VICTORIAN PLANNING AUTHORITY

AUGUST 2024

PUBLIC

# BALLARAT NORTH PRECINCT STRUCTURE PLAN

## BIODIVERSITY ASSESSMENT REPORT

Question today
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# Ballarat North Precinct Structure Plan
# Biodiversity Assessment Report

Victorian Planning Authority

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| | NAME | DATE | SIGNATURE |
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# EXECUTIVE SUMMARY

## INTRODUCTION

WSP Australia Pty Ltd (WSP) was commissioned by the Victorian Planning Authority (VPA) to prepare a Biodiversity Assessment Report. The Ballarat North Precinct Structure Plan (PSP) will primarily allow for residential development, supplemented by non-residential components to support a new community.

This Biodiversity Assessment Report identifies the biodiversity values of the precinct, determine areas suitable for retention or restoration and assesses relevant legislative requirements which apply to the precinct. Results of this Biodiversity Assessment report will be used to inform decisions about the future development of the Ballarat North PSP.

This Biodiversity Assessment is the first stage of the assessment, with stage two being the development of the Native Vegetation Precinct Plan (NVPP) following further discussions with VPA.

Due to a lack of land access granted, this assessment covers approximately 643 hectares (ha) of land out of the total 832 ha of the precinct. While non-accessible properties were not traversed, aerial photography and observations from adjoining lands informed recommendations on areas identified for further assessment, and conversely, areas of low ecological value identified as not requiring further assessment.

## METHODS

A database search and literature review were undertaken for an indication of the ecological values of the study area, and potential ecological constraints to the project. This review was used to prepare a list of threatened flora and fauna species, ecological communities, listed migratory species and any significant habitat previously recorded or predicted to occur in the study area and the broader locality (listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Flora and Fauna Guarantee Act 1988* (FFG Act).

An initial site reconnaissance survey was undertaken in June 2023 to verify the targeted survey effort required for the project. Site assessments, including vegetation mapping and targeted surveys, were undertaken by WSP ecologists from August 2023 through to January 2024. Vegetation mapping involved mapping native vegetation patches and scattered trees as per the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017d) (the Guidelines). Habitat Hectare assessments were undertaken as per the *Vegetation Quality Assessment Manual* (DSE, 2004), and incidental flora and fauna observations were recorded and potential fauna habitat assessed. The following sections detail the methodology of the targeted flora and fauna surveys.

### *GOLDEN SUN MOTH*

Four repeat site visits, each a minimum of a week apart, were undertaken between December 2023 – January 2024 for Golden Sun Moth *Synemon plana*. Where possible, surveys for Golden Sun Moth were conducted under the correct environmental conditions, in accordance with the guidelines stipulated in the *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (Synemon plana)* (DEWHA, 2009c), on days when moths were known to be flying nearby.

### *GROWLING GRASS FROG*

Growling Grass Frogs *Litoria raniformis* are known to occur in creeks and dams south of Ballarat. During the initial site assessment, seven wetlands (both permanent and periodically inundated wetlands) were identified to be potential habitat for the species and suitable for undertaking surveys. Targeted surveys for the Growling Grass Frog in these sites were conducted over two nights, 5 and 12 December 2023, in the peak activity period. Surveys were conducted in accordance

with the *Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the EPBC Act* (DEWHA, 2010) and the significant impact guidelines for the species (DEWHA, 2009d).

### STRIPED LEGLESS LIZARD

Following the initial site reconnaissance survey, 10 locations across the study area were proposed as survey sites. Each survey site was set-up with grids of artificial shelters (terracotta roof tiles) for Striped Legless Lizard *Delma impar*. Grids were checked 10 times over 10 weeks between 6 September 2023 and 13 November 2023 in accordance with the *Referral guidelines for the Striped Legless Lizard* (DSEWPaC, 2011a) and the *Survey guidelines for Australia's threatened reptiles* (DSEWPC, 2011).

### THREATENED FLORA SURVEYS

Targeted flora surveys were undertaken concurrently with Vegetation Quality Assessments for species considered possible or likely to occur within the Study Area.

- Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* – EPBC Act Critically Endangered, FFG Act critically endangered. Survey guidelines are detailed is the significant impact guidelines for the species (DEWHA, 2009b).
- Matted Flax-lily *Dianella amoena* – EPBC Act Endangered, FFG Act critically endangered. Survey guidelines are outlined on the Species Profile and Threats Database page (DAWE, 2020).
- Large-headed Fireweed *Senecio macrocarpus* – EPBC Act Vulnerable, FFG Act critically endangered.
- Button Wrinklewort *Rutidosis leptorhynchoides* – EPBC Act Endangered, FFG Act critically endangered.
- Stiff Groundsel *Senecio behrianus* – EPBC Act Endangered, FFG Act critically endangered.

Surveys for spring flowering flora were undertaken at the same time as Vegetation Quality Assessments being 19 – 21 September, 2 – 3 November, 14 – 15 November, 22 November and 21 December 2023. Surveys for winter flowering flora – being Spiny Rice-flower, were undertaken on 16 & 24 August 2023.

### THREATENED COMMUNITY ASSESSMENTS

Surveys were also undertaken to qualify possible EPBC Act listed Threatened Ecological Communities (TEC), '*Natural Temperate Grassland & Grassy Eucalypt Woodland of the Victorian Volcanic Plain'* (NTGVVP & GEW*), Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains* (SHW). When assessing for TECs, determination of qualification with regards to vegetative cover was done by percentage cover estimates. Qualification of these communities was assessed against the most appropriate guidelines or listing advise for these communities (DSEWPaC, 2011b) (TSSC, 2009, TSSC, 2012). Surveys and assessments of TECs are considered adequate to assess the presence or absence of TECs across the study area.

# RESULTS

The study area is, in general, predominantly modified from its likely condition pre-European settlement. Prior to colonial settlement the study area would have been a diverse mosaic of grassland and grassy woodland. The study area now is predominantly agricultural land, small patches of native vegetation along watercourses and roadsides, and the occasional scattered tree along property boundaries.

There are approximately 26.6 ha of patches of remnant native vegetation identified across the study area. In addition to this, there are 25.72 hectares of Current Wetland (DELWP, 2013) modelled across the study area. This native vegetation is most attributable to six EVCs. Overall, 90 canopy trees occur within the study area, other than small trees in patches. Of these, 84 are Scattered trees, including 53 qualifying as large as per the most appropriate EVC benchmark. The remaining 6 Large canopy trees occurred within patches.

### *FLORA*

### *THREATENED FLORA SPECIES*

Target species, being Spiny Rice-flower *Pimelea* spinescens ssp. *spinescens,* Button Wrinklewort *Rutidosis leptorhynchoides,* Large-headed Fireweed *Senecio macrocephalus* or Matted Flax-lily *Dianella amoena* were not observed. VBA records (DEECA, 2023e) of Stiff Groundsel *Senecio behrianus* – EPBC Act Endangered, are considered present on property 2 but were not observed in this study. River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable was observed on property 43. No other EPBC Act listed flora species were observed. One FFG Act listed threatened flora species was observed being Floodplain Fireweed *Senecio campylocarpus* – FFG Act endangered, in addition to Stiff Groundsel *Senecio behrianus* – FFG Act critically endangered being considered present, and four Protected flora species were observed.

### *THREATENED ECOLOGICAL COMMUNITIES*

One EPBC Act listed TECs were confirmed as present during the assessment.

Overall, 15.889 ha of *'Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains'* – SHW, was identified across 7 seasonally wet depressions supporting native vegetation. Native vegetation qualifying as SHW are mapped in C2.

### *FAUNA*

No Golden Sun Moths, Growling Grass Frogs or Striped Legless Lizards were recorded during targeted survey.

Based on the results of targeted surveys, Growling Grass Frog is considered unlikely to currently occur within the study area. However, the creeks and associated wetlands are connected with known habitat ~8.6 km upstream via the Burrumbeet Creek and Slattery Creek in Creswick State Forest. It is reasonable to assume that under the right conditions (e.g. high rainfall/flooding) this species would be likely to utilise aquatic riparian habitat across the study area whilst dispersing throughout the landscape.

Two threatened species were recorded, including Hardhead *Aythya australis* (listed as vulnerable under the FFG Act) and Tussock Skink *Pseudemoia pagenstecheri* (listed as endangered under the FFG Act).

Platypus *Ornithorhynchus anatinus* – listed as vulnerable under the FFG Act, has been recorded ~ 11 km north-west of the study area from the 1970s - 1980s. This species has subsequently been assumed to have a moderate likelihood of occurrence in areas of suitable habitat. Suitable habitat comprises wooded vegetation along watercourses within the study area.

