata,* Magpie-Lark *Grallina cyanoleuca*, Australian Magpie *Cracticus tibicen*, Little Raven *Corvus mellori*, Willie Wagtail *Rhipidura leucophrys* and Yellow Thornbill *Acanthiza nana*.

3.2.3 Planted Vegetation

Planted vegetation is located throughout the study area predominantly as ornamental plantings around dwellings. These areas provide foraging, roosting and nesting habitat for mobile generalist fauna including locally common birds and microbats. Species observed using this habitat includes Noisy Miner *Manorina melanocephala*, Superb Fairy-wren *Malurus cyaneus*, Grey Fantail *Rhipidura albiscarpa*, New Holland Honeyeater *Phylidonyris novaehollandiae*, Grey Shrike-thrush *Colluricincla harmonica* and introduced bird species Common Blackbird *Turdus merula* and Common Starling *Sturnus vulgaris*.

3.3 Removal of Native Vegetation (the Guidelines)

The study area (Properties 1-16) contains the following extent of native vegetation:

- 60 Scattered Trees;
    - 32 Large Old Trees; and,
    - 28 Small Trees.
- 72.791 hectares of native vegetation, comprising:
    - 4.776 hectares of the Grassy Woodland EVC;
    - 34.453 hectares of the Plains Grassland EVC;
    - 0.069 hectares of the Plains Grassy Wetland EVC;
    - 28.170 hectares of the Rocky Chenopod Woodland EVC; and,
    - 5.323 hectares of a modelled Current Wetland.

A summary of the breakdown of native vegetation is provided below (Table 5).

Table 5. Summary of native vegetation within the study area

Native Vegetation	Properties 1-15	Property 16	Total
Scattered Trees	60	0	60
Grassy Woodland	4.776	0	4.776
Plains Grassland	19.358	15.095	34.453
Plains Grassy Wetland	0.069	0	0.069
Rocky Chenopod Woodland	0.371	27.799	28.170
Current Wetland	5.323	0	5.323
Remnant Patch (total)	**29.897**	**42.894**	**72.791**

3.3.1 Vegetation proposed to be removed

The study area is within Location category 3, with 12.069 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Detailed assessment pathway. Vegetation impacts are summarised in Table 3.

Condition scores for vegetation proposed to be removed are based on the habitat hectare assessment completed by a qualified vegetation assessor, and are provided in Appendix 2.3.

Table 6. Removal of native vegetation (the Guidelines)

Assessment pathway	Detailed
Total Extent	12.069
Large Trees (no.)	0
Location Category	3

3.3.2 Offset Targets

The offset requirement for native vegetation removal is 0.001 General Habitat Units (HUs) and specific offsets for the following species:

- 9.744 species units of habitat for Small Golden Moths *Diuris basaltica;*
- 10.049 species units of habitat for Heath Spear-grass *Austrostipa exilis;*
- 10.108 species units of habitat for Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata;*
- 9.675 species units of habitat for Basalt Podolepis *Podolepis linearifolia;*
- 10.079 species units of habitat for Bacchus Marsh Wattle *Acacia rostriformis;* and,
- 10.049 species units of habitat for Fragrant Saltbush *Rhagodia parabolica*.

A summary of proposed vegetation losses and associated offset requirements is presented in Table 7 and the Native Vegetation Removal (NVR) Report is presented in Appendix 4.

Table 7. Offset targets

General Offsets Required	0.001 General HUs
Specific Offsets Required	• 9.744 species units of habitat for Small Golden Moths *Diuris basaltica* • 10.049 species units of habitat for Heath Spear-grass *Austrostipa exilis* • 10.108 species units of habitat for Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata* • 9.675 species units of habitat for Basalt Podolepis *Podolepis linearifolia* • 10.079 species units of habitat for Bacchus Marsh Wattle *Acacia rostriformis* • 10.049 species units of habitat for Fragrant Saltbush *Rhagodia parabolica*
Vicinity (catchment / LGA)	Port Philip and Westernport CMA / Moorabool Shire Council
Minimum SBV	0.800

Note: HU = Habitat Units; SBV – Strategic Biodiversity Value.

3.4 Significance Assessment

3.4.1 Flora

A total of 119 flora species (62 indigenous and 57 non-indigenous or introduced) were recorded within the study area during the field assessment.

The nationally significant Spiny Rice-flower, and State significant Fragrant Saltbush, Black Roly-poly *Sclerolaena muricata* var. *muricata*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis* and Bacchus Marsh Wattle *Acacia rostriformis* were recorded within the study area.

A consolidated list of flora species recorded is provided in Appendix 2.1.

The VBA contains records of three nationally significant and 50 State significant flora species previously recorded within 10 kilometres of the study area (DELWP 2017e) (Appendix 2.2; Figure 4). The PMST nominated an additional nine nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2018). Most records are located within and adjacent to the Long Forest Flora and Fauna Reserve to the east of the study area, the Lerderderg State Park to the north-west of the study area, and existing road reserves within the local area where survey effort has likely been greater (Figure 4).

Based on the condition of remnant vegetation, landscape context and the proximity of previous records, the following significant flora species have the potential to occur within the study area (Table 8) (Appendix 2.2).

Table 8. Significant flora species with the potential to occur within the study area.

Common Name	Scientific Name	Habitat
National Significance		
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	There are five records of Spiny Rice-flower (SRF) recorded in the VBA within the local area, with the most recent from 2003 located east of the study area in Long Forest Flora and Fauna Reserve. Based on a literature review, we are aware of a large population located in Property 16 (BL&A 2012), with other records having been noted informally elsewhere in the study area. There is suitable habitat within the study within Plains Grassland EVC, as well as non-native grassland not previously subject to previous cropping activities. Targeted surveys for the species were commissioned by the client to ascertain its presence or otherwise within the study area. The results of the targeted surveys are provided below (Section 3.5).
Small Golden Moths	*Diuris basaltica*	There are five records of Small Golden Moths recorded in the VBA within the local area, with all located south of Werribee River and Bacchus Marsh township (VBA 2017d). An additional record is located further east near Melton, with another record north-west in Toolern Vale (DELWP 2017e). Small Golden Moth orchids typically grow in herb-rich native grasslands, dominated by Kangaroo Grass *Themeda triandra* on heavy basaltic soils, often embedded with basalt boulders, with the known distribution of the species highly restricted (DSE 2010b). Given the absence of Kangaroo Grass-dominated grassland within the study area, general poor condition of habitat (outside of Property 16), high levels of weed invasion, absence of other orchids within the locality, and history of agricultural activities, there is considered to be a low likelihood of occurrence in Properties 1-15, and surveys are not required.

Common Name	Scientific Name	Habitat
Basalt Peppercress	*Lepidium hyssopifolium*	Although there are no records within the VBA within 10 kilometres, there is an informal record recorded in the Atlas of Living Australia (ALA) within Property 6 south of Buckleys Road (ALA 2017). This property has been cropped, and the specimen would no longer be present. It is understood that almost all remaining populations of Basalt Peppercress occur in heavily modified, non-natural environments, usually amongst exotic pasture grasses and weed species, sometimes with an overstorey of introduced tree species (DSE 2010c). However, the species appears to rely heavily on favourable microsite conditions, with Basalt Peppercress appearing to only establish in relatively open bare ground where there is limited competition from other plants (both native and introduced species), rather than in areas with thick ground cover (DSE 2010c). As the majority of grassland vegetation (native and non-native_ within Properties 1-15 supports high levels of biomass, with few patches of bare ground present, as well as the lack of other records in close proximity to the study area, there is considered a low likelihood of occurrence within the study area, and targeted surveys are not required. Further, the biodiversity assessment and targeted surveys (for other species) did not note any specimens that meet the description of the species.
Large-head Fireweed	*Senecio macrocarpus*	There are no known records of Large-headed Fireweed within 10 kilometres of the study area, with the closest known record located approximately 17 kilometres to the east (VBA 2017e). Previous surveys for the species in nearby properties did not record the species (Ecology and Heritage Partners 2013b), and there is considered to be a low likelihood of occurrence that the species occurs in the locality. As such, targeted surveys are not required.
State Significance*		
Fragrant Saltbush	*Rhagodia parabolica*	There are over 600 known records of Fragrant Saltbush within the local area, (VBA 2017e), with more than 400 estimated to occur throughout the study area as observed during the ecological assessment.
Bacchus Marsh Wattle	*Acacia rostriformis*	A total of 262 records of Bacchus Marsh records have been recorded within 10 kilometres of the study area (VBA 2017e). Several additional records were recorded within the study area, although many of these were planted as part of revegetation works within Property 1.
Werribee Blue-box	*Eucalyptus baueriana* subsp. *thalassina*	A total of 313 records of Werribee Blue-box have been recorded within 10 kilometres of the study area, with all records located within the Long Forest Flora and Fauna reserve (VBA 2017e; Figure 4). Although there is suitable habitat in Woodland areas throughout the study area, no specimens were observed during the ecological assessment, nor recorded during previous surveys within the study area (BL&A 2010).

Note. * Those species with the highest likelihood of occurrence.

Recommendation

Targeted surveys have been undertaken for Spiny Rice-flower at an appropriate time of year with suitable habitat to ascertain its presence within the study area (Section 3.5). Based on the landscape context, absence of suitable habitat and proximity of precious records, surveys for other nationally significant flora species are not considered to be required

Based on habitat condition, and the proximity of previous records, there is also suitable habitat within the study area for the State-significant Buloke *Allocasuarina luehmannii*, Melbourne Yellow-gum *Eucalyptus*

leucoxylon subsp. *connata*, Small Scurf-pea *Cullen parvum*, Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra), and Austral Tobacco *Nicotiana suaveolens.*

Targeted surveys for State significant flora would assist to determine their presence within the study area. However, based on existing legislative approvals under the P&E Act, further survey for these species is not currently required.

3.4.2 Fauna

The VBA contains records of nine (9) nationally significant, 32 State significant and 13 regionally significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2017d) (Appendix 3.1; Figure 5). The PMST nominated an additional 14 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2018).

Based on the modified nature of the study area, landscape context and the proximity of previous records, the following significant fauna species have the potential to occur within the study area (Table 9; Appendix 3.1).

Table 9. Significant fauna species with the potential to occur within the study area.

Common Name	Scientific Name	Habitat
National Significance		
Golden Sun Moth	*Synemon plana*	There are over 300 records of Golden Sun Moth from the local area recorded within the VBA (2017d), with the majority of these recorded by Ecology and Heritage Partners in a nearby property to the south-east (Ecology and Heritage Partners 2013b). There is suitable habitat for this species in areas of native and non-native grassland containing Wallaby-grass. Targeted surveys for Golden Sun Moth have been undertaken by Ecology and Heritage Partners, with the results detailed in a separate report (Ecology and Heritage Partners 2018).
Swift Parrot	*Lathamus discolor*	Swift Parrot may forage on eucalypts within the study area on occasion. However, the species breeds only in Tasmania and migrates to mainland Australia in autumn and is usually recorded between Stawell in the central west and Wodonga in the north-east. As such the study area is unlikely to provide important or limiting habitat for this species.
Striped Legless Lizard	*Delma impar*	There are no records of Striped Legless Lizard within 10 kilometres of the study area registered in the VBA (2017d), although there is an unverified record located immediately south of the Werribee River approximately three kilometres south (ALA 2017). However, due to the similarity in habitat within the study area, and known populations of the species located further to the east of Melton, there is considered to be a moderate possibility of the species occurring. Targeted surveys for Striped Legless Lizard have been undertaken by Ecology and Heritage Partners, with the results detailed in a separate report (Ecology and Heritage Partners 2018).
State Significance *		
Brown Treecreeper	*Climacteris picumnus victoriae*	There are 75 records of Brown Treecreeper from the local area, with the most recent taken in 2010. Habitat is mainly found in woodland areas within the study area, particularly closer to Long Forest Flora and Fauna Reserve.

Common Name	Scientific Name	Habitat
Hooded Robin	*Melanodryas cucullata cucullata*	There are 12 records of Hooded Robin from the local area. Habitat is mainly found in woodland areas within the study area, particularly closer to Long Forest Flora and Fauna Reserve (DELWP 2017e).
Diamond Firetail	*Stagonopleura guttata*	There are 69 records of Diamond Firetail from the local area, the most recent in 2011 (DELWP 2017e). Diamond Firetail generally prefers woodland habitats, but is also associated with grassland habitats as well.
Bullant	*Myrmecia* sp. 17	Although there are only four records listed in the VBA (2017e), the species has large areas of suitable habitat within the study area.

Note. * Those species with the highest likelihood of occurrence.

Recommendation

Targeted surveys have been undertaken for the nationally significant Golden Sun Moth and Striped Legless Lizard to ascertain their presence within the study area, with the results of these surveys provided in a separate report (Ecology and Heritage Partners 2018). The survey methodology for Striped Legless Lizard is also suitable for the detection of the Fat-tailed Dunnart (and other small mammals). Based on the landscape context, absence of suitable breeding and limiting habitat, and proximity of precious records, surveys for other nationally significant species are not considered to be required

Based on habitat condition, and the proximity of previous records, there is also potential habitat within the study area for the State-significant Speckled Warbler *Chthonicola sagittatus*, Barking Owl *Ninox connivens connivens* and Crested Bellbird Oreoica *gutturalis gutturalis* as well as the Regionally significant Fat-tailed Dunnart and Spotted Harrier *Circus assimilis.*

Targeted surveys for State significant fauna would assist to determine their presence within the study area. However, based on existing assessment and approval requirements under the P&E Act, further survey for these species is not currently required.

3.4.3 Communities

3.4.3.1 Nationally Significant

Five nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DoEE 2018):

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain;
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia;
- Natural Temperate Grassland of the Victorian Volcanic Plain;
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; and,
- White Box-Yellow Box-Blakeley's Red-gum Grassy Woodland and Derived Native Grassland.

Natural Temperate Grassland of the Victorian Volcanic Plain

Some remnants of habitat zone PG4 and all of PG7, PG8 and PG9 met the thresholds that define the nationally significant *Natural Temperate Grasslands of the Victorian Volcanic Plain* (NTGVVP) ecological community (Figure 2). Patches PG8 and PG9 were of the highest quality, were contiguous with each other and other larger remnants of vegetation in Property 16, and supported high native species diversity (Plate 21; Plate 22).

Plate 21. NTGVVP (PG8) within the study area (Ecology and Heritage Partners Pty Ltd 25/10/2017).

Plate 22. NTGVVP (PG8) within the study area (Ecology and Heritage Partners Pty Ltd 25/10/2017).

A total of 17.665 hectares of NTGVVP was recorded within the study area, with 14.456 hectares located in Property 16, and the remaining 3.209 hectares situated in Properties 1-15 (Figure 2).

Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

Habitat zones GW4 and is the largest and most intact patch of remnant vegetation that is most similar to the condition thresholds that describe the Grey Box community.

Although the habitat zone has an overstorey dominated by Grey Box, and contains scattered occurrences of native vegetation, include Fragrant Saltbush, Ruby Saltbush and Berry Saltbush, the ground layer is dominated by Serrated Tussock and Galenia, with several stands of African Box-thorn also present.

As the ground layer does not contain at least a 10% cover of perennial native grass species, or a 50% cover in the ground layer of perennial native species, GW4 does not meet the condition thresholds that describe the Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia ecological community.

Although RC3 also contains a high cover of Grey Box, the dominant canopy species is Bull Mallee, and therefore does not meet the minimum condition thresholds. Zone RCW4 does not contain a 10% cover or perennial grasses, and RCW5 is too weedy.

The remaining nationally significant communities are not considered to be present predominantly due to the absence of key indicator species, and/or lack of community structure and low species diversity.

Two FFG Act-listed ecological communities are present in the study area:

- Western (Basalt) Plains Grassland Community; and,

- Rocky Chenopod Open Scrub Community,

These communities correspond to areas of the Rocky Chenopod Woodland EVC and Plains Grassland EVC mapped in Property 16 within the study area and meets the relevant description and characteristics described for these communities (DELWP 2017i).

3.5 Targeted Spiny Rice-flower Survey

A total of 201 Spiny Rice-flower individuals were recorded in Property 11 (Figure 3a).

Although the targeted surveys were undertaken during the known flowering period when the species was known to be flowering within the locality, no other specimens were recorded on Properties 4b, 5, 9, 10, or 15 in areas considered to support suitable habitat.

3.6 Site Ecological Significance

The criteria adopted for assessing the ecological significance of the study area is presented in Appendix 1.3. Based on available information and the results of the field assessment, Property 11 and 16 are considered to be of High ecological significance for the following reasons:

- Remnant vegetation associated with one EVC (Plains Grassland) listed as Endangered in the Victorian Volcanic Plain bioregion;
- Presence of the nationally significant NTGVVP ecological community;
- Presence of a large population of the nationally significant Spiny Rice-flower;
- Presence of two FFG Act listed communities; and,
- Habitat for the nationally significant Golden Sun Moth.

All other properties are considered to be of low to moderate conservation significance.

4 LEGISLATIVE AND POLICY IMPLICATIONS

The implications of the project with regards to relevant environmental legislation and policy is outlined below.

4.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of National Environmental Significance (NES).

For species listed under the EPBC Act, a 'significant impact' is defined as an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE 2013). Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is affected, and upon the intensity, duration, magnitude and geographic extent of the impacts. Importantly, for a 'significant impact' to be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility (DoE 2013).

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on any matters of National Environment Significance (NES), described in Table 10.

Table 10. Potential impacts to matters of National Environmental Significance (NES)

Matter of NES	Potential Impacts
World Heritage properties	There are no World Heritage properties within 10 kilometres of the study area.
National heritage places	There are no National Heritage Places within 10 kilometres of the study area.
Ramsar wetlands of international significance	The study area occurs approximately 35 kilometres upstream of one Ramsar wetland – Port Phillip Bay (western shoreline) and Bellarine Peninsula (DoEE 2018). Provided management practices and construction techniques are consistent with Construction Techniques for Sediment Pollution Control (EPA 1991) and Environmental Guidelines for Major Construction Sites (EPA 1996), the proposed action is unlikely to impact the ecological character of any Ramsar wetland.
Threatened species and ecological communities	There is suitable habitat within the study area for one flora species (Spiny Rice-flower) and one fauna species listed under the EPBC Act (Golden Sun Moth) (Section 3.4.1 and 3.4.2). One ecological community listed under the EPBC Act (NTGVVP) was recorded within the study area (Section 3.4.3).
Migratory and marine species	Twenty Migratory and/or Marine species have been recorded, or are predicted to occur within 10 kilometres of the study area (DELWP 2017e; Appendix 3.1). However, the study area would not be classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013), in that it does not contain: • Habitat utilised by a migratory species occasionally or periodically within a region

Matter of NES	Potential Impacts
	that supports an ecologically significant proportion of the population of the species; • Habitat utilised by a migratory species which is at the limit of the species range; or, • Habitat within an area where the species is declining.
Commonwealth marine area	The proposed action will not impact any Commonwealth marine areas.
Nuclear actions (including uranium mining)	The proposed action is not a nuclear action.
Great Barrier Reef Marine Park	The proposed action will not impact the Great Barrier Reef Marine Park.
Water resources impacted by coal seam gas or mining development	The proposed action is not a coal seam gas or mining development.

4.1.1 Implications

It should be noted that the proponent has engaged Ecology and Heritage Partners to prepare a referral to the Commonwealth Minister of the Environment and Energy based on the proposed impacts to matters of NES.

4.1.1.1 Golden Sun Moth

Golden Sun Moth were detected within the study area with 58.298 hectares of confirmed habitat identified. The proposed development will impact upon 22.197 hectares of Golden Sun Moth habitat, with the remaining 36.101 hectares being avoided. Due to the impact on 22.197 hectares, it is considered that the action will have a significant impact on the species and a referral to the Commonwealth Minister is required to assess the impact.

4.1.1.2 Spiny Rice-flower

Targeted surveys were undertaken for Spiny Rice-flower, with a total of 201 individuals recorded in Property 11. The population present on property 11 is being retained, and will not be impacted by the proposed development (Figure 2). No other individuals were recorded within Properties 1-15. Therefore, in accordance with the significant impact guidelines for the species (DEWHA 2009), the proposed action is not considered to result in a significant impact to Spiny Rice-flower.

4.1.1.3 Striped Legless Lizard

Targeted surveys for Striped Legless Lizard were undertaken in habitat that had the potential to support the species. Despite the efforts of the targeted surveys no Striped Legless Lizards were detected within the study area. Due to this, the presence of the species within the study area is considered low and the proposed action is unlikely to have a significant impact on the species.

4.1.1.4 Natural Temperate Grassland of the Victorian Volcanic Plain

A total of 17.665 hectares of the nationally significant ecological community NTGVVP is present within the study area, with 1.78 hectares proposed to be impacted. According to the significant impact criteria for

critically endangered ecological communities (DoE 2013), an action is likely to be significant where there is a real chance or possibility that it will reduce the extent of the ecological community. Bacchus Marsh Developments has engaged Ecology and Heritage Partners to prepare a referral to the Commonwealth Environment Minister to assess impacts within the study area under the EPBC Act.

4.2 Flora and Fauna Guarantee Act 1988 (Victoria)

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

There is suitable habitat within the study area for several 'listed' and 'protected' flora and fauna species under the FFG Act (Appendix 2.1; Section 3.4). Further, two FFG Act communities are present within the study area (Section 3.4.3).

4.2.1 Implications

There is suitable habitat within the study area for several species listed or protected under the FFG Act (Section 3.4). However, the study area is privately owned, as such a permit under the FFG Act is not required, unless impacts to FFG Act listed matters are impacted on public land (i.e. road reserves). If required, the proponent should allow up to six weeks to obtain a FFG Act permit through DELWP.

4.3 *Planning and Environment Act 1987* (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies (Appendix 1.5.3) or a subdivision is proposed with lots less than 0.4 hectares[1]. Local planning schemes may contain other provisions in relation to the removal of native vegetation (Section 4.3.1).

4.3.1 Local Planning Schemes

The study area is located within the Moorabool Shire Council municipality. The following zoning and overlays apply (DELWP 2017g, 2017h):

- Rural Conservation Zone (RCZ) and Farming Zone (FZ);
- Significant Landscape Overlay – Schedule 1 (SLO1);

[1] In accordance with the Victorian Civil and Administrative Tribunal's (VCAT) decision Villawood v Greater Bendigo CC (2005) VCAT 2703 (20 December 2005) all native vegetation is considered lost where proposed lots are less than 0.4 hectares in area and must be offset at the time of subdivision.

- Design and Development Overlay – Schedule 1 and Schedule 2 (DDO1; DDO2);
- Environmental Significance Overlay – Schedule 3 (ESO3) – Property 16 only; and
- Bushfire Management Overlay (BMO) – Property 16 only.

Any proposed development must address the relevant decision guidelines and standards described in the above zones and overlays where appropriate. There are no specific ecological implications arising from the zones or overlays that apply to the development area in Properties 1-15.

4.3.2 The Guidelines

The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) and Clause 12.01 require Planning and Responsible Authorities to have regard for The Guidelines (DELWP 2017a). Where the clearing of native vegetation is permitted, the quantity and type of vegetation to be offset is determined using methodology specified in the Guidelines.

A permit will be referred to DELWP as a 'recommending authority' if vegetation removal meets one or more of the below thresholds (Table 11).

Table 11. Permit to remove native vegetation – application referral triggers (Clause 66, Referral and Notice Provisions)

Native Vegetation	• Remove, destroy or lop native vegetation which is to be considered under the Detailed Assessment pathway
Other Circumstances	• Remove, destroy or lop native vegetation if a property vegetation plan applies to the site
	• Remove, destroy or lop native vegetation on Crown land which is occupied or managed by the responsible authority

4.3.3 Implications

The study area is within Location category 3, with 12.069 hectares of native vegetation (including Current Wetlands) proposed to be removed. As such, the permit application falls under the Detailed assessment pathway.

The offset requirement for native vegetation removal is 0.001 General Habitat Units (HUs) and specific offsets for the following species:

- 9.744 species units of habitat for Small Golden Moths;
- 10.049 species units of habitat for Heath Spear-grass;
- 10.108 species units of habitat for Melbourne Yellow-gum;
- 9.675 species units of habitat for Basalt Podolepis;
- 10.079 species units of habitat for Bacchus Marsh Wattle; and,
- 10.049 species units of habitat for Fragrant Saltbush.

A Planning Permit from Moorabool Shire Council is required to remove, destroy or lop any native vegetation. In this instance, the application will be referred to DELWP as the application will be assessed under the Detailed Assessment Pathway (i.e. greater than 0.5 hectares of native vegetation removed).

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

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

4.5 *Water Act 1989* (Victoria)

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

A 'works on waterways' permit from the Port Philip and Westernport CMA is likely to be required where any action impacts on designated waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DELWP with the Port Philip and Westernport CMA included for comment.

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

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

Weeds listed as noxious under the CaLP Act were recorded during the assessment (See Section 3.1.1). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (European Rabbit, Red Fox). A Weed Management Plan and a pest fauna eradication plan may be required as part of the future development of the study area.

5 MITIGATION MEASURES

For the removal of vegetation that falls under all assessment pathways, the Guidelines (DELWP 2017c) require the responsible authority to consider whether the applicant has demonstrated avoidance and minimisation of impacts to native vegetation.

5.1 Avoidance and Minimisation Statement

The proposed development plan will impact upon a large proportion of the study site, with the majority or areas proposed to be impacted comprised of cropped agricultural land devoid of native vegetation. Of the 72.791 hectares of native vegetation mapped within Properties 1-16, impacts to a total of 60.443 hectares of the highest quality native vegetation will be avoided. Of the 12.069 hectares of native vegetation proposed to be impacted, 5.323 hectares comprises a modelled wetland that is highly modified, has been subjected to multiple cropping events in recent years, and is considered highly unlikely to continue to support seasonal wetland vegetation due to the alterations to the historical hydrological influences caused by agricultural practices (ploughing, tilling cropping).

All of the vegetation on Property 16 (42.894 hectares) is proposed for use as an offset site, and will be protected and managed in order to enhance to existing biodiversity values that occur within the site and surrounds. All scattered trees and large old trees within patches that are located within the development footprint (properties 1-15) will be retained. In addition, the population of Spiny Rice-flower present on property 11 will be retained.

In the context of the contribution to Victoria's biodiversity that the native vegetation makes, the above avoidance and minimisation measures are considered appropriate in the context of the project, and broader ecological values within and adjacent to the study area.

5.2 Best Practice Mitigation Measures

Recommended measures to mitigate impacts upon terrestrial and aquatic values present within the study area may include:

- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation within wetlands should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Habitat Zones (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Tree Retention Zones (TRZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2011). A TRZ applies to a tree and is a specific area above and below the ground, with a radius 12 x the DBH. At a minimum standard a TRZ should consider the following:
    - A TRZ of trees should be a radius no less than two metres or greater than 15 metres;

  - Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) should be excluded from the TRZ;
  - Where encroachment exceeds 10% of the total area of the TRZ, the tree should be considered as lost and offset accordingly;
  - Directional drilling may be used for works within the TRZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;
  - The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained and no offset would be required; and,
  - Where the minimum standard for a TRZ has not been met an offset may be required.
- Consideration of Water Sensitive Urban Design techniques such as stormwater treatment wetlands, bio-retention systems, porous paving or swales;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation, LOTs and/or wetlands;
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Authority guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

In addition to these measures, the following documents should be prepared and implemented prior to any construction activities:

- Construction Environmental Management Plan (CEMP). The CEMP should include specific species/vegetation conservation strategies, daily monitoring, sedimentation management, and site specific rehabilitation plans. A weed management plan is likely to be required as a component of the CEMP.

5.3 Offset Impacts

Ecology and Heritage Partners are a DELWP accredited OTC offset broker and BushBroker site assessor.

Based on an assessment of the native vegetation to be retained and protected in Property 16, and the gain that can be generated through the permanent protection of native vegetation via an on-title security mechanism (i.e. Section 69 agreement under the *Conservation, Forests and Lands Act 1987*), and ongoing management and enhancement activates, the majority of the offset obligation can be met on-site (Appendix 4.2).

The following offset credits relevant to the development can generated via the management and security of 42.894 hectares of native vegetation (Appendix 4.2):

- 12.973 General HUs; and,
- 12.114 species habitat units for Bacchus Marsh Wattle;

- 4.757 species habitat units for Small Golden Moths;
- 12.109 species habitat units for Fragrant Saltbush,
- 12.109 species habitat units for Heath Spear-grass; and,
- 12.109 species habitat units for Melbourne Yellow-gum.

This leaves a deficit of:

- 9.675 species units of habitat for Basalt Podolepis; and,
- 4.983 species units of habitat for Small Golden Moths.

Ecology and Heritage Partners are currently preparing a separate offset strategy to demonstrate how these obligations can and will be secured.

6 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided below (Table 12).

Table 12. Further requirements associated with development of the study area.

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The removal of 22.197 hectares of suitable Golden Sun Moth habitat and 1.78 hectares of Natural Temperate Grasslands of the Victorian Volcanic Plains is a significant impact under 'Section 18a - listed threatened species and communities' of the EPBC Act. As such, a referral to the Commonwealth Environment Minister will be required. No additional MNES are likely to be impacted by the proposed development	Prepare and submit a referral to the Commonwealth Environment Minister at DoEE.
Flora and Fauna Guarantee Act 1988	There is suitable habitat within the study area for several species listed or protected under the FFG Act (Section 3.4). However, the study area is privately owned, as such a permit under the FFG Act is not required, unless impacts to FFG Act listed matters are impacted on public land (i.e. road reserves). If required, the proponent should allow up to six weeks to obtain a FFG Act permit through DELWP.	No further action required.
Planning and Environment Act 1987	A Planning Permit from Moorabool Shire Council is required to remove, destroy or lop any native vegetation. In this instance, the application will be referred to DELWP as the application will be assessed under the Detailed Assessment Pathway (i.e. greater than 0.5 hectares of native vegetation removed). The property is covered by a Bushfire Management Overlay and an Environmental Significance Overlay.	Prepare a Planning permit for Moorabool Shire Council for the removal of remnant native vegetation.
Catchment and Land Protection Act 1994	Several weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Planning Permit conditions are likely to include a requirement for a Weed Management Plan.
Water Act 1989	A 'works on waterways' permit is likely to be required from the Port Philip and Westernport CMA where any action impacts on waterways within the study area.	Obtain a 'works on waterways' permit from Port Philip and Westernport CMA.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.

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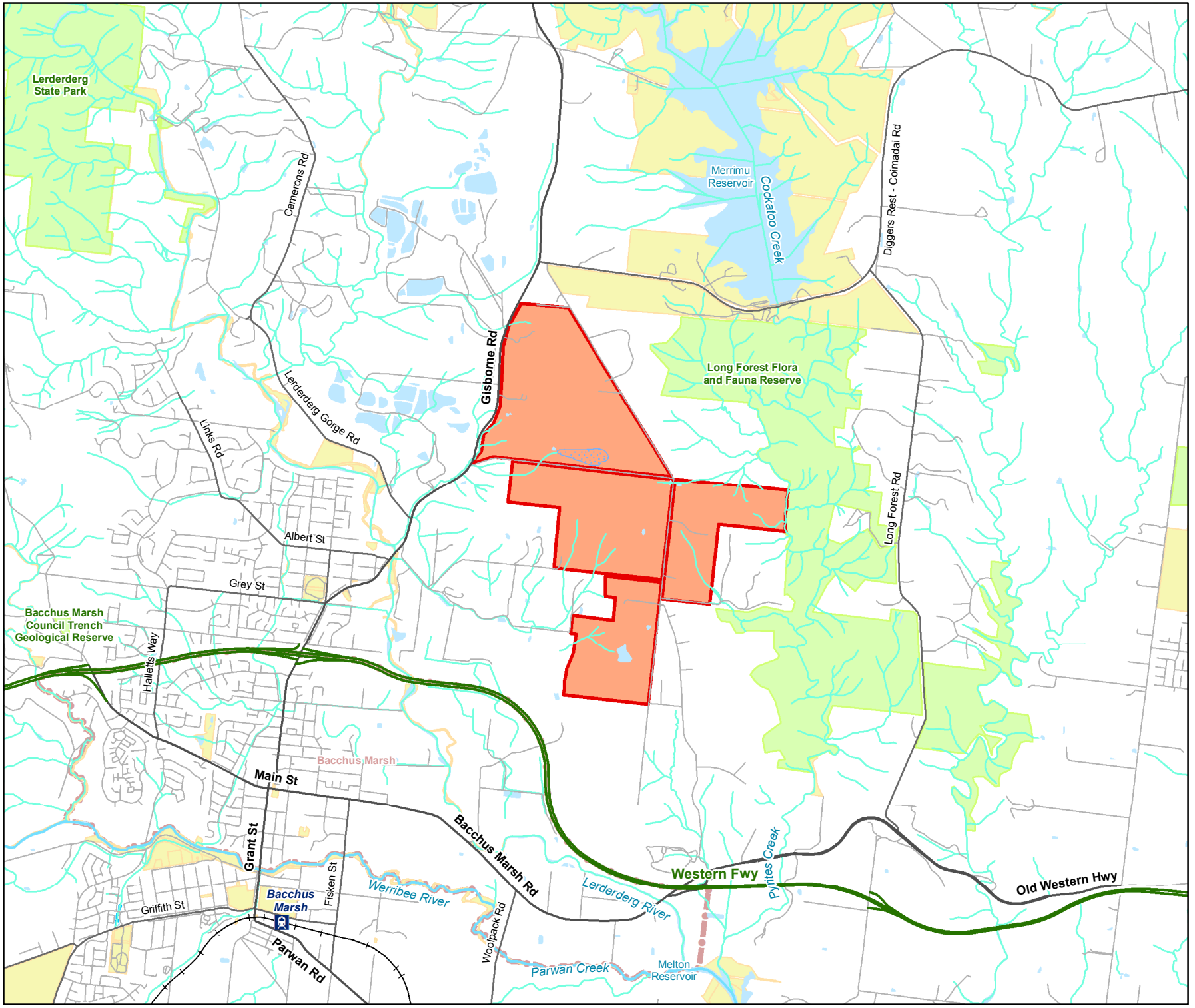


Legend

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the study area

Targeted Fauna Surveys for 16 properties at Bences Road, Bacchus Marsh

N

0 600 1,200

Metres

ecology & heritage partners

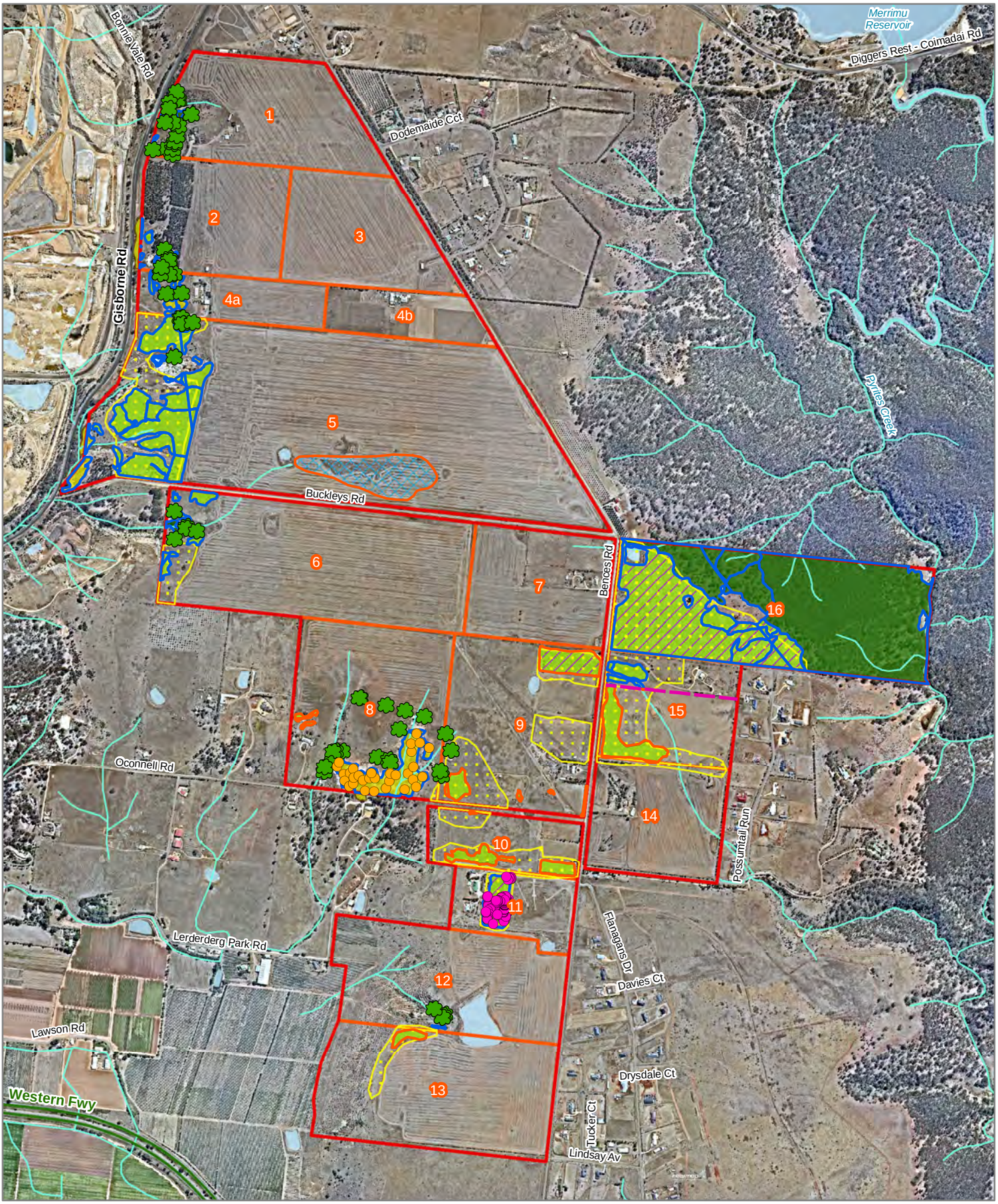


Figure 2 Overview

Ecological features

Ecological Assessments for 16 properties at Bences Road, Bacchus Marsh

ecology & heritage partners

Legend

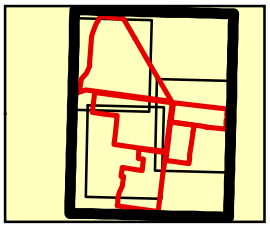
- Study Area
- Proposed lot division
- Spiny Rice-flower
- GSM Habitat
- Lot in Patch retained
- Scattered Tree retained

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Plains Grassy Wetland EVC 125
- Rocky Chenopod Woodland EVC 64
- Current Wetland
- Removed vegetation
- Retained vegetation



N

0 170 340

Metres

10937_Fig02_EcolFeat_P_MBv2 2/08/2018 psorensen

Aerial source: Nearmap 2017

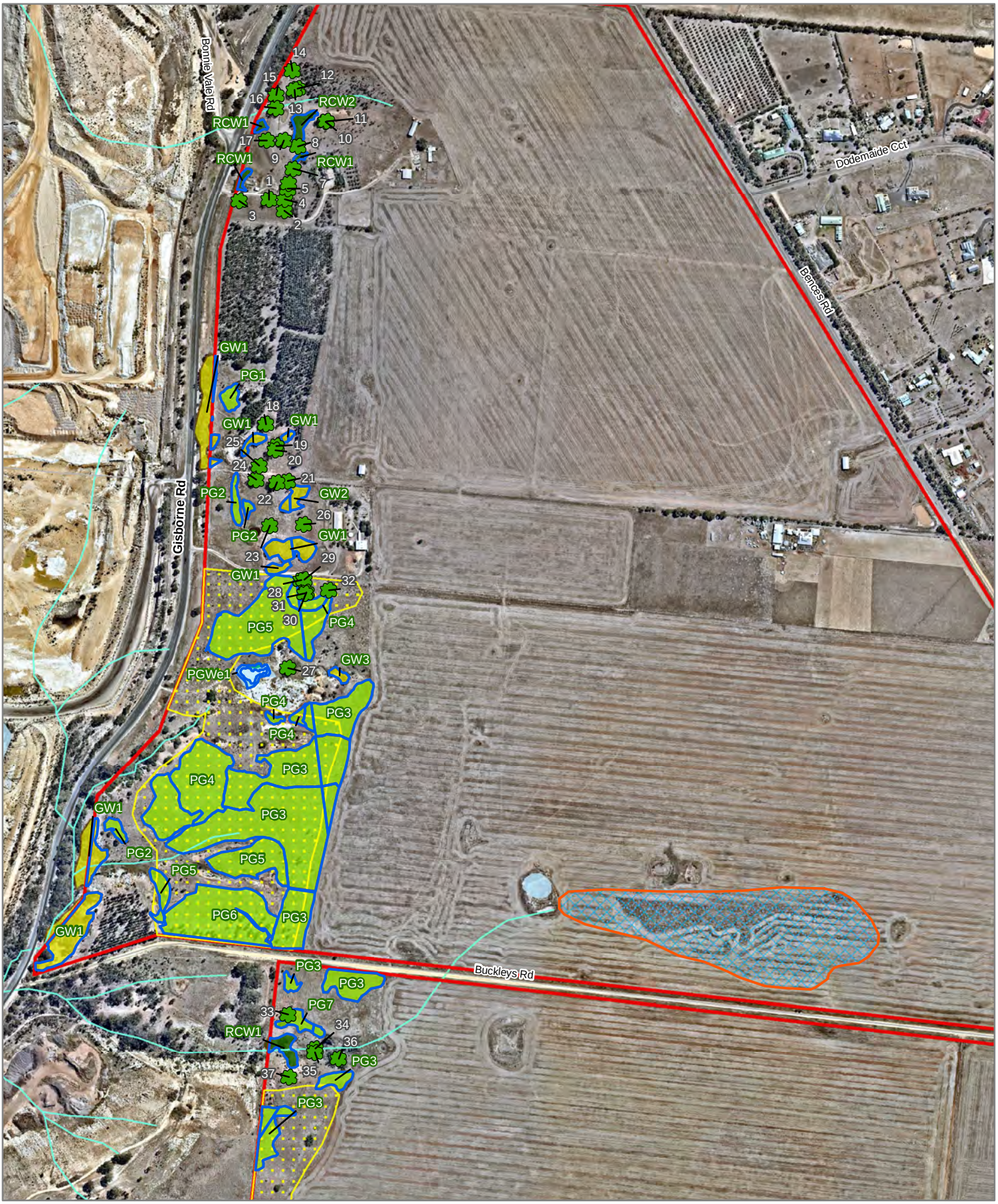


Figure 2a

Ecological features

Ecological Assessments for 16 properties at Bences Road, Bacchus Marsh

Legend

- Study Area
- GSM Habitat
- Scattered Tree retained

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Plains Grassy Wetland EVC 125
- Rocky Chenopod Woodland EVC 64
- Current Wetland
- Removed vegetation
- Retained vegetation

N

0 75 150

Metres

10937_Fig02_EcolFeat_P_MBv2 2/08/2018 psorensen

ecology & heritage partners

Aerial source: Nearmap 2017

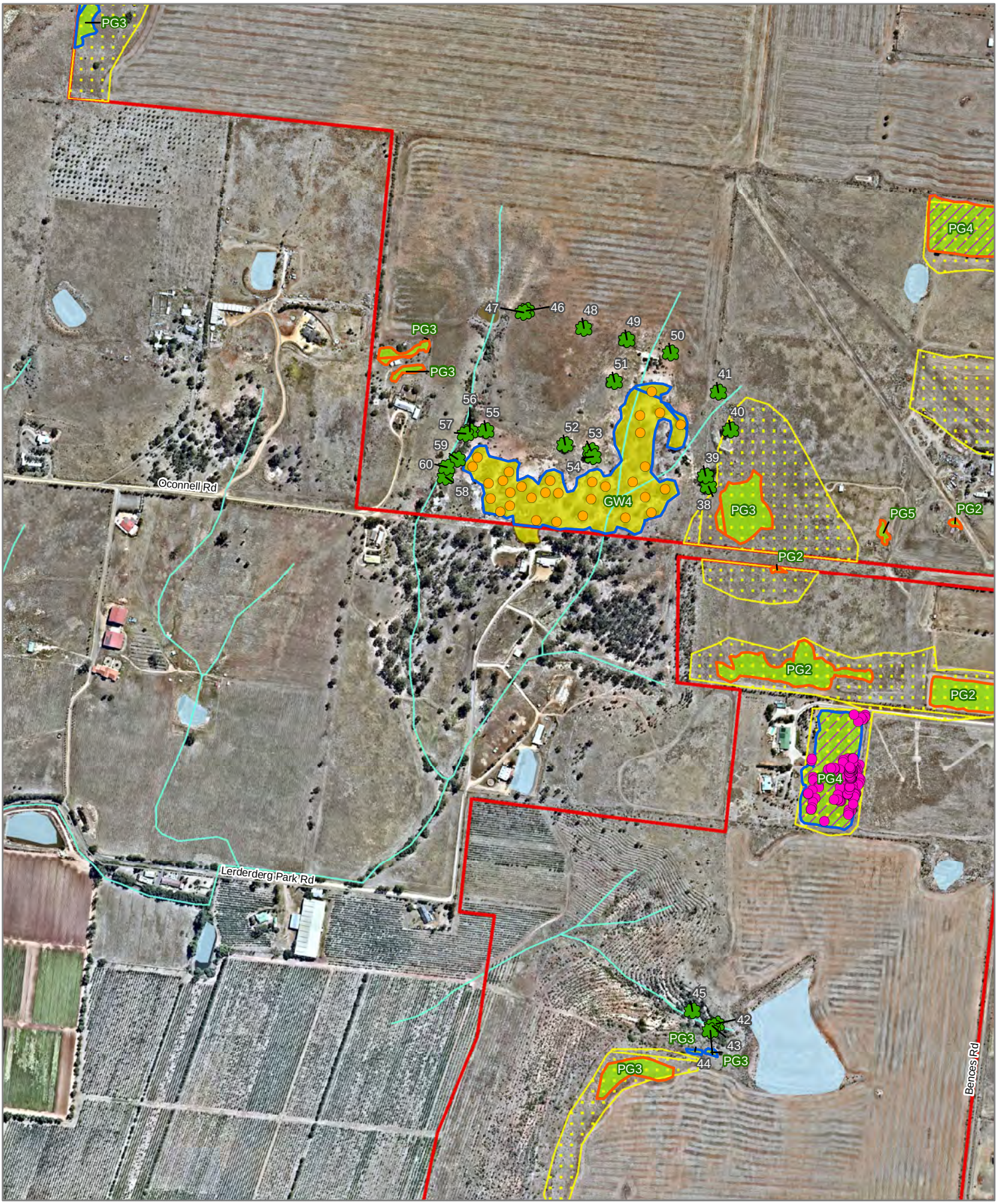


Figure 2b

Ecological features

Ecological Assessments for 16 properties at Bences Road, Bacchus Marsh

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Legend

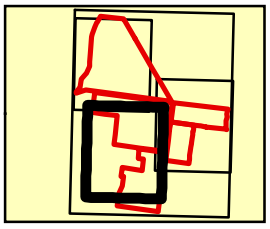
- Study Area
- Spiny Rice-flower
- GSM Habitat
- Lot in Patch retained
- Scattered Tree retained

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Removed vegetation
- Retained vegetation



N

0 75 150

Metres

10937_Fig02_EcolFeat_P_MBv2 2/08/2018 psorensen

Aerial source: Nearmap 2017

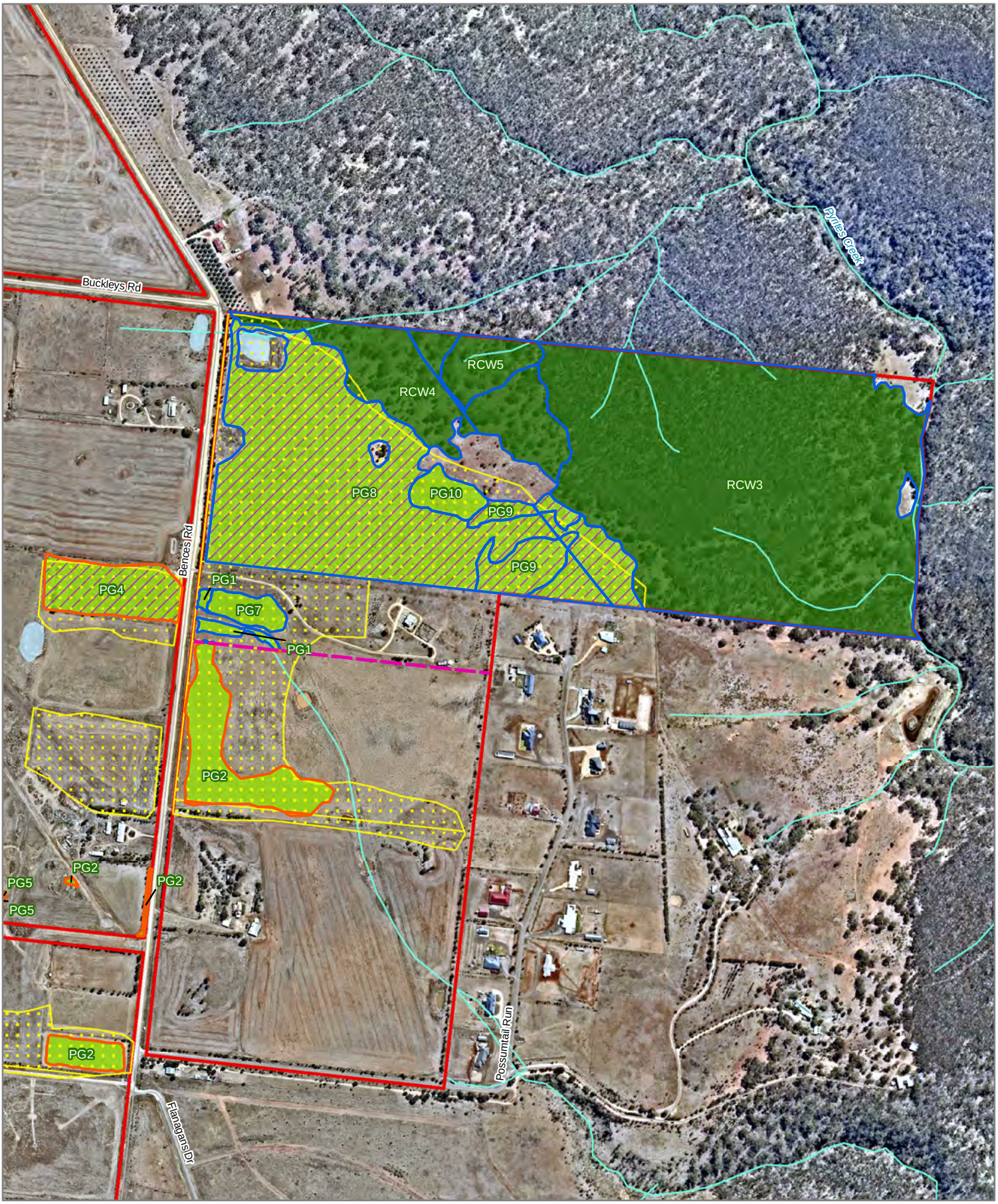


Figure 2c

Ecological features

Ecological Assessments for 16 properties at Bences Road, Bacchus Marsh

Legend

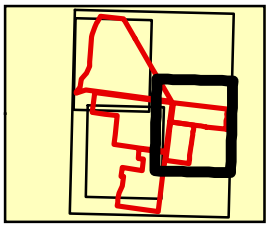
- Study Area
- Proposed lot division
- GSM Habitat

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain

Ecological Vegetation Classes

- Plains Grassland EVC 132
- Rocky Chenopod Woodland EVC 64
- Removed vegetation
- Retained vegetation



N

0 75 150

Metres

ecology & heritage partners

10937_Fig02_EcolFeat_P_MBv2 2/08/2018 psorensen

Aerial source: Nearmap 2017

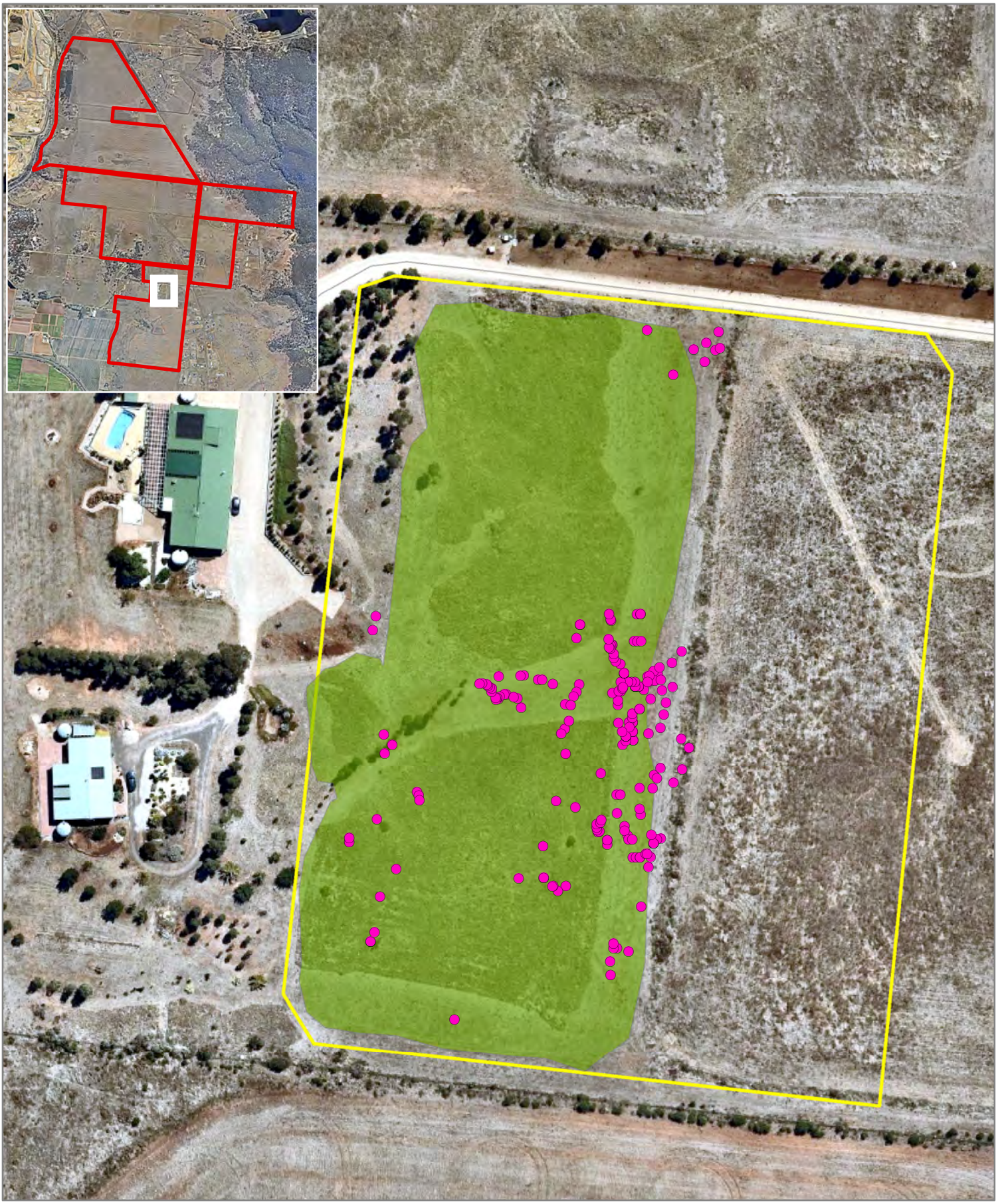
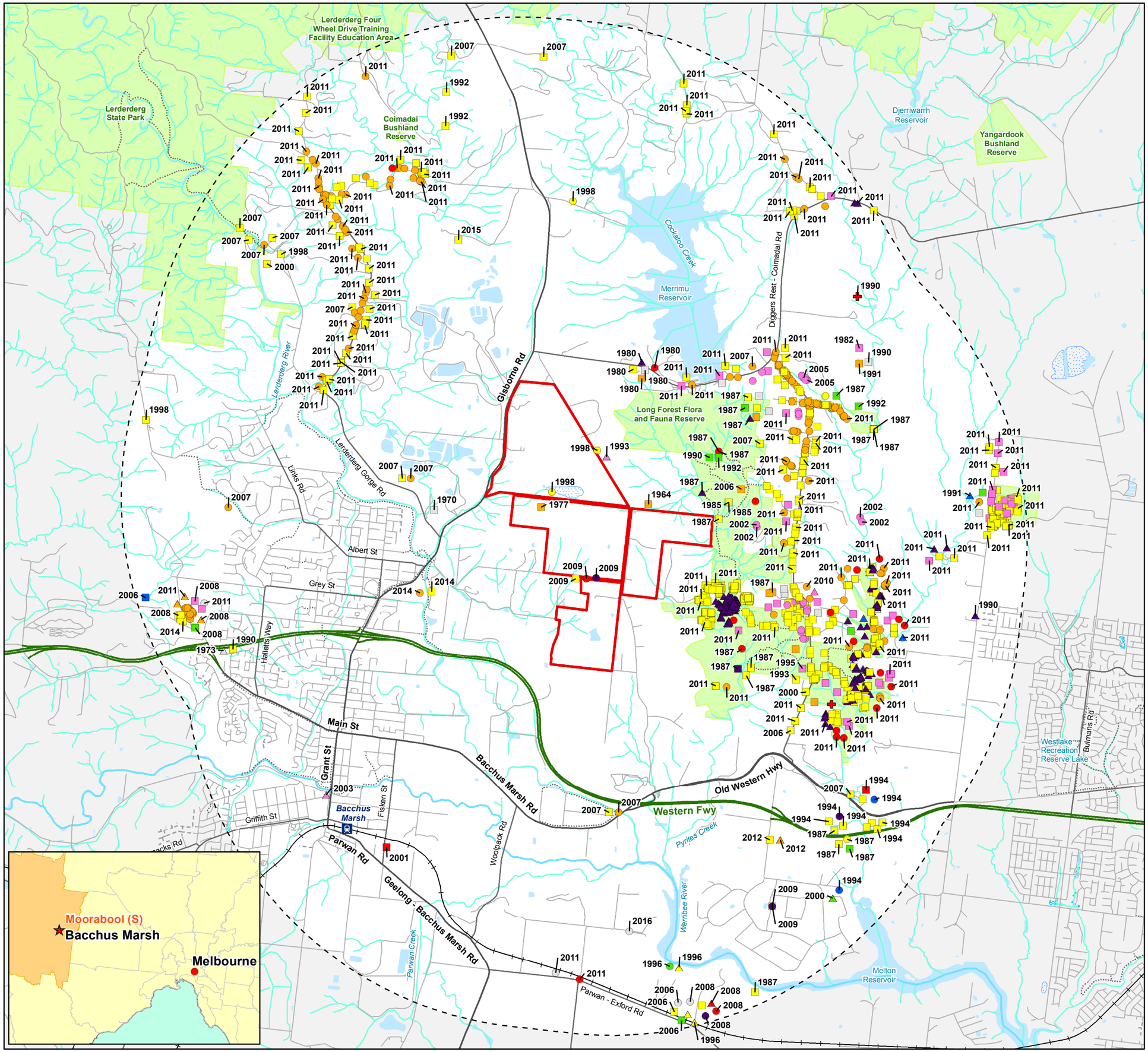


Figure 3a
Spiny Rice-flower Survey Results
Spiny Rice-flower Survey, 376 Bences Road, Merrimu

ecology & heritage partners

9794_Fig03_SRF_SurvResults 22/12/2017 melsley

Aerial source: Nearmap 2017



Legend

- Study Area

Significant flora

- Arching Flax-lily
- Austral Tobacco
- Bacchus Marsh Wattle
- Black Roly-poly
- Black-tip Greenhood
- Branching Groundsel
- Brittle Greenhood
- Buloke
- Cane Spear-grass
- Curved Rice-flower
- Forked Rice-flower
- Fragrant Saltbush
- Heath Spear-grass
- Leafless Bluebush
- Melbourne Yellow-gum
- Narrow-leaf Wax-flower
- Rough Wattle
- Rye Beetle-grass
- Slender Bindweed
- Small Golden Moths
- Smooth Nardoo
- Snowy Mint-bush
- Spiny Rice-flower
- Werribee Blue-box
- Western Golden-tip

Figure 4

Previously documented significant flora within 5km of the study area

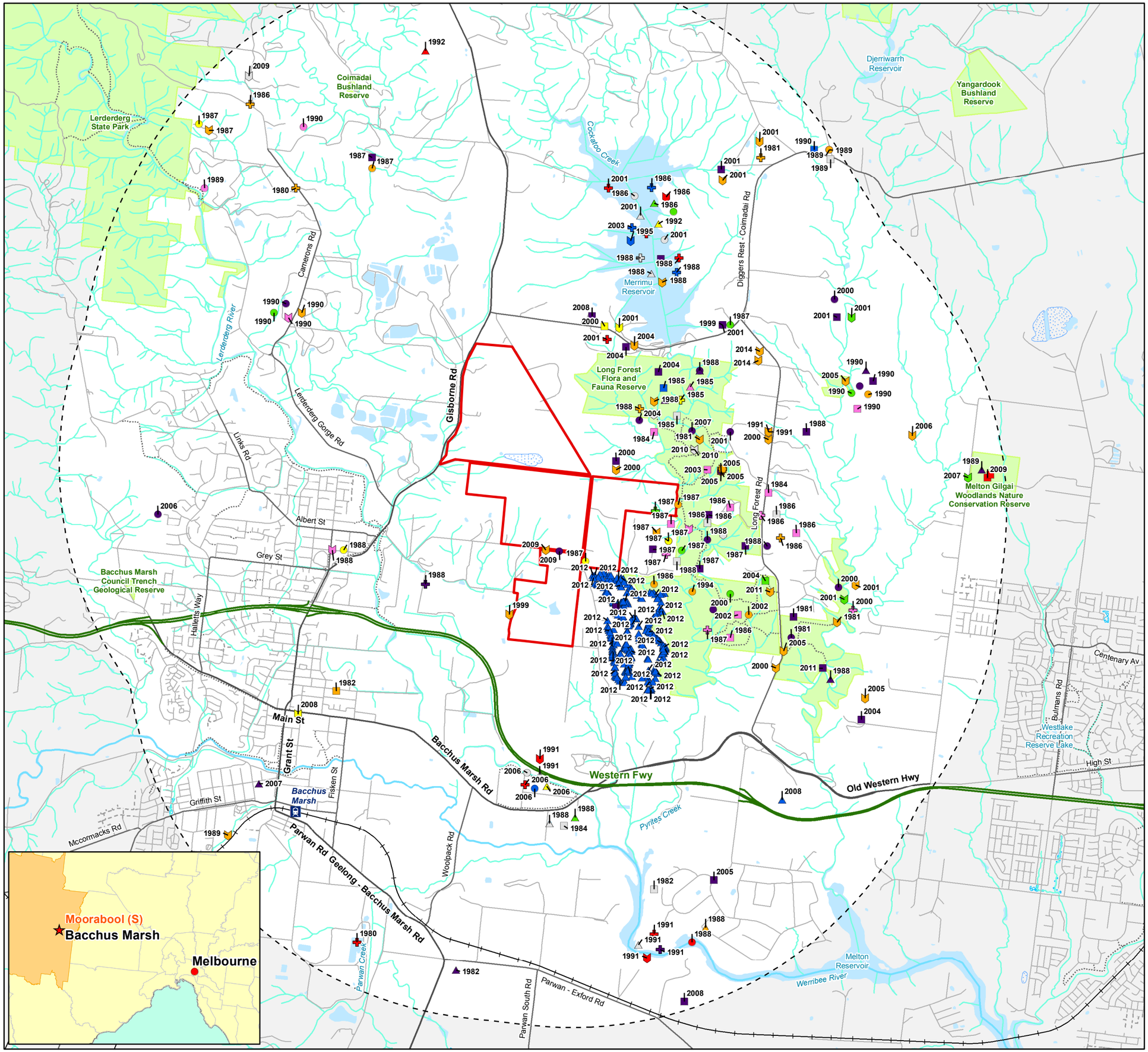
Ecological Assessments for 16 properties at Bences Road, Bacchus Marsh

N

0 1 2

Kilometres

ecology & heritage partners



Legend

Study Area

Significant fauna

- Australasian Shoveler
- Azure Kingfisher
- Barking Owl
- Black Falcon
- Black-eared Cuckoo
- Blue-billed Duck
- Brown Toadlet
- Brown Treecreeper (south-eastern ssp.)
- Brush-tailed Phascogale
- Bullant
- Caddisfly
- Caspian Tern
- Chestnut-rumped Heathwren
- Common Dunnart
- Crested Bellbird
- Diamond Firetail
- Eastern Great Egret
- Eastern Pygmy-possum
- Eastern Snake-necked Turtle
- Freckled Duck
- Glossy Ibis
- Golden Sun Moth
- Grey-headed Flying-fox
- Growling Grass Frog
- Gull-billed Tern
- Hardhead
- Hooded Robin
- Lace Monitor
- Latham's Snipe
- Musk Duck
- Nankeen Night Heron
- Pied Cormorant
- Powerful Owl
- Royal Spoonbill
- Speckled Warbler
- Spotted Harrier
- Swift Parrot
- White-bellied Sea-Eagle
- White-throated Needletail

Figure 5

Previously documented significant fauna within 5km of the study area

Ecological Assessments for 16 properties at Bences Road, Bacchus Marsh

N

0 1 2

Kilometres

ecology & heritage partners

APPENDICES

APPENDIX 1

Appendix 1.1 – Rare or Threatened Categories for Listed Victorian Taxa

Table A1.1. Rare or Threatened categories for listed Victorian taxa.

Rare or Threatened Categories
Conservation Status in Australia (Based on the EPBC Act 1999)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
Conservation Status in Victoria (Based on DEPI 2014, DSE 2009 or2013)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

Appendix 1.2 – Defining Ecological Significance

Table A1.2. Criteria for defining Ecological Significance ratings for significant flora, fauna and communities.

National Significance
Flora: National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
Fauna: National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. Extinct, Critically Endangered, Endangered, Vulnerable). Fauna listed as Extinct, Critically Endangered, Endangered, Vulnerable, or Rare under National Action Plans for terrestrial taxon prepared for DoE: mammals (Woinarski *et al.* 2014), bats (Duncan *et al*. 1999), birds (Garnett *et al.* 2011), reptiles (Cogger *et al*. 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
Communities: Vegetation communities considered critically endangered, endangered or vulnerable under the EPBC Act and considering vegetation condition.
State Significance
Flora: Threatened taxa listed under the provisions of the FFG Act. Flora listed in the State Government's Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014).
Fauna: Threatened taxon listed under Schedule 2 of the FFG Act. Fauna listed as Extinct, Critically Endangered, Endangered and Vulnerable on the State Government's Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013). Listed as Lower Risk (Near Threatened, Conservation Dependent or Least concern) or Data Deficient under National Action Plans for terrestrial species prepared for the DoE: mammals (Woinarski *et al*. 2014), bats (Duncan *et al*. 1999), birds (Garnett *et al.* 2011), reptiles (Cogger *et al*. 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
Communities: Ecological communities listed as threatened under the FFG Act (DELWP 2017h). EVC listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion and considering vegetation condition.
Regional Significance
Fauna: Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the particular Bioregion in which the study area is located. A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government's Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013).
Communities: EVC listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion) and considering vegetation condition. EVC considered rare by the author for a particular bioregion.
Local Significance
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.

Appendix 1.3 – Defining Site Significance

Table A1.3. Criteria for defining Site Significance ratings.

National Significance
A site is of National significance if: • It regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the DoE. • It regularly supports, or has a high probability of supporting, an 'important population' as defined under the EPBC Act of one or more nationally 'vulnerable' flora and fauna taxon. • It is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. • It is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. • It contains an area, or part thereof designated as 'critical habitat' under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. • It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
State Significance
A site is of State significance if: • It occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans. • It regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (,DSE 2013; DEPI 2014), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. • It contains an area, or part thereof designated as 'critical habitat' under the FFG Act. • It supports, or likely to support a high proportion of any Victorian flora and fauna taxa. • It contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. • It is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.
Regional Significance
A site is of Regional significance if: • It regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. • Is contains a large population (i.e. greater than 1% or 5%) of flora considered rare in any regional Native Vegetation Plan for a particular bioregion. • It supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. • It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
Local Significance
Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as: • An area which supports indigenous flora species and/or a remnant EVC, and habitats used by locally significant fauna species. • An area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

Appendix 1.4 – Vegetation Condition and Habitat Quality

Table A1.4.1 Defining Vegetation Condition ratings.

Criteria for defining Vegetation Condition
High Quality: Vegetation dominated by a diversity of indigenous species, with defined structures (where appropriate), such as canopy layer, shrub layer, and ground cover, with little or few introduced species present.
Moderate Quality: Vegetation dominated by a diversity of indigenous species, but is lacking some structures, such as canopy layer, shrub layer or ground cover, and/or there is a greater level of introduced flora species present.
Low Quality: Vegetation dominated by introduced species, but supports low levels of indigenous species present, in the canopy, shrub layer or ground cover.

Table A1.4.2 Defining Habitat Quality.

Criteria for defining Habitat Quality
High Quality: • High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups). • High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity). • High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat. • Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DEPI 2014; DSE 2009 or 2013.
Moderate Quality: • Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups. • Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes. • Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat. • Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DEPI 2014; DSE 2009 or 2013.
Low Quality: • Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups). • Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes. • Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat. • Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DEPI 2014; DSE 2009 or 2013.

Appendix 1.5 – Offsets and Exemptions

Table A1.5.1. Calculation of Biodiversity Equivalence Scores and General or Specific Offsets (DEPI 2013)

Pathway	Biodiversity Assessment Tools	Information Source
Low Risk-based pathway	Condition Score	Modelled data, NVIM Tool (DELWP 2017a)
	Habitat Hectares	= Condition Score x Extent (ha)
	Strategic Biodiversity Score	Modelled data, NVIM Tool (DELWP 2017a)
	General Biodiversity Equivalence Score	= Habitat Hectares x Strategic Biodiversity Score
Moderate or High Risk-based pathway	Condition Score	Habitat hectare assessment
	Habitat Hectares	= Condition Score x Extent (ha)
	Strategic Biodiversity Score and Habitat Importance Score	Modelled data, determined by DEPI
	Specific Biodiversity Equivalence Score **(A)**	= Habitat Hectares x Habitat Importance Score
	Sum of Specific Biodiversity Equivalence Scores of remaining habitat **(B)**	Data gathered during the field assessment is provided to DEPI for analysis and a resulting assessment offset report is provided by the Department.
	Specific Offset Threshold **(C)**	
	General/Specific Threshold Test: If **A ÷ B > C** a **Specific** offset is required If **A ÷ B < C** a **General** offset required	

Table A1.5.2. Summary of offset requirements (DEPI 2013)

Risk –based Pathway	Offset Type	Offset Amount (Risk adjusted biodiversity equivalence score)	Offset Attributes		
			Habitat for Species	Vicinity	Strategic Biodiversity Score
Low Risk	General offset	1.5 times the general biodiversity equivalence score of the native vegetation to be removed.	No restrictions	In the same Catchment Management Authority or Local Government Area boundary as the native vegetation to be removed.	At least 80 per cent of the strategic biodiversity score of the native vegetation to be removed.
Moderate or High Risk	General offset	1.5 times the general biodiversity equivalence score of the native vegetation to be removed.	No restrictions	In the same Catchment Management Authority or Local Government Area boundary as the native vegetation to be removed.	At least 80 per cent of the strategic biodiversity score of the native vegetation to be removed.
Moderate or High Risk	Specific offset	For each species impacted, 2 times the specific biodiversity equivalence score of the native vegetation to be removed.	Likely habitat for each rare or threatened species that a specific offset is required for, according to the specific-general offset test.	No restrictions	No restrictions

Appendix 1.6 – *Flora and Fauna Guarantee Act 1988* Protected Species

Protected flora and fauna under the *Flora and Fauna Guarantee Act 1988* (FFG Act) are defined as those that have legal protection under the Act. Protected taxa includes plants and animals from three sources:

- plant or animal taxa (species, subspecies or varieties) listed as threatened under the FFG Act;
- plant taxa belonging to communities listed as threatened under the FFG Act; and,
- plant taxa which are not threatened but require protection for other reasons.

Note that representative plants of a given community are protected as well as the community itself (for example scattered Wallaby-grasses *Rytidosperma* spp. are protected in degraded areas previously supporting the listed Western [Basalt] Plains Grassland Community.

Table A1.6 provides a list of plant groups protected under the FFG Act. For threatened plant species likely to occur within the study area refer to Appendix and for listed communities (or representative species) likely to occur within the study area refer to Sections 3.4.1 and 3.4.2.

Table A1.6. Plant groups (Families, Genera and Kingdom Divisions) protected under the FFG Act (DELWP 2016).

Family/Genera	Common Name	Exclusions
Pteridophyta	Clubmosses, ferns and fern allies	Austral Bracken *Pteridium esculentum*
Asteraceae	Daisies	N/A
Ericaceae (formerly Epacridaceae)	Heaths	N/A
Orchidaceae	Orchids	N/A
Acacia	Wattles	*Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon and Acacia paradoxa*
Baeckea	Baeckeas	N/A
Boronia	Boronias	N/A
Calytrix	Fringe-myrtles	N/A
Correa -	Correas	N/A
Darwinia	Darwinias	N/A
Eremophila	Emu-bushes	N/A
Eriostemon	Wax-flowers	N/A
Gompholobium	Wedge-peas	N/A
Grevillea	Grevilleas	N/A
Prostanthera	Mint-bushes	N/A
Sphagnum	Sphagnum mosses	N/A
Stylidium	Trigger-plants	N/A
Thryptomene	Thryptomenes	N/A
Thysanotus	Fringe-lilies	N/A
Xanthorrhoea	Grass-trees	N/A

APPENDIX 2 - FLORA

Appendix 2.1 – Flora Results

Legend:

CR/EN/VU Listed as Critically Endangered/Endangered/Vulnerable under the EPBC Act;

I Protected under the FFG Act (DELWP 2016);

L Listed under the FFG Act (DELWP 2017e);

e/v/r Listed as endangered/vulnerable/rare in Victoria under the Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014);

***** Listed as a noxious weed under the CaLP Act;

w Weed of National Significance;

Planted Victorian and non-Victorian species;

+ Planted indigenous species that also occur in remnant native vegetation in the study area;

****** Planted indigenous species in the study area; and,

- Not applicable

Table A2.1. Flora recorded within the study area.

Scientific Name	Common Name	Comments
Indigenous Species		
Acacia acinacea	Gold-dust Wattle	**I**
Acacia implexa	Lightwood	
Acacia paradoxa	Hedge Wattle	
Acacia pycnantha	Golden Wattle	**I**
Acacia rostriformis	Bacchus Marsh Wattle	**I v ****
Acaena echinata	Sheep's Burr	
Asperula conferta	Common Woodruff	
Atriplex semibaccata	Berry Saltbush	
Austrostipa bigeniculata	Kneed Spear-grass	
Austrostipa densiflora	Dense Spear-grass	
Austrostipa elegantissima	Feather Spear-grass	
Austrostipa gibbosa	Spurred Spear-grass	
Austrostipa scabra subsp. *falcata*	Rough Spear-grass	

Scientific Name	Common Name	Comments
Brachyscome dentata	Lobe-seed Daisy	**I**
Calocephalus citreus	Lemon Beauty-heads	**I**
Carpobrotus modestus	Inland Pigface	
Cassinia arcuata	Drooping Cassinia	**I**
Centrolepis aristata	Pointed Centrolepis	
Chloris truncata	Windmill Grass	
Chrysocephalum semipapposum	Clustered Everlasting	**I**
Clematis microphylla s.l.	Small-leaved Clematis	
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed	**k**
Crassula decumbens var. *decumbens*	Spreading Crassula	
Crassula sieberiana s.l.	Sieber Crassula	
Dichondra repens	Kidney-weed	
Dodonaea viscosa	Sticky Hop-bush	
Einadia hastata	Saloop	
Einadia nutans	Nodding Saltbush	
Eleocharis acuta	Common Spike-sedge	
Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush	
Eucalyptus behriana	Bull Mallee	
Eucalyptus leucoxylon subsp. *pruinosa*	Waxy Yellow-gum	
Eucalyptus melliodora	Yellow Box	
Eucalyptus microcarpa	Grey Box	
Eucalyptus obliqua	Messmate Stringybark	
Goodenia ovata	Hop Goodenia	
Juncus holoschoenus	Joint-leaf Rush	
Juncus pallidus	Pale Rush	
Linum marginale	Native Flax	
Lomandra filiformis	Wattle Mat-rush	
Maireana enchylaenoides	Wingless Bluebush	
Melaleuca lanceolata	Moonah	
Melicytus denta	Tree Violet	
Oxalis perennans	Grassland Wood-sorrel	
Pimelea curviflora	Curved Rice-flower	
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	**EN I e**
Pycnosorus chrysanthes	Golden Billy-buttons	
Rhagodia parabolica	Fragrant Saltbush	**r**
Rumex brownii	Slender Dock	
Rytidosperma caespitosum	Common Wallaby-grass	

Scientific Name	Common Name	Comments
Rytidosperma geniculatum	Kneed Wallaby-grass	
Rytidosperma setaceum	Bristly Wallaby-grass	
Sclerolaena diacantha	Grey Copperburr	
Sclerolaena muricata var. *muricata*	Black Roly-poly	**k**
Senecio pinnatifolius	Variable Groundsel	
Senecio quadridentatus	Cotton Fireweed	
Themeda triandra	Kangaroo Grass	
Typha spp.	Bulrush	
Vittadinia cuneata	Fuzzy New Holland Daisy	**I**
Wahlenbergia gracilis	Sprawling Bluebell	
Wahlenbergia luteola	Bronze Bluebell	
Walwhalleya proluta	Rigid Panic	
Introduced Species		
Acetosella vulgaris	Sheep Sorrel	
Aira caryophyllea subsp. *caryophyllea*	Silvery Hair-grass	
Arctotheca calendula	Cape Weed	
Asparagus asparagoides	Bridal Creeper	**W ***
Avena spp.	Oat	
Brassica spp.	Turnip	
Briza minor	Lesser Quaking-grass	
Bromus catharticus	Prairie Grass	
Bromus diandrus	Great Brome	
Bromus hordeaceus subsp. *hordeaceus*	Soft Brome	
Cirsium vulgare	Spear Thistle	*
Conyza spp.	Fleabane	
Coprosma repens	Mirror Bush	
Cupressus macrocarpa	Monterey Cypress	
Cynara cardunculus subsp. *flavescens*	Artichoke Thistle	*
Cynodon dactylon var. *dactylon*	Couch	
Cyperus eragrostis	Drain Flat-sedge	
Dactylis glomerata	Cocksfoot	
Dittrichia graveolens	Stinkwort	*
Ehrharta erecta var. *erecta*	Panic Veldt-grass	
Eucalyptus botryoides	Southern Mahogany	#
Eucalyptus cladocalyx	Sugar Gum	#
Galenia pubescens var. *pubescens*	Galenia	
Gazania linearis	Gazania	

Scientific Name	Common Name	Comments
Helminthotheca echioides	Ox-tongue	
Holcus lanatus	Yorkshire Fog	
Hordeum spp.	Barley	
Hypochoeris radicata	Flatweed	
Lepidium africanum	Common Peppercress	
Lolium perenne	Perennial Rye-grass	
Lycium ferocissimum	African Box-thorn	**W ***
Marrubium vulgare	Horehound	**W ***
Nassella neesiana	Chilean Needle-grass	**W ***
Nassella trichotoma	Serrated Tussock	**W ***
Olea europaea	Olive	
Opuntia spp.	Prickly pear	**W ***
Oxalis pes-caprae	Soursob	*
Paspalum dilatatum	Paspalum	
Phalaris aquatica	Toowoomba Canary-grass	
Physalis hederifolia	Sticky Ground-cherry	
Plantago coronopus	Buck's-horn Plantain	
Plantago lanceolata	Ribwort	
Prunus spp.	Prunus	
Romulea rosea	Onion Grass	
Rosa rubiginosa	Sweet Briar	*
Rubus fruticosus spp. agg.	Blackberry	**W ***
Rumex crispus	Curled Dock	
Salvia verbenaca	Wild Sage	
Schinus molle	Pepper Tree	
Solanum nigrum s.l.	Black Nightshade	
Sonchus asper s.l.	Rough Sow-thistle	
Sonchus oleraceus	Common Sow-thistle	
Tribulus terrestris	Caltrop	
Trifolium angustifolium var. *angustifolium*	Narrow-leaf Clover	
Trifolium spp.	Clover	
Vulpia bromoides	Squirrel-tail Fescue	
Vulpia myuros	Rat's-tail Fescue	

Appendix 2.2 – Significant Flora Species

Table A2.2 Significant flora recorded within 10 kilometres of the study area

Likelihood: Habitat characteristics of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings are defined below.

1 - Known occurrence
- Recorded within the study area recently (i.e. within ten years)

2 - High Likelihood
- Previous records of the species in the local vicinity; and/or,
- The study area contains areas of high quality habitat.

3 - Moderate Likelihood
- Limited previous records of the species in the local vicinity; and/or,
- The study area contains poor or limited habitat.

4 - Low Likelihood
- Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence.

5 – Unlikely
- No suitable habitat and/or outside the species range.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
NATIONAL SIGNIFICANCE							
Dianella amoena #	Matted Flax-lily	-	-	EN	L	e	4
Diuris basaltica	Small Golden Moths	5	2012	EN	L	e	4
Diuris fragrantissima	Sunshine Diuris	1	1770	EN	L	e	4
Eucalyptus aggregata #	Black Gum	-	-	VU	L	e	4
Glycine latrobeana #	Clover Glycine	-	-	VU	L	v	3
Lachnagrostis adamsonii #	Adamson's Blown-grass	-	-	EN	L	v	4
Leucochrysum albicans var. *tricolor* #	Hoary Sunray	-	-	EN	-	e	4
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	5	2003	CR	L	e	1
Prasophyllum frenchii #	Maroon Leek-orchid	-	-	EN	L	e	4

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Senecio macrocarpus #	Large-headed Fireweed	-	-	VU	L	e	3
Thelymitra matthewsii #	Spiral Sun-orchid	-	-	VU	L	v	4
Xerochrysum palustre #	Swamp Everlasting	-	-	VU	L	v	4
STATE SIGNIFICANCE							
Acacia aspera subsp. *parviceps*	Rough Wattle	2	1995	-	-	r	4
Acacia rostriformis	Bacchus Marsh Wattle	262	2016	-	L	v	1
Allocasuarina luehmannii	Buloke	15	2010	-	L	e	2
Alternanthera sp. 1 (Plains)	Plains Joyweed	2	2009	-	-	k	4
Amyema linophylla subsp. *orientalis*	Buloke Mistletoe	2	2010	-	-	v	4
Austrostipa breviglumis	Cane Spear-grass	18	2014	-	-	r	3
Austrostipa exilis	Heath Spear-grass	14	2008	-	-	r	3
Boronia anemonifolia subsp. *aurifodina*	Goldfield Boronia	1	1917	-	-	r	4
Bossiaea cordigera	Wiry Bossiaea	1	1980	-	-	r	4
Calotis anthemoides	Cut-leaf Burr-daisy	1	1984	-	L	-	3
Calotis lappulacea	Yellow Burr-daisy	2	1910	-	-	r	3
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed	5	2012	-	-	k	1
Cullen parvum	Small Scurf-pea	5	2012	-	L	e	2
Cullen tenax	Tough Scurf-pea	1	1853	-	L	e	3
Desmodium varians	Slender Tick-trefoil	3	2010	-	-	k	3
Dianella sp. aff. *longifolia (*Benambra*)*	Arching Flax-lily	7	2016	-	-	v	2
Diuris gregaria	Clumping Golden Moths	1	2012	-	L	e	3
Eucalyptus aff. *ignorabilis (*Lerderderg*)*	Lerderderg Scentbark	5	2011	-	-	e	3

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Eucalyptus baueriana subsp. *thalassina*	Werribee Blue-box	313	2011	-	-	e	2
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum	68	2016	-	-	v	2
Euphrasia collina subsp. *trichocalycina*	Purple Eyebright	1	1963	-	-	r	3
Gahnia microstachya	Slender Saw-sedge	6	2011	-	-	r	3
Goodia medicaginea	Western Golden-tip	2	1993	-	-	r	3
Grevillea rosmarinifolia	Rosemary Grevillea	2	1959	-	-	P	4
Grevillea steiglitziana	Brisbane Range Grevillea	1	1966	-	-	r	4
Lepidium pseudohyssopifolium	Native Peppercress	2	2008	-	-	k	3
Leucopogon microphyllus var. *pilibundus*	Hairy Beard-heath	10	2011	-	-	r	3
Maireana aphylla	Leafless Bluebush	6	2006	-	-	k	3
Marsilea mutica	Smooth Nardoo	1	2000	-	-	k	3
Myoporum montanum	Waterbush	1	1853	-	-	r	3
Nicotiana suaveolens	Austral Tobacco	53	2013	-	-	r	2
Olearia minor	Satin Daisy-bush	1	1929	-	-	r	3
Philotheca angustifolia subsp. *montana*	Narrow-leaf Wax-flower	1	1987	-	-	v	3
Pimelea curviflora var. aff. *subglabrata*	Curved Rice-flower	3	2001	-	-	k	3
Pimelea hewardiana	Forked Rice-flower	14	2011	-	-	r	2
Poranthera corymbosa	Clustered Poranthera	1	1982	-	-	r	3
Prostanthera decussata	Dense Mint-bush	1	1980	-	-	r	3
Prostanthera nivea var. *nivea*	Snowy Mint-bush	5	2011	-	-	r	3
Prostanthera saxicola var. *bracteolata*	Slender Mint-bush	1	2011	-	-	r	3
Pseudanthus orbicularis	Tangled Pseudanthus	3	1991	-	-	r	3

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Pterostylis bicolor	Black-tip Greenhood	1	1996	-	-	k	3
Pterostylis truncata	Brittle Greenhood	83	2013	-	L	e	3
Ptilotus erubescens	Hairy Tails	1	1984	-	L	v	3
Pultenaea reflexifolia	Wombat Bush-pea	1	1959	-	-	r	3
Pultenaea weindorferi	Swamp Bush-pea	1	1980	-	-	r	3
Rhagodia parabolica	Fragrant Saltbush	646	2016	-	-	r	1
Sclerolaena muricata var. *muricata*	Black Roly-poly	7	1998	-	-	k	1
Senecio cunninghamii var. *cunninghamii*	Branching Groundsel	5	2008	-	-	r	3
Tripogon loliiformis	Rye Beetle-grass	2	2008	-	-	r	3
Westringia glabra	Violet Westringia	4	1980	-	-	r	3

Notes: EPBC = *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), FFG = *Flora and Fauna Guarantee Act 1988* (FFG Act), DEPI= Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014), L = Listed, # = Records identified from EPBC Act Protected Matters Search Tool, Data source: Victorian Biodiversity Atlas (DELWP 2017d); Protected Matters Search Tool (DoEE 2018). Order: Alphabetical. .

Appendix 2.3 – Habitat Hectare Results

Table A2.3. Habitat Hectares results for remnant vegetation recorded within the study area.

Vegetation Zone		GW1	GW2	GW3	GW4	PG1	PG2	PG3	PG4	PG5	PG6	PG7
Bioregion		CVU	CVU	CVU	CVU	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC / Tree		GW	GW	GW	GW	PG(LR)	PG(LR)	PG(LR)	PG(LR)	PG(LR)	PG(LR)	PG(LR)
EVC Number		175	175	175	175	132_63	132_63	132_63	132_63	132_63	132_63	132_63
EVC Conservation Status		En	En	En	En	En	En	En	En	En	En	En
Patch Condition	Large Old Trees /10	7	7	0	5	0	0	0	0	0	0	0
	Canopy Cover /5	5	3	4	5	0	0	0	0	0	0	0
	Under storey /25	5	5	5	5	10	5	5	10	10	5	10
	Lack of Weeds /15	4	2	6	2	4	4	0	4	4	2	6
	Recruitment /10	3	1	1	3	3	1	0	3	0	6	6
	Organic Matter /5	5	5	0	3	4	2	2	5	4	5	5
	Logs /5	2	0	0	0	0	0	0	0	0	0	0
	Treeless EVC Multiplier	1.00	1.00	1.00	1.00	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Subtotal =	31.00	23.00	16.00	23.00	28.56	16.32	9.52	29.92	24.48	24.48	36.72
Landscape Value /25		4	4	4	4	4	4	4	4	4	4	4
Habitat Points /100		35	27	20	27	33	20	14	34	28	28	41
Habitat Score		0.35	0.27	0.20	0.27	0.33	0.20	0.14	0.34	0.28	0.28	0.41
Total Area (ha)		1.586	0.109	0.043	3.748	0.341	3.926	6.783	3.727	2.174	1.258	0.663
Total habitat hectares		0.555	0.029	0.009	1.012	0.113	0.785	0.950	1.267	0.609	0.352	0.272
Conservation Significance		High	High	High	High	High	High	High	High	High	High	V. High
Large Old Trees in Patches		11	2	0	21	0	0	0	0	0	0	0

Vegetation Zone		PG8	PG9	PG10	RCW1	RCW2	RCW3	RCW4	RCW5	PGWe1
Bioregion		VVP	VVP	VVP	CVU	CVU	CVU	CVU	CVU	CVU
EVC / Tree		PG(LR)	PG(LR)	PG(LR)	RCW	RCW	RCW	RCW	RCW	PGWe
EVC Number		132_63	132_63	132_63	64	64	64	64	64	125
EVC Conservation Status		En	En	En	Vu	Vu	Vu	Vu	Vu	En
Patch Condition	Large Old Trees /10	0	0	0	10	9	10	9	9	0
	Canopy Cover /5	0	0	0	4	4	5	5	5	0
	Under storey /25	15	10	10	5	10	15	15	15	10
	Lack of Weeds /15	9	6	2	2	4	11	9	0	4
	Recruitment /10	10	10	10	0	1	6	6	6	3
	Organic Matter /5	5	5	5	5	5	3	3	3	3
	Logs /5	0	0	0	0	0	4	4	4	0
	Treeless EVC Multiplier	1.36	1.36	1.36	1.00	1.00	1.00	1.00	1.00	1.36
	Subtotal =	53.04	42.16	36.72	26.00	33.00	54.00	51.00	42.00	27.20
Landscape Value /25		16	16	16	4	4	17	17	17	4
Habitat Points /100		69	58	53	30	37	71	68	59	31
Habitat Score		0.69	0.58	0.53	0.30	0.37	0.71	0.68	0.59	0.31
Total Area (ha)		13.009	1.446	0.640	0.226	0.096	21.951	4.700	1.148	0.069
Total habitat hectares		8.976	0.839	0.339	0.068	0.036	15.585	3.196	0.677	0.021
Conservation Significance		V. High	V. High	V. High	High	High	V. High	V. High	V. High	High
Large Old Trees in Patches		0	0	0	4	2	250	60	10	0

Appendix 2.4 – Scattered Trees

Table A2.4. Remnant scattered trees recorded within the study area.

Tree ID	Common Name	Species Name	DBH	Size Class	Comments
1	Grey Box	*Eucalyptus microcarpa*	73	LOT	
2	Grey Box	*Eucalyptus microcarpa*	14	ST	
3	Grey Box	*Eucalyptus microcarpa*	34	ST	
4	Grey Box	*Eucalyptus microcarpa*	77	LOT	
5	Grey Box	*Eucalyptus microcarpa*	64	ST	Hollow
6	Grey Box	*Eucalyptus microcarpa*	62	ST	
7	Grey Box	*Eucalyptus microcarpa*	79	LOT	
8	Grey Box	*Eucalyptus microcarpa*	56	ST	Hollow
9	Grey Box	*Eucalyptus microcarpa*	76	LOT	
10	Grey Box	*Eucalyptus microcarpa*	102	LOT	Hollow
11	Grey Box	*Eucalyptus microcarpa*	97	LOT	
12	Grey Box	*Eucalyptus microcarpa*	87	LOT	
13	Grey Box	*Eucalyptus microcarpa*	79	LOT	
14	Grey Box	*Eucalyptus microcarpa*	78	LOT	
15	Grey Box	*Eucalyptus microcarpa*	110	LOT	
16	Grey Box	*Eucalyptus microcarpa*	105	LOT	Hollow
17	Grey Box	*Eucalyptus microcarpa*	41	ST	
18	Grey Box	*Eucalyptus microcarpa*	105	LOT	Hollow
19	Stag	Stag	74	LOT	Hollow
20	Messmate	*Eucalyptus obliqua*	110	LOT	
21	Grey Box	*Eucalyptus microcarpa*	88	LOT	
22	Grey Box	*Eucalyptus microcarpa*	112	LOT	Hollow
23	Grey Box	*Eucalyptus microcarpa*	9	ST	

Tree ID	Common Name	Species Name	DBH	Size Class	Comments
24	Grey Box	*Eucalyptus microcarpa*	91	LOT	
25	Grey Box	*Eucalyptus microcarpa*	88	LOT	
26	Grey Box	*Eucalyptus microcarpa*	14	ST	
27	Grey Box	*Eucalyptus microcarpa*	71	LOT	
28	Grey Box	*Eucalyptus microcarpa*	54	ST	
29	Grey Box	*Eucalyptus microcarpa*	61	ST	
30	Grey Box	*Eucalyptus microcarpa*	50	ST	
31	Grey Box	*Eucalyptus microcarpa*	65	ST	
32	Grey Box	*Eucalyptus microcarpa*	75	LOT	
33	Grey Box	*Eucalyptus microcarpa*	117	LOT	Hollow
34	River Red-gum	*Eucalyptus camaldulensis*	68	ST	
35	River Red-gum	*Eucalyptus camaldulensis*	59	ST	
36	River Red-gum	*Eucalyptus camaldulensis*	75	LOT	
37	Grey Box	*Eucalyptus microcarpa*	60	ST	
38	Grey Box	*Eucalyptus microcarpa*	92	LOT	Hollow
39	Grey Box	*Eucalyptus microcarpa*	106	LOT	Hollow
40	Grey Box	*Eucalyptus microcarpa*	95	LOT	Hollow
41	Yellow Box	*Eucalyptus melliodora*	21	ST	
42	River Red-gum	*Eucalyptus camaldulensis*	55	ST	
43	River Red-gum	*Eucalyptus camaldulensis*	61	LOT	
44	Stag	Stag	55	ST	
45	Yellow Box	*Eucalyptus melliodora*	17	ST	
46	Grey Box	*Eucalyptus microcarpa*	27	ST	
47	Grey Box	*Eucalyptus microcarpa*	25	ST	
48	Yellow Box	*Eucalyptus melliodora*	81	LOT	Hollow
49	River Red-gum	*Eucalyptus camaldulensis*	97	LOT	Hollow
50	Grey Box	*Eucalyptus microcarpa*	49	ST	

Tree ID	Common Name	Species Name	DBH	Size Class	Comments
51	Grey Box	*Eucalyptus microcarpa*	71	LOT	
52	Yellow Box	*Eucalyptus melliodora*	75	LOT	
53	Grey Box	*Eucalyptus microcarpa*	73	LOT	
54	Grey Box	*Eucalyptus microcarpa*	10	ST	
55	Grey Box	*Eucalyptus microcarpa*	78	LOT	Hollow
56	Yellow Box	*Eucalyptus melliodora*	55	ST	
57	Yellow Box	*Eucalyptus melliodora*	45	ST	
58	Grey Box	*Eucalyptus microcarpa*	37	ST	
59	Grey Box	*Eucalyptus microcarpa*	51	ST	
60	Stag	Stag	40	ST	

APPENDIX 3 - FAUNA

Appendix 3.1 – Significant Fauna Species

Table A3.1 Significant fauna within 10 kilometres of the study area.

Habitat characteristics of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings for each of the threatened species are:

1	High Likelihood	• Known resident in the study area based on site observations, database records, or expert advice; and/or, • Recent records (i.e. within five years) of the species in the local area (VBA 2011); and/or, • The study area contains the species' preferred habitat.
2	Moderate Likelihood	• The species is likely to visit the study area regularly (i.e. at least seasonally); and/or, • Previous records of the species in the local area (DSE 2011b); and/or, • The study area contains some characteristics of the species' preferred habitat.
3	Low Likelihood	• The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or, • There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, • The study area contains few or no characteristics of the species' preferred habitat.
4	Unlikely	• No previous records of the species in the local area; and/or, • The species may fly over the study area when moving between areas of more suitable habitat; and/or, • Out of the species' range; and/or, • No suitable habitat present.

EX	Extinct
RX	Regionally extinct
CR	Critically endangered
EN	Endangered
VU	Vulnerable
RA	Rare
NT	Near threatened
CD	Conservation dependent
LC	least concern
DD	Data deficient (insufficiently or poorly known
L	Listed as threatened under FFG Act
I	Invalid or ineligible for listing under the FFG Act
#	Listed on the Protected Matters Search Tool
*	Additional information from the Victorian Fauna Database

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
NATIONAL SIGNIFICANCE								
Spot-tailed Quoll #	*Dasyurus maculatus maculatus*	-	-	EN	L	EN	VU	4
Eastern Barred Bandicoot	*Perameles gunnii*	1883	15	EN	L	WX	CR	4
Greater Glider #	*Petauroides volans*	-	-	VU	-	VU	VU	4
Grey-headed Flying-fox	*Pteropus poliocephalus*	1968	2	VU	L	VU	VU	3
Smoky Mouse #	*Pseudomys fumeus*	-	-	EN	L	EN	RA	4
Australasian Bittern	*Botaurus poiciloptilus*	1970	1	EN	L	EN	VU	4
Plains-wanderer	*Pedionomus torquatus*	1880	1	CR	L	CR	EN	3
Australian Painted Snipe	*Rostratula australis*	1989	1	VU	L	CR	VU	4
Eastern Curlew #	*Numenius madagascariensis*	-	-	CR	-	VU	-	4
Curlew Sandpiper #	*Calidris ferruginea*	-	-	CR	-	EN	-	4
Superb Parrot	*Polytelis swainsonii*	1881	1	VU	L	EN	VU	4
Swift Parrot	*Lathamus discolor*	2008	12	CR	L	EN	EN	2
Regent Honeyeater #	*Anthochaera phrygia*	-	-	CR	L	CR	EN	4
Painted Honeyeater #	*Grantiella picta*	-	-	VU	L	VU	NT	4
Pink-tailed Worm-Lizard #	*Aprasia parapulchella*	-	-	VU	L	EN	-	4
Striped Legless Lizard #	*Delma impar*	-	-	VU	L	EN	VU	2
Grassland Earless Dragon #	*Tympanocryptis pinguicolla*	-	-	EN	L	CR	VU	4
Growling Grass Frog	*Litoria raniformis*	2007	22	VU	L	EN	VU	4
Dwarf Galaxias #	*Galaxiella pusilla*	-	-	VU	L	EN	VU	4
Australian Grayling #	*Prototroctes maraena*	-	-	VU	L	VU	VU	4
Golden Sun Moth	*Synemon plana*	2012	333	CR	L	CR	-	1

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
STATE SIGNIFICANCE								
Brush-tailed Phascogale	*Phascogale tapoatafa*	1989	9	-	L	VU	NT	3
Common Dunnart	*Sminthopsis murina murina*	1990	3	-	-	VU	-	4
Common Bent-wing Bat	*Miniopterus schreibersii* GROUP	1999	5	-	L	-	CD	3
Musk Duck	*Biziura lobata*	2003	19	-	-	VU	-	4
Freckled Duck	*Stictonetta naevosa*	2006	6	-	L	EN	-	4
Australasian Shoveler	*Anas rhynchotis*	2006	11	-	-	VU	-	4
Hardhead	*Aythya australis*	2006	16	-	-	VU	-	4
Blue-billed Duck	*Oxyura australis*	2006	4	-	L	EN	-	4
Diamond Dove	*Geopelia cuneata*	1905	2	-	L	NT	-	4
White-throated Needletail	*Hirundapus caudacutus*	1994	9	-	-	VU	-	3
Eastern Great Egret	*Ardea modesta*	2001	8	-	L	VU	-	3
Little Egret	*Egretta garzetta nigripes*	1990	1	-	L	EN	-	3
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	2006	5	-	L	VU	-	4
Black Falcon	*Falco subniger*	1988	8	-	-	VU	-	3
Lewin's Rail	*Lewinia pectoralis pectoralis*	1880	1	-	L	VU	NT	4
Australian Bustard	*Ardeotis australis*	1911	1	-	L	CR	NT	4
Bush Stone-curlew	*Burhinus grallarius*	1880	1	-	L	EN	NT	4
Gull-billed Tern	*Gelochelidon nilotica macrotarsa*	1986	1	-	L	EN	-	4
Caspian Tern	*Hydroprogne caspia*	2000	1	-	L	NT	-	4
Powerful Owl	*Ninox strenua*	2011	10	-	L	VU	-	3
Barking Owl	*Ninox connivens connivens*	2002	25	-	L	EN	NT	3

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	2010	75	-	-	NT	NT	2
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	2004	10	-	L	VU	-	4
Speckled Warbler	*Chthonicola sagittatus*	2014	82	-	L	VU	NT	2
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*	1880	1	-	L	EN	NT	4
Crested Bellbird	*Oreoica gutturalis gutturalis*	2003	18	-	L	NT	NT	3
Hooded Robin	*Melanodryas cucullata cucullata*	1999	12	-	L	NT	NT	3
Diamond Firetail	*Stagonopleura guttata*	2011	69	-	L	NT	NT	2
Bearded Dragon	*Pogona barbata*	1986	2	-	-	VU	-	4
Lace Goanna	*Varanus varius*	1987	2	-	-	EN	-	3
Brown Toadlet	*Pseudophryne bibronii*	1990	5	-	L	EN	DD	4
Bullant	*Myrmecia* sp. 17	2009	4	-	L	VU	-	2
REGIONAL SIGNIFICANCE								
Fat-tailed Dunnart	*Sminthopsis crassicaudata*	1988	1	-	-	NT	-	2
Eastern Pygmy-possum	*Cercartetus nanus*	1992	2	-	-	NT	-	4
Pied Cormorant	*Phalacrocorax varius*	2003	4	-	-	NT	-	3
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2000	11	-	-	NT	-	3
Glossy Ibis	*Plegadis falcinellus*	1986	2	-	-	NT	-	3
Royal Spoonbill	*Platalea regia*	1991	6	-	-	NT	-	3
Spotted Harrier	*Circus assimilis*	2008	7	-	-	NT	-	2
Latham's Snipe	*Gallinago hardwickii*	1990	5	-	-	NT	-	3
Little Button-quail	*Turnix velox*	2011	2	-	-	NT	-	3
Black-eared Cuckoo	*Chrysococcyx osculans*	2000	13	-	-	NT	-	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Azure Kingfisher	*Alcedo azurea*	1988	2	-	-	NT	-	4
Red-backed Kingfisher	*Todiramphus pyrropygia pyrropygia*	1986	1	-	-	NT	-	4
Spotted Quail-thrush	*Cinclosoma punctatum*	2010	4	-	-	NT	-	3

EPBC *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

FFG *Flora and Fauna Guarantee Act 1988* (FFG Act)

DSE Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013); Advisory List of Threatened Invertebrate Fauna in Victoria (DSE 2009)

NAP National Action Plan (Cogger *et al.* 1993; Duncan *et al.* 1999; Garnet and Crowley 2000; Lee 1995; Maxwell *et al.* 1996; Sands and New 2002; Tyler 1997

Data source: Victorian Biodiversity Atlas (DELWP 2017e); Protected Matters Search Tool (DoEE 2018).

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

APPENDIX 4 - NATIVE VEGETATION REPORTS

Appendix 4.1 – Native Vegetation Removal Report

Native vegetation removal report

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

Date of issue: **02/07/2018**
Time of issue: **12:00 pm**

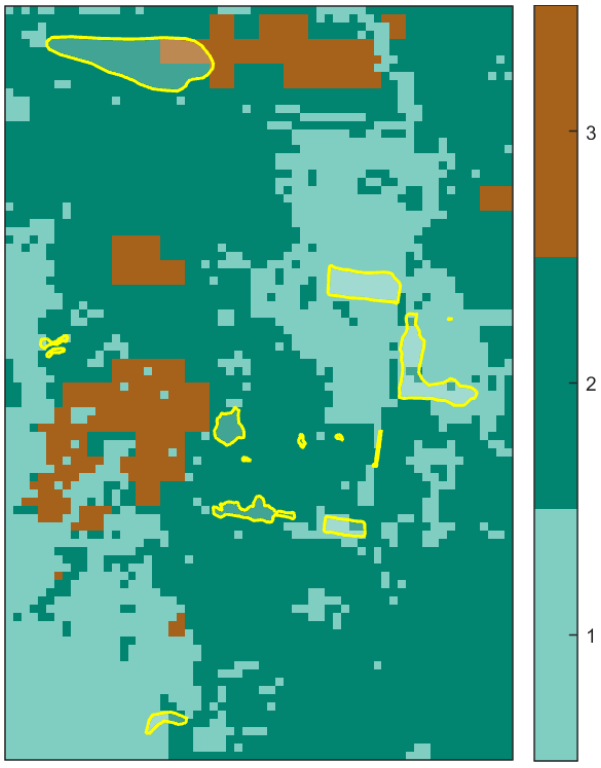
Report ID: EHP_2018_172

Project ID	EHP10937_Bacchus_Marsh

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	12.069 ha
Extent of past removal	0.000 ha
Extent of proposed removal	12.069 ha
No. Large trees proposed to be removed	0
Location category of proposed removal	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map).

1. Location map



Offset requirements if a permit is granted

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

General offset amount[1]	0.001 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Moorabool Shire Council
Minimum strategic biodiversity value score[2]	0.800
Large trees*	0 large trees
Species offset amount[3]	9.744 species units of habitat for Small Golden Moths, *Diuris basaltica* 10.049 species units of habitat for Heath Spear-grass, *Austrostipa exilis* 10.108 species units of habitat for Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata* 9.675 species units of habitat for Basalt Podolepis, *Podolepis linearifolia* 10.079 species units of habitat for Bacchus Marsh Wattle, *Acacia rostriformis* 10.049 species units of habitat for Fragrant Saltbush, *Rhagodia parabolica*
Large trees*	0 trees
*** The total number of large trees that the offset must protect**	0 large trees to be protected in either the general, species or combination across all habitat units protected

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

Appendix 1 includes information about the native vegetation to be removed

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

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

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

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

Next steps

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

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

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

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

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

Additional application requirements must be met including:

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

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

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-G	Patch	vvp_0132_61	Endangered	0	no	0.200	2.263	2.263	0.925	0.726	0.781	501473 Small Golden Moths *Diuris basaltica*
										0.499	0.781	503984 Heath Spear-grass *Austrostipa exilis*
										0.499	0.781	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.499	0.781	504658 Basalt Podolepis *Podolepis linearifolia*
										0.439	0.781	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.499	0.781	502929 Fragrant Saltbush *Rhagodia parabolica*
2-G	Patch	vvp_0132_61	Endangered	0	no	0.200	0.055	0.055	0.852	0.743	0.019	501473 Small Golden Moths *Diuris basaltica*
										0.735	0.019	503984 Heath Spear-grass *Austrostipa exilis*
										0.735	0.019	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.735	0.019	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.735	0.019	502929 Fragrant Saltbush *Rhagodia parabolica*
3-G	Patch	vvp_0132_61	Endangered	0	no	0.200	0.018	0.018	0.830	0.720	0.006	503984 Heath Spear-grass *Austrostipa exilis*
										0.720	0.006	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.720	0.006	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.720	0.006	502929 Fragrant Saltbush *Rhagodia parabolica*
4-I	Patch	vvp_0132_61	Endangered	0	no	0.340	1.782	1.782	0.547	0.683	1.020	501473 Small Golden Moths *Diuris basaltica*
										0.254	1.019	503984 Heath Spear-grass *Austrostipa exilis*
										0.254	1.019	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.103	1.006	504658 Basalt Podolepis *Podolepis linearifolia*
										0.254	1.019	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.254	1.019	502929 Fragrant Saltbush *Rhagodia parabolica*
5-H	Patch	vvp_0132_61	Endangered	0	no	0.140	0.659	0.659	0.807	0.728	0.159	503984 Heath Spear-grass *Austrostipa exilis*
										0.728	0.159	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.728	0.159	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.728	0.159	502929 Fragrant Saltbush *Rhagodia parabolica*
6-J	Patch	vvp_0132_61	Endangered	0	no	0.280	0.043	0.043	0.770	0.810	0.022	503984 Heath Spear-grass *Austrostipa exilis*
										0.810	0.022	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.810	0.022	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.810	0.022	502929 Fragrant Saltbush *Rhagodia parabolica*
7-G	Patch	vvp_0132_61	Endangered	0	no	0.200	0.560	0.560	0.900	0.718	0.192	501473 Small Golden Moths *Diuris basaltica*
										0.718	0.192	503984 Heath Spear-grass *Austrostipa exilis*
										0.718	0.192	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.398	0.193	504658 Basalt Podolepis *Podolepis linearifolia*
										0.667	0.192	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.718	0.192	502929 Fragrant Saltbush *Rhagodia parabolica*
8-G	Patch	vvp_0132_61	Endangered	0	no	0.200	0.816	0.816	0.865	0.710	0.279	501473 Small Golden Moths *Diuris basaltica*
										0.641	0.268	503984 Heath Spear-grass *Austrostipa exilis*
										0.641	0.268	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.147	0.243	504658 Basalt Podolepis *Podolepis linearifolia*
										0.641	0.268	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.641	0.268	502929 Fragrant Saltbush *Rhagodia parabolica*
9-G	Patch	vvp_0132_61	Endangered	0	no	0.200	0.014	0.014	0.890	0.780	0.005	503984 Heath Spear-grass *Austrostipa exilis*
										0.780	0.005	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.780	0.005	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.780	0.005	502929 Fragrant Saltbush *Rhagodia parabolica*
10-H	Patch	vvp_0132_61	Endangered	0	no	0.140	0.364	0.364	0.437	0.710	0.087	503984 Heath Spear-grass *Austrostipa exilis*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.407	0.087	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.407	0.087	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.407	0.087	502929 Fragrant Saltbush *Rhagodia parabolica*
11-H	Patch	vvp_0132_61	Endangered	0	no	0.140	0.116	0.116	0.820	0.406	0.023	503984 Heath Spear-grass *Austrostipa exilis*
										0.406	0.023	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.406	0.023	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.406	0.023	502929 Fragrant Saltbush *Rhagodia parabolica*
12-H	Patch	vvp_0132_61	Endangered	0	no	0.140	0.058	0.058	0.820	0.409	0.011	503984 Heath Spear-grass *Austrostipa exilis*
										0.409	0.011	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.409	0.011	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.409	0.011	502929 Fragrant Saltbush *Rhagodia parabolica*
13-U	Patch	vvp_0132_61	Endangered	0	no	0.785	5.320	5.320	0.960	0.784	7.452	501473 Small Golden Moths *Diuris basaltica*
										0.785	7.456	503984 Heath Spear-grass *Austrostipa exilis*
										0.593	7.515	504484 Melbourne Yellow-gum *Eucalyptus leucoxylon subsp. connata*
										0.733	7.452	504658 Basalt Podolepis *Podolepis linearifolia*
										0.428	7.486	505136 Bacchus Marsh Wattle *Acacia rostriformis*
										0.785	7.456	502929 Fragrant Saltbush *Rhagodia parabolica*
17-E	Patch	vvp_0132_61	Endangered	0	no	0.330	0.002	0.002	1.000		0.001	General

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

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

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Small Golden Moths	*Diuris basaltica*	501473	Endangered	Dispersed	Top ranking map	0.0426
Heath Spear-grass	*Austrostipa exilis*	503984	Rare	Dispersed	Top ranking map	0.0393
Bacchus Marsh Wattle	*Acacia rostriformis*	505136	Vulnerable	Dispersed	Top ranking map	0.0372
Basalt Podolepis	*Podolepis linearifolia*	504658	Endangered	Dispersed	Top ranking map	0.0303
Melbourne Yellow-gum	*Eucalyptus leucoxylon subsp. connata*	504484	Vulnerable	Dispersed	Top ranking map	0.0211
Bacchus Marsh Wattle	*Acacia rostriformis*	505136	Vulnerable	Dispersed	Habitat importance map	0.0137
Small Golden Moths	*Diuris basaltica*	501473	Endangered	Dispersed	Habitat importance map	0.0093
Heath Spear-grass	*Austrostipa exilis*	503984	Rare	Dispersed	Habitat importance map	0.0088
Fragrant Saltbush	*Rhagodia parabolica*	502929	Rare	Dispersed	Habitat importance map ; special site	0.0075
Melbourne Yellow-gum	*Eucalyptus leucoxylon subsp. connata*	504484	Vulnerable	Dispersed	Habitat importance map	0.0041
Basalt Podolepis	*Podolepis linearifolia*	504658	Endangered	Dispersed	Habitat importance map	0.0037
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0032
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	12922	Critically endangered	Dispersed	Habitat importance map	0.0029
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0024
Large-flower Crane's-bill	*Geranium sp. 1*	505342	Endangered	Dispersed	Habitat importance map	0.0022
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0020
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map ; special site	0.0020
Velvet Daisy-bush	*Olearia pannosa subsp. cardiophylla*	502317	Vulnerable	Dispersed	Habitat importance map	0.0020

Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0019
Cane Spear-grass	*Austrostipa breviglumis*	503268	Rare	Dispersed	Habitat importance map	0.0015
Small Scurf-pea	*Cullen parvum*	502773	Endangered	Dispersed	Habitat importance map	0.0015
Yellow Burr-daisy	*Calotis lappulacea*	500598	Rare	Dispersed	Habitat importance map	0.0013
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0013
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0012
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0012
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0011
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0011
Rye Beetle-grass	*Tripogon loliiformis*	503455	Rare	Dispersed	Habitat importance map	0.0011
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0011
Dark Wire-grass	*Aristida calycina var. calycina*	503630	Rare	Dispersed	Habitat importance map	0.0009
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0009
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0008
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map	0.0008
Rosemary Grevillea	*Grevillea rosmarinifolia subsp. rosmarinifolia*	504066	Rare	Dispersed	Habitat importance map	0.0008
Late-flower Flax-lily	*Dianella tarda*	505085	Vulnerable	Dispersed	Habitat importance map	0.0007
Fragrant Saltbush	*Rhagodia parabolica*	502929	Rare	Dispersed	Top ranking map ; special site	0.0005
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0005
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0005
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Top ranking map	0.0005
Waterbush	*Myoporum montanum*	502240	Rare	Dispersed	Habitat importance map	0.0004
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0004

Brittle Greenhood	*Pterostylis truncata*	502821	Endangered	Dispersed	Habitat importance map	0.0004
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0003
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0003
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Top ranking map	0.0003
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0002
Buloke	*Allocasuarina luehmannii*	500678	Endangered	Dispersed	Habitat importance map ; special site	0.0002
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0002
Shiny Leionema	*Leionema lamprophyllum subsp. obovatum*	505478	Rare	Dispersed	Habitat importance map	0.0002
Port Lincoln Snake	*Parasuta spectabilis*	12813	Vulnerable	Dispersed	Habitat importance map	0.0001
Austral Crane's-bill	*Geranium solanderi var. solanderi s.s.*	505337	Vulnerable	Dispersed	Habitat importance map	0.0001
Forked Rice-flower	*Pimelea hewardiana*	502522	Rare	Dispersed	Habitat importance map	0.0001
Dwarf Brooklime	*Gratiola pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0000
Western Golden-tip	*Goodia medicaginea*	501518	Rare	Dispersed	Habitat importance map	0.0000
Hairy Beard-heath	*Leucopogon microphyllus var. pilibundus*	501988	Rare	Dispersed	Habitat importance map	0.0000
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0000
Dense Mint-bush	*Prostanthera decussata*	502739	Rare	Dispersed	Habitat importance map	0.0000
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0000
Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0000
Silky Kidney-weed	*Dichondra sp. 1*	505786	Rare	Dispersed	Habitat importance map	0.0000
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0000
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0000
Common Dunnart	*Sminthopsis murina murina*	11061	Vulnerable	Dispersed	Habitat importance map	0.0000
Barking Owl	*Ninox connivens connivens*	10246	Endangered	Dispersed	Habitat importance map	0.0000

Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0000
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0000
Slender Mint-bush	*Prostanthera saxicola var. bracteolata*	502750	Rare	Dispersed	Habitat importance map	0.0000

Habitat group

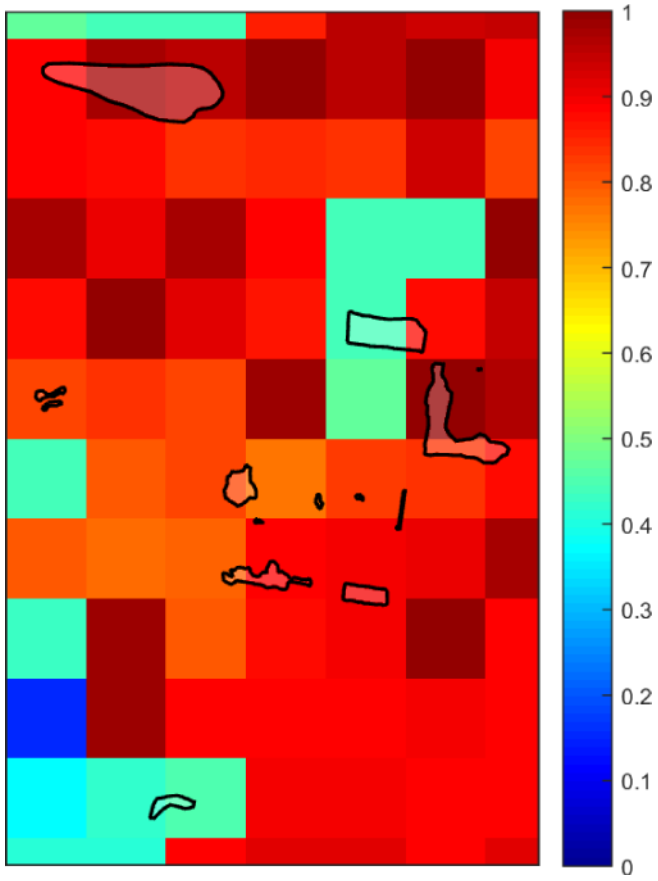
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

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

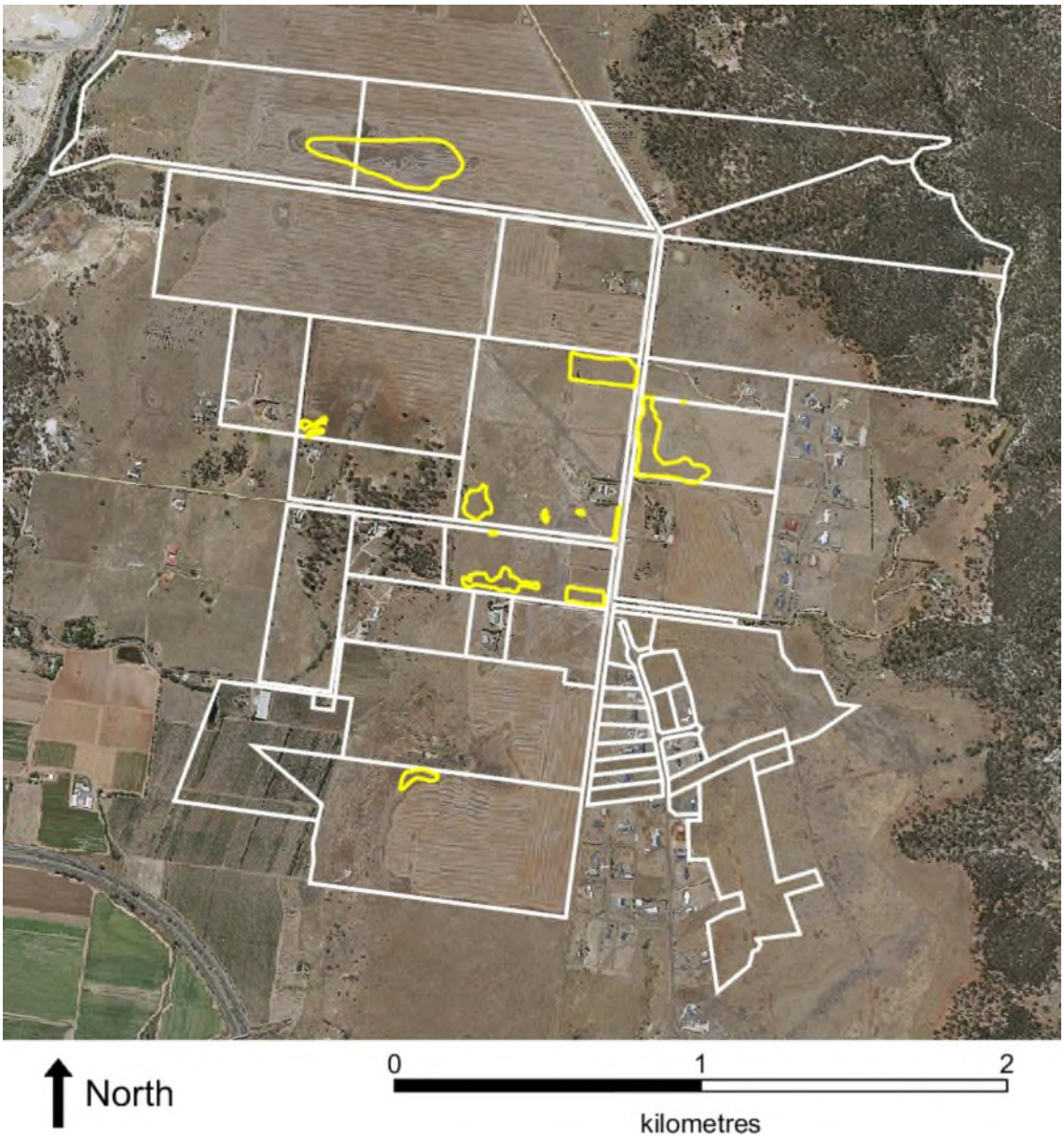
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

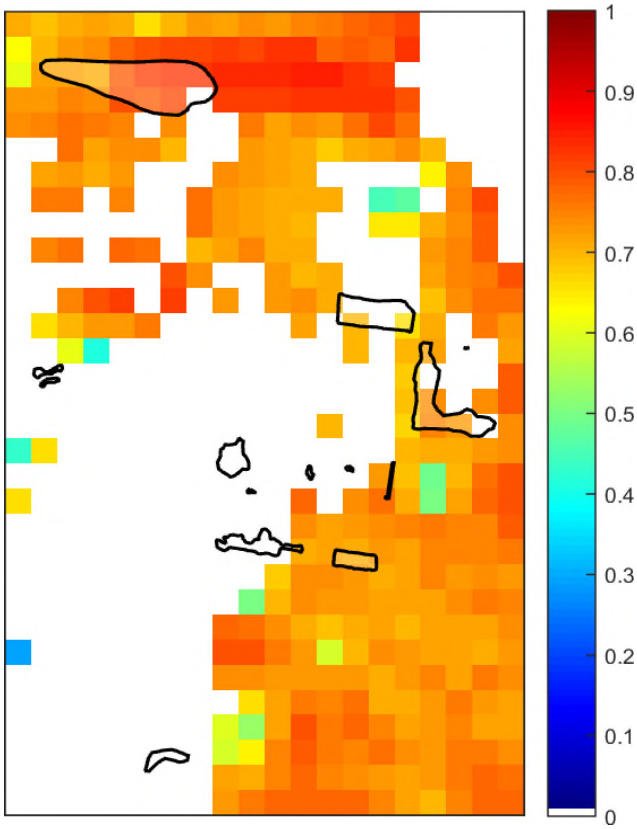
4. Map of the property in context



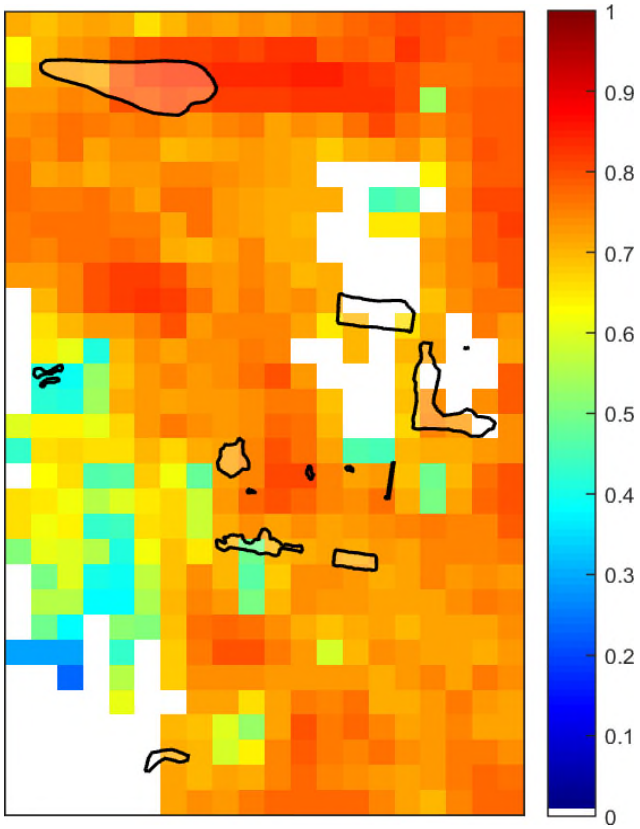
Yellow boundaries denote areas of proposed native vegetation removal.

4. Habitat importance maps

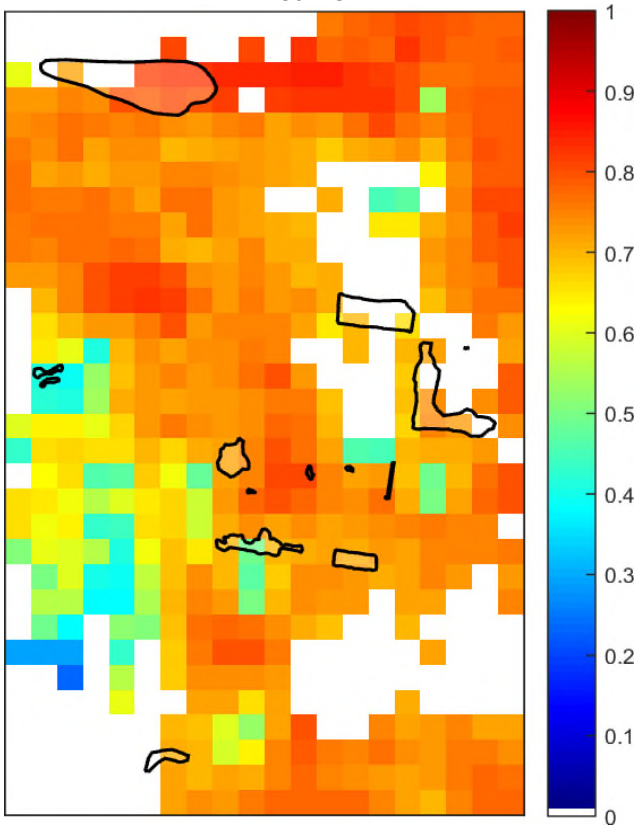
Small Golden Moths
Diuris basaltica
501473



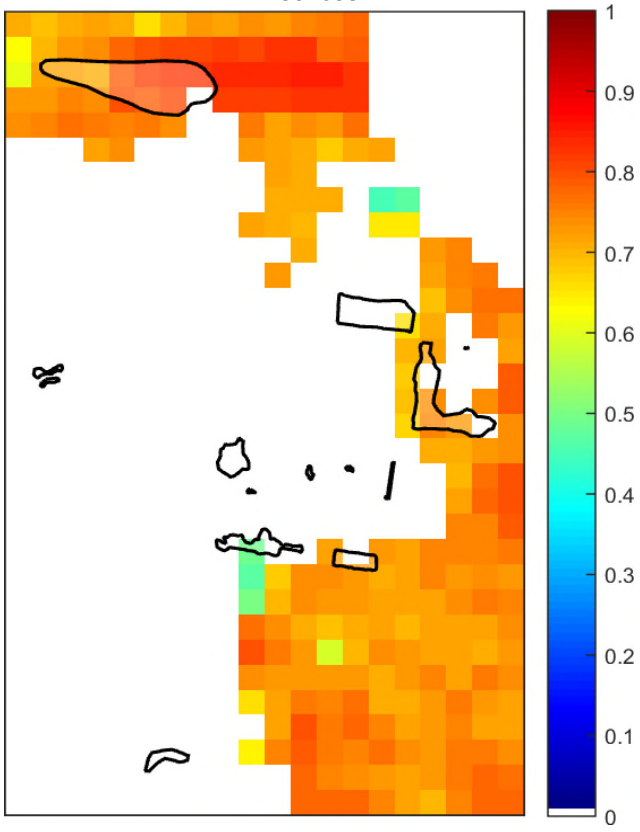
Heath Spear-grass
Austrostipa exilis
503984



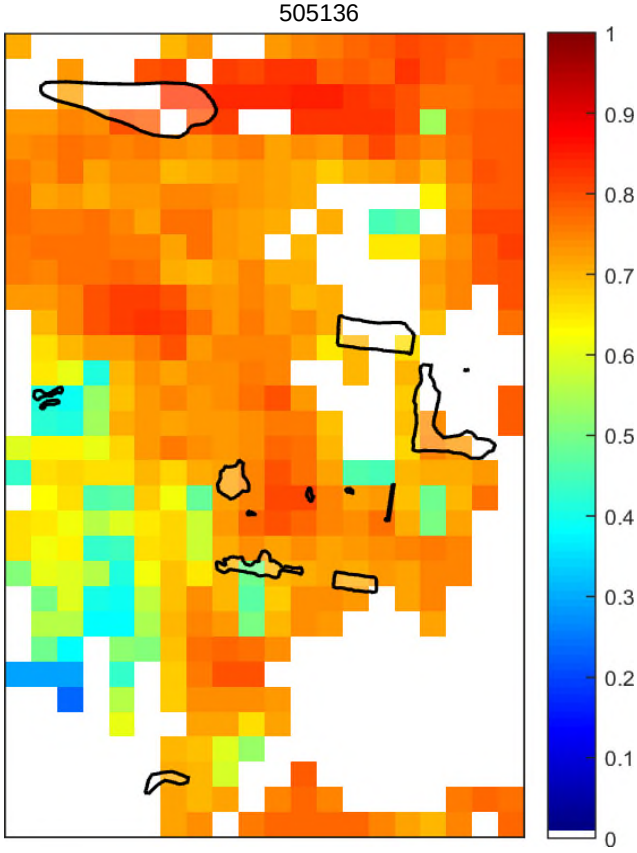
Melbourne Yellow-gum
Eucalyptus leucoxylon subsp. connata
504484



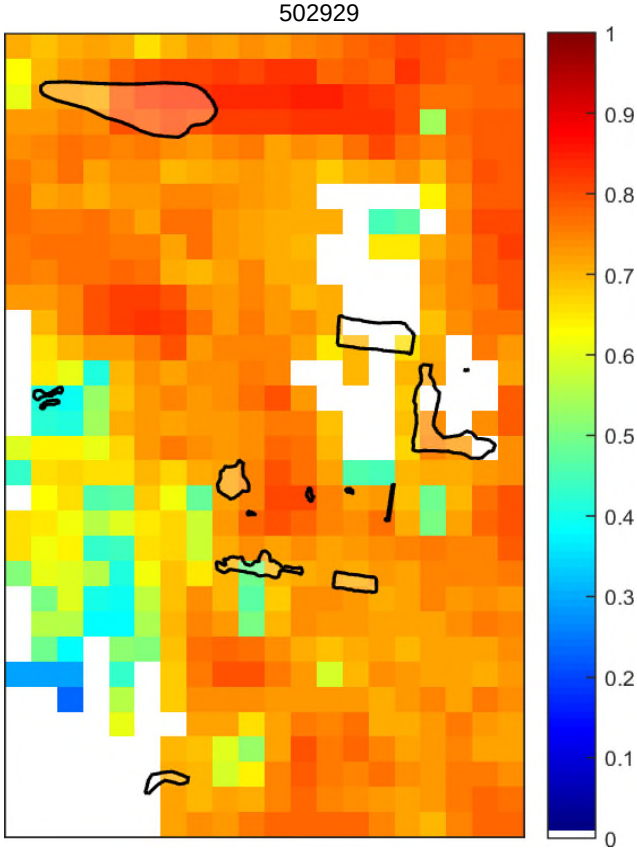
Basalt Podolepis
Podolepis linearifolia
504658



Bacchus Marsh Wattle
Acacia rostriformis
505136



Fragrant Saltbush
Rhagodia parabolica
502929



Appendix 4.2 – Native Vegetation Offset Report

Native vegetation offset report

Information included in this report is based on spatial data provided to DELWP. The proposal has not been assessed to confirm eligibility or gain

This report provides information about a potential native vegetation offset site in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The information in this report is based on spatial information and the gain score provided by the landholder (or their representative). Any changes to this input information will change the habitat units of gain reflected in this report and it must be reissued.

Date of issue: **02/08/2018**
Time of issue: **1:57 pm**

DELWP ref: EHP_2018_0203

Project ID	EHP10937_Bacchus_Marsh

Extent of proposed offset site

Total extent	42.869 ha
Patches	42.869 ha
Revegetation	0.000 ha
Scattered tree(s)	0.000 ha

Habitat units of gain for the proposed offset site

The offset site has the following total general and species habitat units. These units can be used to satisfy a **single permit condition** or if the offset site is established as a **first party offset site**.

Total habitat units and attributes used for a single permit (once off use)	
Number of large tree(s)	11 large trees are protected at the offset site
General habitat units	12.973 general habitat units Port Phillip And Westernport CMA, Moorabool Shire Council 0.895 Strategic biodiversity value
Species habitat units	12.114 species habitat units for Bacchus Marsh Wattle, *Acacia rostriformis* 5.558 species habitat units for Werribee Blue-box, *Eucalyptus baueriana subsp. thalassina* 6.309 species habitat units for Swift Parrot, *Lathamus discolor* 9.867 species habitat units for Speckled Warbler, *Chthonicola sagittatus* 12.213 species habitat units for Grassland Earless Dragon, *Tympanocryptis pinguicolla* 7.627 species habitat units for Brown Toadlet, *Pseudophryne bibronii* 12.956 species habitat units for Golden Sun Moth, *Synemon plana*

	12.118 species habitat units for Yellow Burr-daisy, *Calotis lappulacea*
	11.970 species habitat units for Trailing Hop-bush, *Dodonaea procumbens*
	4.757 species habitat units for Small Golden Moths, *Diuris basaltica*
	11.939 species habitat units for Western Golden-tip, *Goodia medicaginea*
	11.944 species habitat units for Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	12.109 species habitat units for Austral Tobacco, *Nicotiana suaveolens*
	5.109 species habitat units for Velvet Daisy-bush, *Olearia pannosa subsp. cardiophylla*
	11.944 species habitat units for Forked Rice-flower, *Pimelea hewardiana*
	12.109 species habitat units for Snowy Mint-bush, *Prostanthera nivea var. nivea*
	11.797 species habitat units for Brittle Greenhood, *Pterostylis truncata*
	12.109 species habitat units for Fragrant Saltbush, *Rhagodia parabolica*
	4.444 species habitat units for Button Wrinklewort, *Rutidosis leptorhynchoides*
	5.109 species habitat units for Large-headed Fireweed, *Senecio macrocarpus*
	12.109 species habitat units for Cane Spear-grass, *Austrostipa breviglumis*
	12.109 species habitat units for Rye Beetle-grass, *Tripogon loliiformis*
	5.109 species habitat units for Plump Swamp Wallaby-grass, *Amphibromus pithogastrus*
	12.109 species habitat units for Heath Spear-grass, *Austrostipa exilis*
	5.109 species habitat units for Brackish Plains Buttercup, *Ranunculus diminutus*
	12.109 species habitat units for Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
	12.109 species habitat units for Matted Flax-lily, *Dianella amoena*
	5.109 species habitat units for Large-flower Crane's-bill, *Geranium sp. 1*
	12.049 species habitat units for Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
	12.109 species habitat units for Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*

Habitat units of gain per zone of the proposed offset site

This table provides the habitat units of gain per zone of the offset site. Trading and allocation of units within the **Native Vegetation Credit Register** takes place at the zone.

The species-general offset test is done to determine which species the proposed offset site provides habitat for. The threshold is set at 0.0025 per cent of the mapped habitat value for a species. When the threshold is met or exceeded, species habitat units are generated. If required species habitat units can be generated for all other species mapped at the site. Multiple species units will be generated if the threshold is exceeded for multiple species.

The species habitat units for each species in a zone is calculated by the following equation in accordance with the Guidelines:

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

The general habitat units in a zone is calculated by the following equation in accordance with the Guidelines:

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

Species and general habitat units are alternates and the use or sale of one type of unit will affect the number of other types of units remaining.

Information provided by or on behalf of the applicant				**Information calculated by EnSym**					
Zone	Type	Gain score	Large tree	Polygon extent	Extent without overlap	SBV	HIS	Habitat units	Attributes
1-S	Patch	0.295	3	2.733	2.733	0.916		0.771 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.800	0.724 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.480	0.596 species habitat units	10309 Swift Parrot, *Lathamus discolor*
							0.532	0.617 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.899	0.764 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.736	0.699 species habitat units	13117 Brown Toadlet, *Pseudophryne bibronii*

	0.908	0.768 species habitat units	15021 Golden Sun Moth, *Synemon plana*
	0.800	0.724 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
	0.800	0.724 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
	0.736	0.699 species habitat units	501473 Small Golden Moths, *Diuris basaltica*
	0.800	0.724 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
	0.800	0.724 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	0.800	0.724 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
	0.799	0.724 species habitat units	502317 Velvet Daisy-bush, *Olearia pannosa subsp. cardiophylla*
	0.800	0.724 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
	0.800	0.724 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
	0.796	0.723 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
	0.800	0.724 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
	0.736	0.699 species habitat units	502982 Button Wrinklewort, *Rutidosis leptorhynchoides*
	0.799	0.724 species habitat units	503116 Large-headed Fireweed, *Senecio macrocarpus*
	0.800	0.724 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
	0.800	0.724 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*

							0.799	0.724 species habitat units	503624 Plump Swamp Wallaby-grass, *Amphibromus pithogastrus*
							0.800	0.724 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.799	0.724 species habitat units	504314 Brackish Plains Buttercup, *Ranunculus diminutus*
							0.800	0.724 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.800	0.724 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.799	0.724 species habitat units	505342 Large-flower Crane's-bill, *Geranium sp. 1*
							0.796	0.723 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.800	0.724 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
2-F	Patch	0.367	0	0.639	0.639	0.796		0.211 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.815	0.213 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.897	0.223 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.915	0.225 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.815	0.213 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.815	0.213 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
							0.815	0.213 species habitat units	502317 Velvet Daisy-bush, *Olearia pannosa subsp. cardiophylla*
							0.815	0.213 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*

							0.815	0.213 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.815	0.213 species habitat units	503116 Large-headed Fireweed, *Senecio macrocarpus*
							0.815	0.213 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.815	0.213 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
							0.815	0.213 species habitat units	503624 Plump Swamp Wallaby-grass, *Amphibromus pithogastrus*
							0.815	0.213 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.815	0.213 species habitat units	504314 Brackish Plains Buttercup, *Ranunculus diminutus*
							0.815	0.213 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.815	0.213 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.815	0.213 species habitat units	505342 Large-flower Crane's-bill, *Geranium sp. 1*
							0.810	0.212 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.815	0.213 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
3-N	Patch	0.367	0	0.262	0.262	0.730		0.083 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.808	0.087 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.891	0.091 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.911	0.092 species habitat units	15021 Golden Sun Moth, *Synemon plana*

	0.808	0.087 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
	0.790	0.086 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
	0.790	0.086 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
	0.790	0.086 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	0.808	0.087 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
	0.811	0.087 species habitat units	502317 Velvet Daisy-bush, *Olearia pannosa subsp. cardiophylla*
	0.790	0.086 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
	0.808	0.087 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
	0.808	0.087 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
	0.811	0.087 species habitat units	503116 Large-headed Fireweed, *Senecio macrocarpus*
	0.808	0.087 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
	0.808	0.087 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
	0.811	0.087 species habitat units	503624 Plump Swamp Wallaby-grass, *Amphibromus pithogastrus*
	0.808	0.087 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
	0.811	0.087 species habitat units	504314 Brackish Plains Buttercup, *Ranunculus diminutus*
	0.808	0.087 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*

							0.808	0.087 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.811	0.087 species habitat units	505342 Large-flower Crane's-bill, *Geranium sp. 1*
							0.807	0.087 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.808	0.087 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
4-T	Patch	0.295	5	1.147	1.147	0.837		0.310 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.784	0.301 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.480	0.250 species habitat units	10309 Swift Parrot, *Lathamus discolor*
							0.532	0.259 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.888	0.319 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.745	0.295 species habitat units	13117 Brown Toadlet, *Pseudophryne bibronii*
							0.901	0.321 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.784	0.301 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.784	0.301 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
							0.784	0.301 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
							0.784	0.301 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
							0.784	0.301 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*

							0.784	0.301 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
							0.784	0.301 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
							0.784	0.301 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
							0.784	0.301 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.784	0.301 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.784	0.301 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
							0.784	0.301 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.784	0.301 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.784	0.301 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.776	0.300 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.784	0.301 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
5-N	Patch	0.367	0	0.960	0.960	0.730		0.305 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.798	0.317 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.890	0.333 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.910	0.337 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.798	0.317 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*

	0.793	0.316 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
	0.810	0.319 species habitat units	501473 Small Golden Moths, *Diuris basaltica*
	0.793	0.316 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
	0.810	0.319 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	0.798	0.317 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
	0.803	0.318 species habitat units	502317 Velvet Daisy-bush, *Olearia pannosa subsp. cardiophylla*
	0.793	0.316 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
	0.798	0.317 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
	0.810	0.319 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
	0.798	0.317 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
	0.803	0.318 species habitat units	503116 Large-headed Fireweed, *Senecio macrocarpus*
	0.798	0.317 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
	0.798	0.317 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
	0.803	0.318 species habitat units	503624 Plump Swamp Wallaby-grass, *Amphibromus pithogastrus*
	0.798	0.317 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
	0.803	0.318 species habitat units	504314 Brackish Plains Buttercup, *Ranunculus diminutus*

							0.798	0.317 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.798	0.317 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.803	0.318 species habitat units	505342 Large-flower Crane's-bill, *Geranium sp. 1*
							0.793	0.316 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.798	0.317 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
6-S	Patch	0.295	1	0.337	0.337	0.856		0.092 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.787	0.089 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.480	0.073 species habitat units	10309 Swift Parrot, *Lathamus discolor*
							0.535	0.076 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.745	0.086 species habitat units	13117 Brown Toadlet, *Pseudophryne bibronii*
							0.906	0.094 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.787	0.089 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.787	0.089 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
							0.787	0.089 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
							0.787	0.089 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
							0.787	0.089 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*

							0.787	0.089 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
							0.787	0.089 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
							0.787	0.089 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
							0.787	0.089 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.787	0.089 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.787	0.089 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
							0.787	0.089 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.787	0.089 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.787	0.089 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.791	0.089 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.787	0.089 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
7-S	Patch	0.295	1	1.628	1.628	0.830		0.439 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.779	0.426 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.480	0.355 species habitat units	10309 Swift Parrot, *Lathamus discolor*
							0.534	0.368 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.884	0.452 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.777	0.426 species habitat units	13117 Brown Toadlet, *Pseudophryne bibronii*

	0.901	0.456 species habitat units	15021 Golden Sun Moth, *Synemon plana*
	0.779	0.426 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
	0.779	0.426 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
	0.779	0.426 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
	0.779	0.426 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	0.779	0.426 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
	0.779	0.426 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
	0.779	0.426 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
	0.778	0.426 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
	0.779	0.426 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
	0.779	0.426 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
	0.779	0.426 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
	0.779	0.426 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
	0.779	0.426 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
	0.779	0.426 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
	0.780	0.427 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*

							0.779	0.426 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
8-M	Patch	0.367	0	0.482	0.482	0.866		0.165 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.778	0.157 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.510	0.134 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.906	0.169 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.778	0.157 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.778	0.157 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
							0.778	0.157 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
							0.777	0.157 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
							0.778	0.157 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
							0.778	0.157 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
							0.778	0.157 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
							0.777	0.157 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
							0.778	0.157 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.778	0.157 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.778	0.157 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*

							0.778	0.157 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.778	0.157 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.778	0.157 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.804	0.160 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.778	0.157 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
9-M	Patch	0.367	0	0.964	0.964	0.959		0.347 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.773	0.314 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.480	0.262 species habitat units	10309 Swift Parrot, *Lathamus discolor*
							0.506	0.267 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.750	0.310 species habitat units	13117 Brown Toadlet, *Pseudophryne bibronii*
							0.902	0.337 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.773	0.314 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.773	0.314 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
							0.773	0.314 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
							0.773	0.314 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
							0.773	0.314 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*

							0.773	0.314 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
							0.773	0.314 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
							0.772	0.314 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
							0.773	0.314 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.773	0.314 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.773	0.314 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
							0.773	0.314 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.773	0.314 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.773	0.314 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.778	0.315 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.773	0.314 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
10-N	Patch	0.367	0	0.182	0.182	0.771		0.059 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.788	0.060 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.788	0.060 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.788	0.060 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
							0.788	0.060 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*

							0.788	0.060 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
							0.788	0.060 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
							0.788	0.060 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
							0.788	0.060 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
							0.780	0.059 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
							0.788	0.060 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.788	0.060 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.788	0.060 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
							0.788	0.060 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.788	0.060 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.788	0.060 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.788	0.060 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.788	0.060 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
12-N	Patch	0.367	0	0.041	0.041	0.828		0.014 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.794	0.014 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.510	0.011 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*

	0.910	0.015 species habitat units	15021 Golden Sun Moth, *Synemon plana*
	0.794	0.014 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
	0.794	0.014 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
	0.794	0.014 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
	0.800	0.014 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	0.794	0.014 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
	0.794	0.014 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
	0.794	0.014 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
	0.800	0.014 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
	0.794	0.014 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
	0.794	0.014 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
	0.794	0.014 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
	0.794	0.014 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
	0.794	0.014 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
	0.794	0.014 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
	0.794	0.014 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*

							0.794	0.014 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
13-R	Patch	0.295	1	21.938	21.938	0.936		6.254 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.745	5.638 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.721	5.558 species habitat units	507580 Werribee Blue-box, *Eucalyptus baueriana subsp. thalassina*
							0.477	4.773 species habitat units	10309 Swift Parrot, *Lathamus discolor*
							0.519	4.908 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.873	6.050 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.799	5.811 species habitat units	13117 Brown Toadlet, *Pseudophryne bibronii*
							0.893	6.116 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.746	5.641 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.755	5.669 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*
							0.745	5.638 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
							0.745	5.638 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
							0.745	5.638 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
							0.747	5.643 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
							0.745	5.638 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*

							0.745	5.638 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
							0.745	5.638 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
							0.745	5.638 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
							0.745	5.638 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
							0.745	5.638 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
							0.745	5.638 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
							0.745	5.638 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
							0.730	5.590 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
							0.745	5.638 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*
14-M	Patch	0.367	0	11.555	11.555	0.849		3.923 general habitat units	Port Phillip And Westernport ; Moorabool Shire
							0.779	3.774 species habitat units	505136 Bacchus Marsh Wattle, *Acacia rostriformis*
							0.522	3.228 species habitat units	10504 Speckled Warbler, *Chthonicola sagittatus*
							0.877	3.981 species habitat units	12922 Grassland Earless Dragon, *Tympanocryptis pinguicolla*
							0.899	4.028 species habitat units	15021 Golden Sun Moth, *Synemon plana*
							0.780	3.776 species habitat units	500598 Yellow Burr-daisy, *Calotis lappulacea*
							0.797	3.813 species habitat units	501090 Trailing Hop-bush, *Dodonaea procumbens*

	0.763	3.740 species habitat units	501473 Small Golden Moths, *Diuris basaltica*
	0.797	3.813 species habitat units	501518 Western Golden-tip, *Goodia medicaginea*
	0.798	3.815 species habitat units	501988 Hairy Beard-heath, *Leucopogon microphyllus var. pilibundus*
	0.776	3.768 species habitat units	502275 Austral Tobacco, *Nicotiana suaveolens*
	0.775	3.767 species habitat units	502317 Velvet Daisy-bush, *Olearia pannosa subsp. cardiophylla*
	0.797	3.813 species habitat units	502522 Forked Rice-flower, *Pimelea hewardiana*
	0.776	3.768 species habitat units	502746 Snowy Mint-bush, *Prostanthera nivea var. nivea*
	0.771	3.757 species habitat units	502821 Brittle Greenhood, *Pterostylis truncata*
	0.776	3.768 species habitat units	502929 Fragrant Saltbush, *Rhagodia parabolica*
	0.765	3.745 species habitat units	502982 Button Wrinklewort, *Rutidosis leptorhynchoides*
	0.775	3.767 species habitat units	503116 Large-headed Fireweed, *Senecio macrocarpus*
	0.776	3.768 species habitat units	503268 Cane Spear-grass, *Austrostipa breviglumis*
	0.776	3.768 species habitat units	503455 Rye Beetle-grass, *Tripogon loliiformis*
	0.775	3.767 species habitat units	503624 Plump Swamp Wallaby-grass, *Amphibromus pithogastrus*
	0.776	3.768 species habitat units	503984 Heath Spear-grass, *Austrostipa exilis*
	0.775	3.767 species habitat units	504314 Brackish Plains Buttercup, *Ranunculus diminutus*

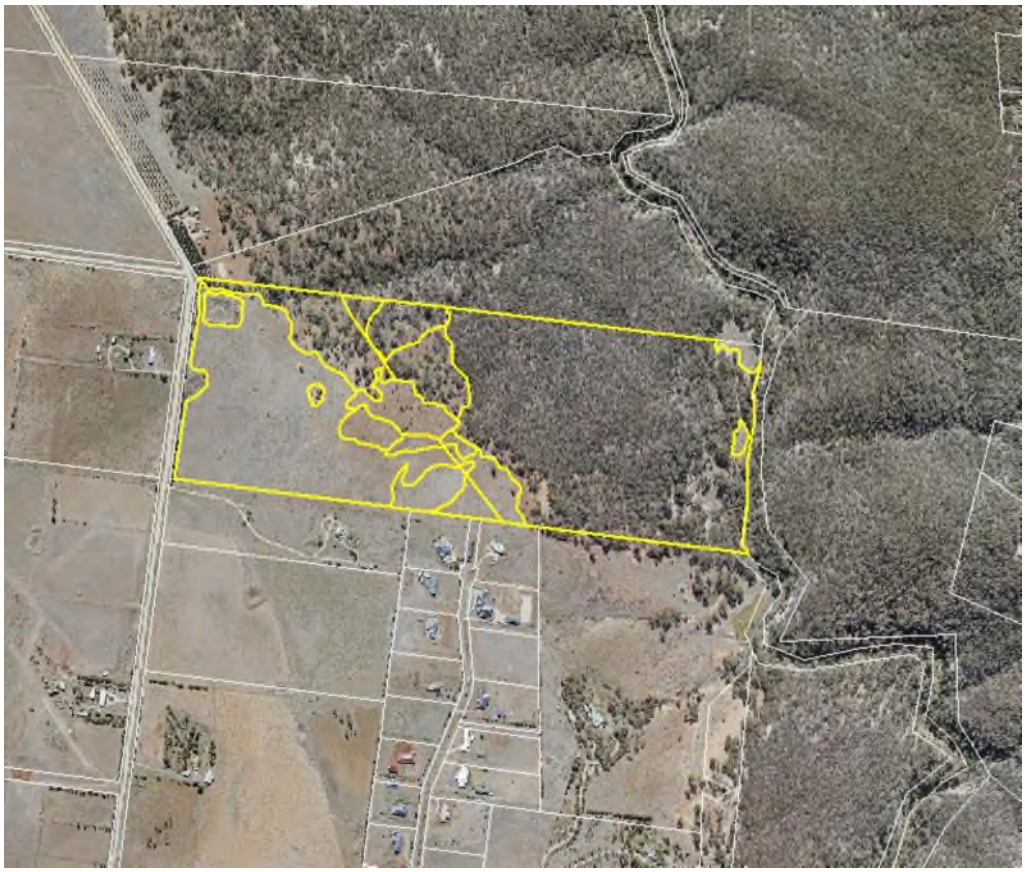
	0.776	3.768 species habitat units	504484 Melbourne Yellow-gum, *Eucalyptus leucoxylon subsp. connata*
	0.776	3.768 species habitat units	505084 Matted Flax-lily, *Dianella amoena*
	0.775	3.767 species habitat units	505342 Large-flower Crane's-bill, *Geranium sp. 1*
	0.771	3.758 species habitat units	505478 Shiny Leionema, *Leionema lamprophyllum subsp. obovatum*
	0.776	3.768 species habitat units	505560 Arching Flax-lily, *Dianella sp. aff. longifolia (Benambra)*

Next steps

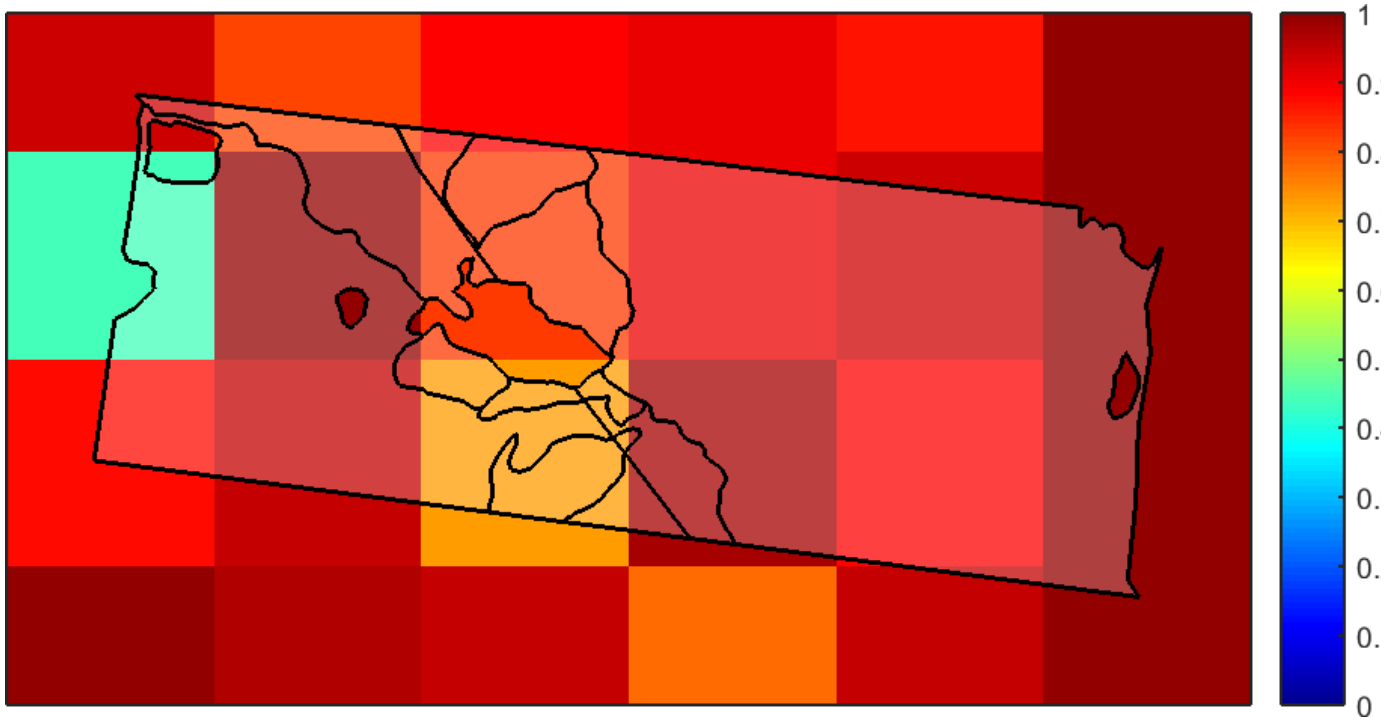
Offset sites must meet eligibility criteria as outlined in the *Guidelines for the removal, destruction or lopping of native vegetation* and the *Native vegetation gain scoring manual, version 2* available on the DELWP website, and any other relevant requirements. Eligible offset sites that are intended to be banked or sold as credits must be registered on the Native Vegetation Credit Register (NVCR). A gain scoring assessment must be done before any offset can be registered on the NVCR. All proposed offset sites must be secured by a relevant security agreement that includes an offset management plan.

Appendix 1 – Images of marked native vegetation

1. Aerial photograph showing marked native vegetation

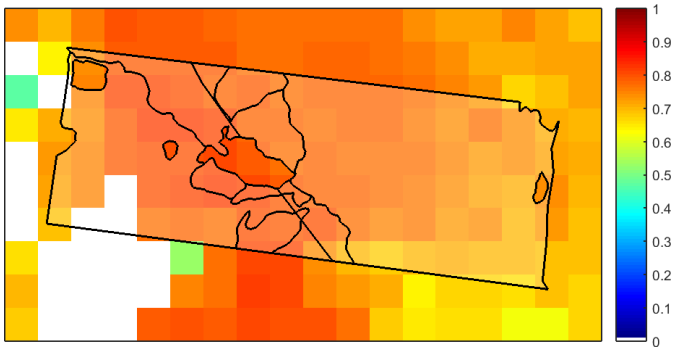


2. Strategic biodiversity value map

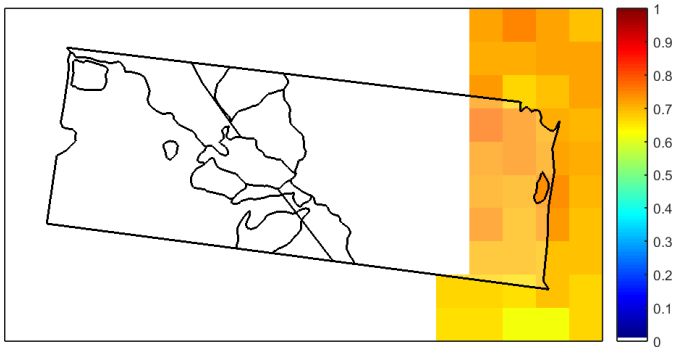


3. Habitat importance maps

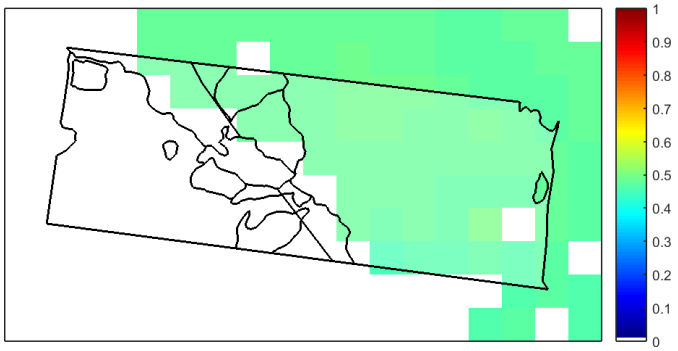
Bacchus Marsh Wattle
Acacia rostriformis
505136



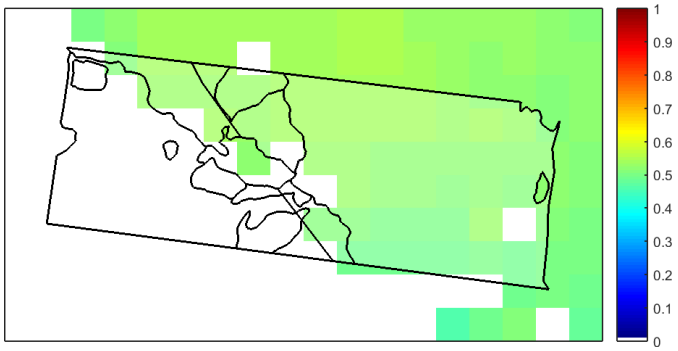
Werribee Blue-box
Eucalyptus baueriana subsp. thalassina
507580



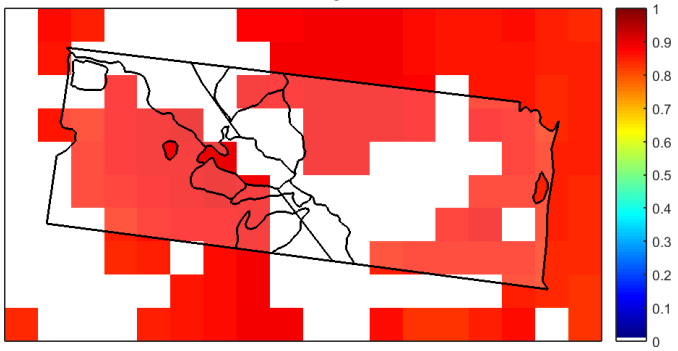
Swift Parrot
Lathamus discolor
10309



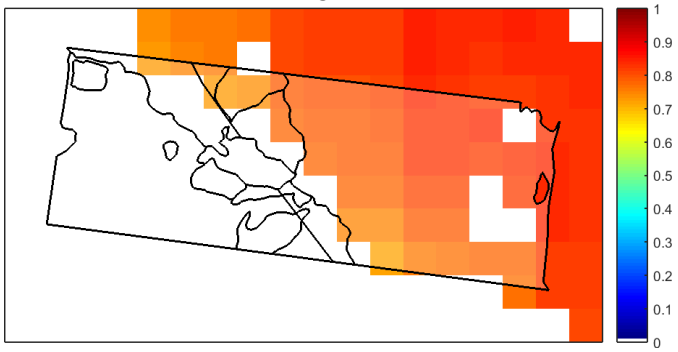
Speckled Warbler
Chthonicola sagittatus
10504



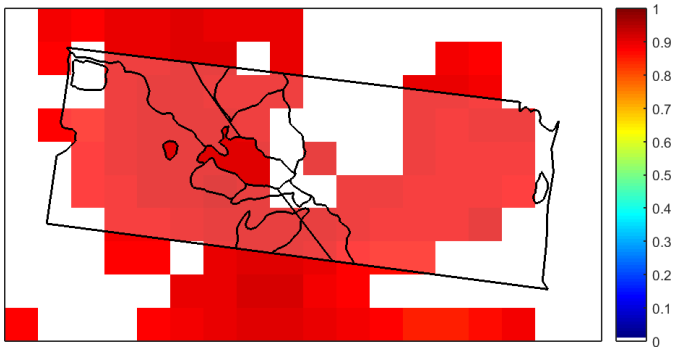
Grassland Earless Dragon
Tympanocryptis pinguicolla
12922



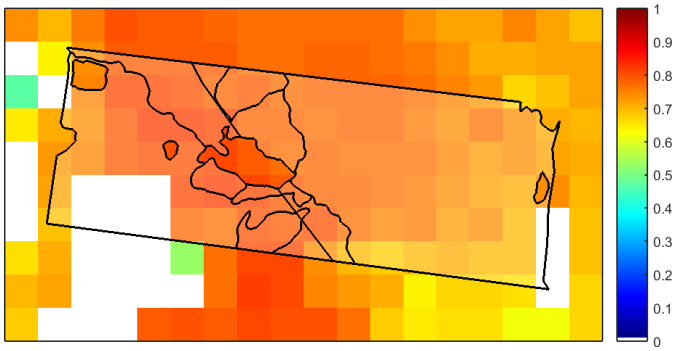
Brown Toadlet
Pseudophryne bibronii
13117



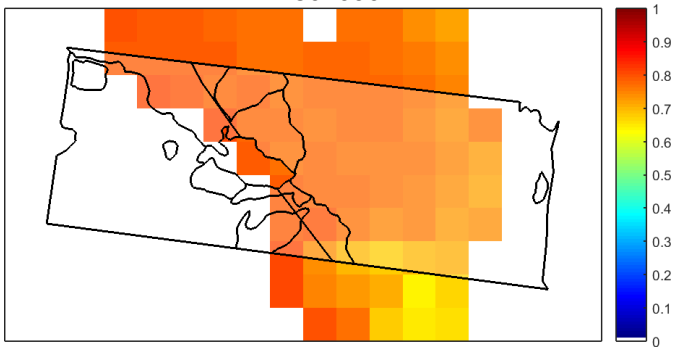
Golden Sun Moth
Synemon plana
15021



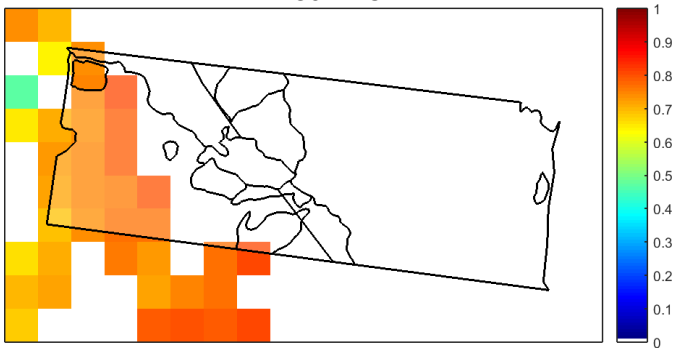
Yellow Burr-daisy
Calotis lappulacea
500598



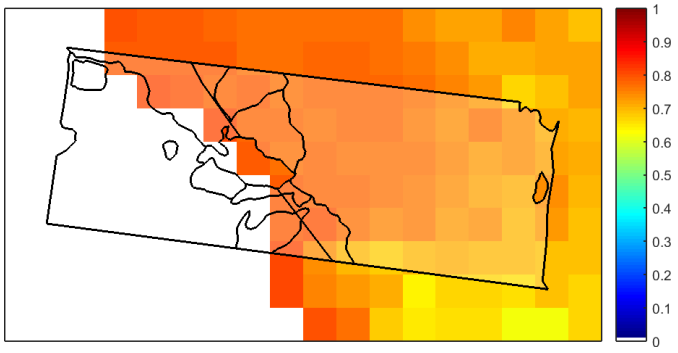
Trailing Hop-bush
Dodonaea procumbens
501090



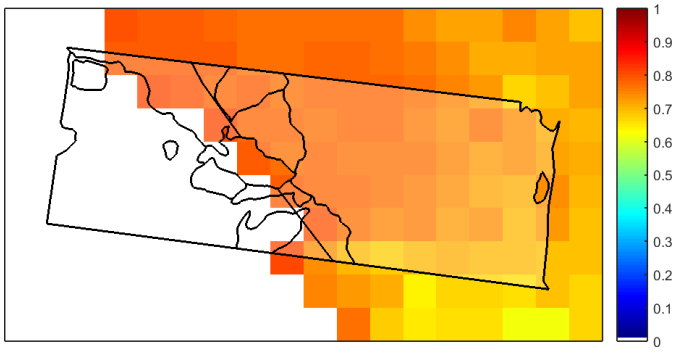
Small Golden Moths
Diuris basaltica
501473



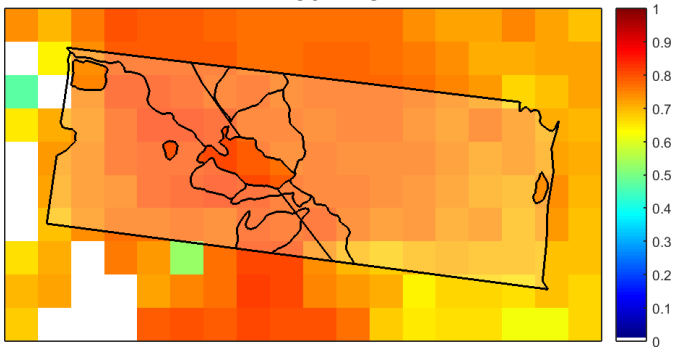
Western Golden-tip
Goodia medicaginea
501518



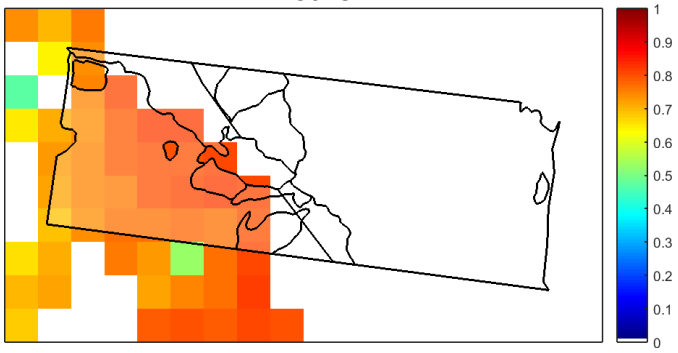
Hairy Beard-heath
Leucopogon microphyllus var. pilibundus
501988



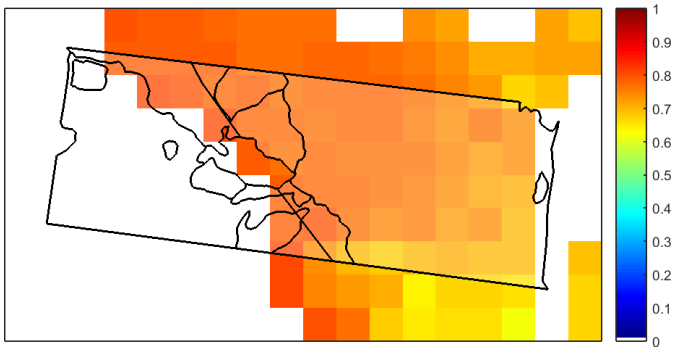
Austral Tobacco
Nicotiana suaveolens
502275



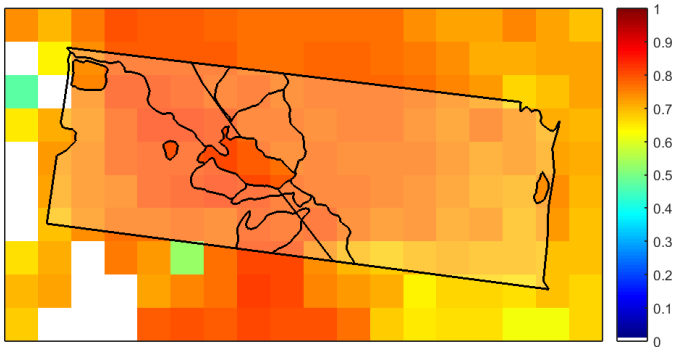
Velvet Daisy-bush
Olearia pannosa subsp. cardiophylla
502317



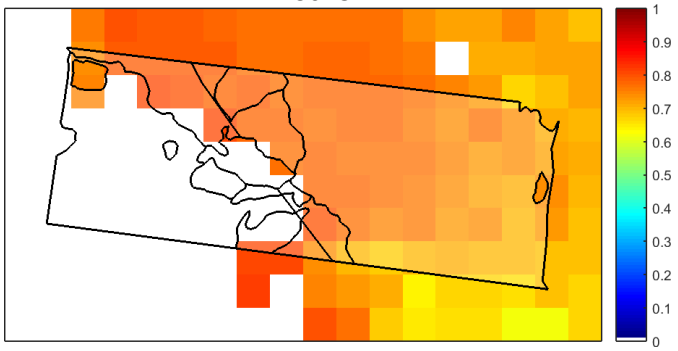
Forked Rice-flower
Pimelea hewardiana
502522



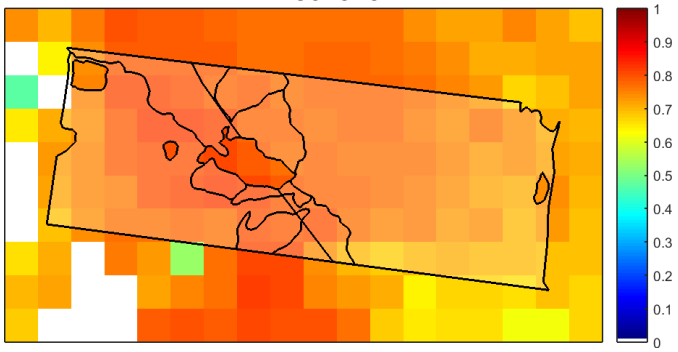
Snowy Mint-bush
Prostanthera nivea var. nivea
502746



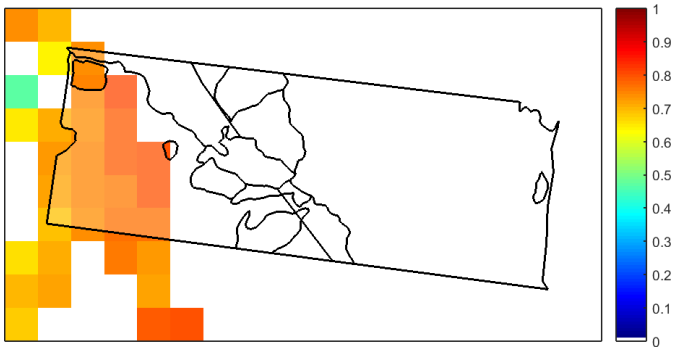
Brittle Greenhood
Pterostylis truncata
502821



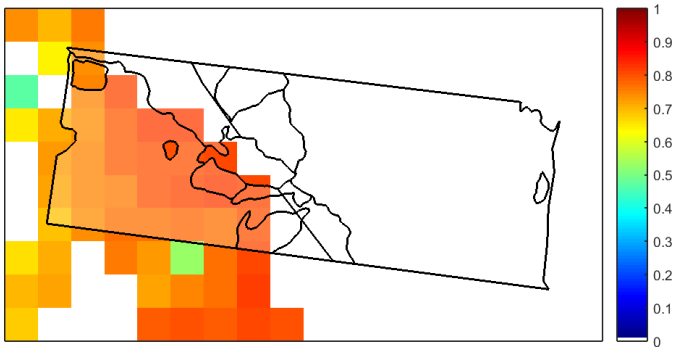
Fragrant Saltbush
Rhagodia parabolica
502929



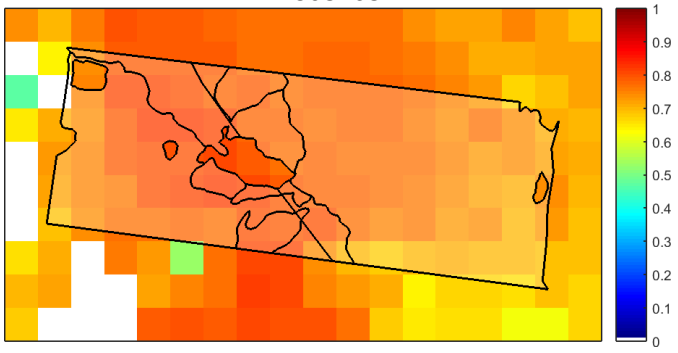
Button Wrinklewort
Rutidosis leptorhynchoides
502982



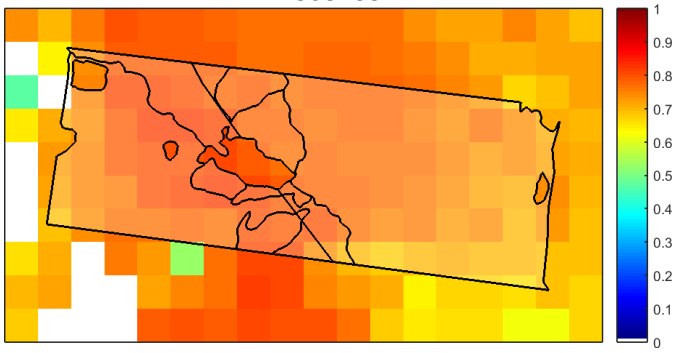
Large-headed Fireweed
Senecio macrocarpus
503116



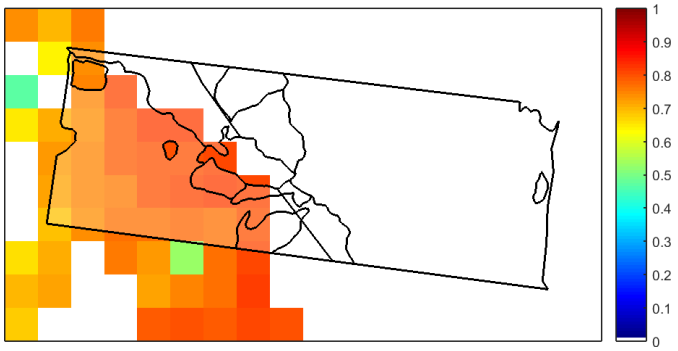
Cane Spear-grass
Austrostipa breviglumis
503268



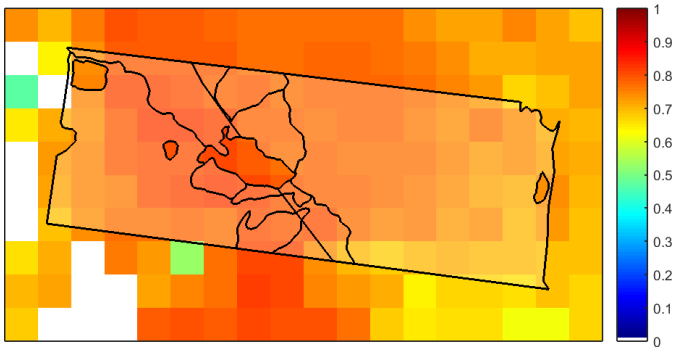
Rye Beetle-grass
Tripogon loliiformis
503455



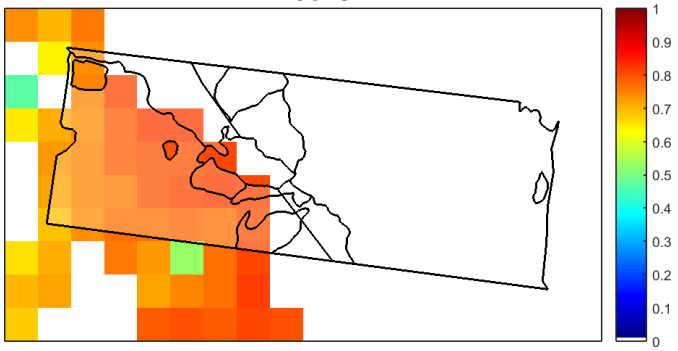
Plump Swamp Wallaby-grass
Amphibromus pithogastrus
503624



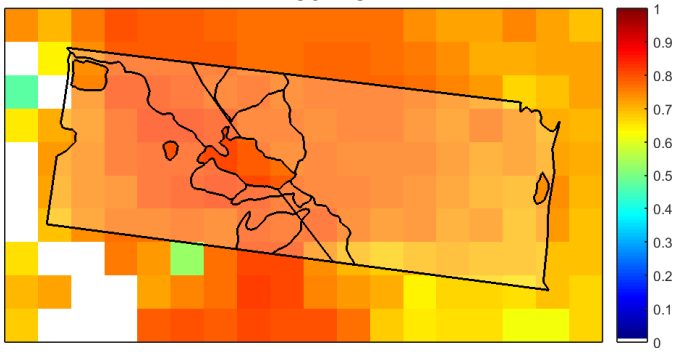
Heath Spear-grass
Austrostipa exilis
503984



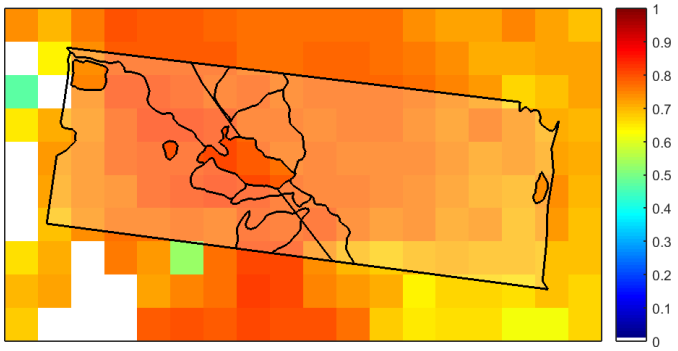
Brackish Plains Buttercup
Ranunculus diminutus
504314



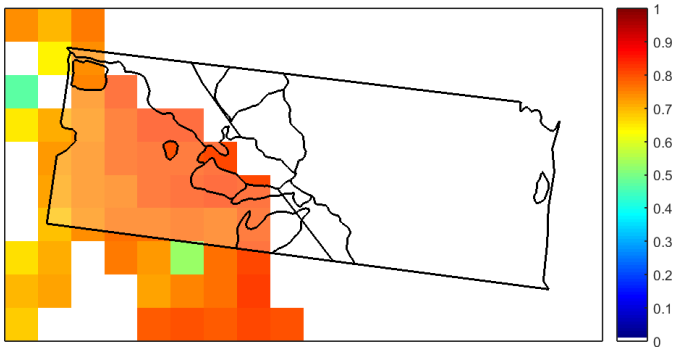
Melbourne Yellow-gum
Eucalyptus leucoxylon subsp. connata
504484



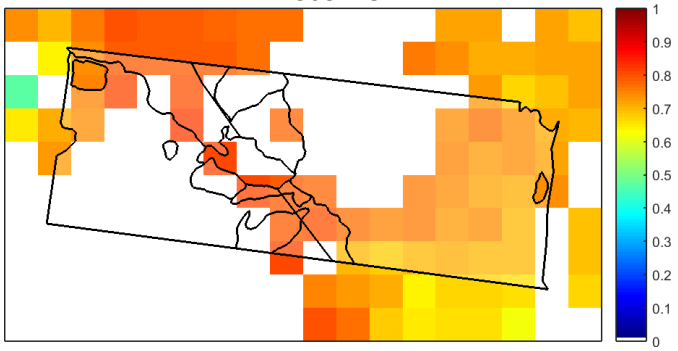
Matted Flax-lily
Dianella amoena
505084



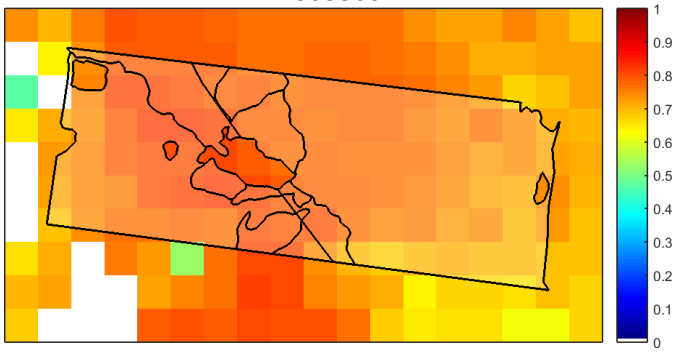
Large-flower Crane's-bill
Geranium sp. 1
505342



Shiny Leionema
Leionema lamprophyllum subsp. obovatum
505478



Arching Flax-lily
Dianella sp. aff. longifolia (Benambra)
505560



GLOSSARY

Alternate offset types

Offset types within a zone are alternates. The use of one offset type will result in the proportional reduction of all other offset types within the zone. Refer to *Native vegetation offset sites* fact sheet available on the DELWP website for more information.

Gain score

This is the site-assessed gain score for the native vegetation based on the agreed management and security commitments. Each zone in the proposed offset site is assigned a gain score according to the gain scoring assessment. The score is divided by 100 to give a number between 0 and 1.

General habitat units of gain

The general habitat units quantify the overall contribution that the protection and management of native vegetation at the offset site makes to Victoria's biodiversity. The general habitat units are calculated as follows:

$$\textbf{General habitat units} = \textbf{extent} \times \textbf{gain score} \times \textbf{general landscape factor}$$

General landscape factor

The general landscape factor is the adjusted strategic biodiversity value (SBV) score. The SBV score is adjusted so that site-based biodiversity information has more influence on the number of units.

General offset attributes

The attributes of a general offset includes the location (Catchment Management Authority and Municipal District), strategic biodiversity value score and the number of large trees protected.

Offset type

There are two types of offsets, general offsets and species offsets. All offset sites include general offsets. Sites that are mapped as habitat for rare or threatened species can also include species offsets for the mapped species.

Species offset attributes

The attributes of a species offset is the mapped habitat for the species and the number of large trees protected.

Species habitat units of gain

The species habitat units quantify the overall contribution that the protection and management of native vegetation at an offset site makes to the habitat of the relevant rare or threatened species. Species habitat units are calculated for each species in the zone where the result of the threshold test is greater than 0.0025 per cent. Species units are calcualted as follows:

$$\textbf{Species habitat units}_{\textbf{species x}} = \textbf{extent} \times \textbf{gain score} \times \textbf{species landscape factor}_{\textbf{species x}}$$