Targeted survey for Migratory, Marine and threatened wetland bird species were not undertaken, however, potential habitat for migratory, and marine birds returned in the desktop VBA & PMST queries, for which there is suitable habitat resources, such as larger wetlands and farm style dams with fringing aquatic shallow and deep marsh vegetation, including those on properties 2, 35, 40, 41 & 45.

# IMPLICATIONS

Implications of targeted surveys are discussed below, and species-specific recommendations provided. It should be noted that these implications and recommendations only pertain to the properties surveyed.

There is limited value in the retention of sporadic occurrences of low-quality remnant native vegetation where it occurs across the precinct.

Table ES.1 Summary of anticipated implications under ecologically relevant legislation and regulation.

| | |
|---|---|
| ***Environment Protection and Biodiversity Conservation (EPBC) Act 1999*** | Two types of Matters of National Environmental Significance – MNES, have the potential to be impacted by the proposed project. These are:<br>Listed threatened species and communities:<br>– Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains (SHW) – 15.89 ha over 7 patches. – EPBC Act Critically Endangered. See Table 3.5.<br>– Stiff Groundsel *Senecio behrianus* is considered present within a large patch of SHW – 12.901 ha, on property 2 is considered potential habitat for this species – EPBC Act Endangered<br>– Similarly all SHW totalling on properties 43 & 44 (2.143 ha) & 35 (0.845 ha), is considered habitat for River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable.<br>Migratory and Marine bird species, although not observed:<br>– White-bellied Sea-Eagle *Haliaeetus leucogaster* – Marine, is considered to have a moderate likelihood of occurrence around Property 45 – where it may hunt whilst dispersing throughout the landscape.<br>– Latham's Snipe, Japanese Snipe *Gallinago hardwickii* – Threatened, Migratory and Marine, is considered to have a moderate likelihood of occurrence around Properties 2, 35, 40, 41 & 45 – where it may forage whilst dispersing throughout the landscape.<br>If impacts to identified habitat for the above listed MNES are anticipated, significant impact assessments will be required. If a significant impact on any of these MNES is likely based on the precinct design, a referral to DCCEEW under the EPBC Act would be recommended to determine implications under the EPBC Act. If impacts are anticipated at the permit stage, assessment of likely implications under the EPBC Act and subsequent approvals would be the responsibility of proponents.<br>It is recommended that all patches of SHW inclusive of wetland habitat for all identified MNES is avoided as per 4.1.2, It is expected that significant impacts can be avoided through sensitive design, and maintenance of hydrological regimes. |
| ***Environment Effects Act 1978*** | Following precinct design, an assessment against both individual assessment individual and combined criteria (relating to ecological matters) set out in the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Ministerial Guidelines) (DTP, 2023) should be undertaken. EES Assessment criteria is provided for consideration in in Table 5.1 & Table 5.2.<br>If the recommendations outlined in Section 4 are adopted, it is unlikely the project will need to be referred as a result of proposed biodiversity-related impacts, as it is assumed that much of the mapped habitat will be retained. However, this assessment will need to be re-evaluated once there is a proposed design. |

| | |
|---|---|
| ***Flora and Fauna Guarantee Act 1988 (FFG Act)*** | The permit requirement under Section 47 of the FFG Act does not apply to the majority of the study area as it is private land, unless the landowner is managed or controlled by a public authority.<br><br>A permit will be required for impacts FFG Act listed species and communities across public land. Should impacts to native vegetation on public land in the western part of the study area be proposed, a permit is likely to be required for protected flora. Public land includes a number of parcels are owned by Ballarat City Council including parcels 1, 2, 23, 24, 62, 63, 64, 65,66, 67, 78, 79, 80, 81, 82, 83, 84, 85, 92, 93, 94, 95, 98, 99, 100, 101, 102, 103, 104. It is understood this land is considered public land, to which the FFG Act would apply. It is also understood the State department of Environment owns parcel 45 which would be public land to which the FFG Act would apply. Much of the study area is also Crown Land Many including many of the road reserves, and large parcels including properties 1, 2, & 45. Crown Land is shown on mapping at C1. Crown Land is effectively Public Land to which state law applies. A permit will be required for impacts FFG Act listed species across public land.<br><br>It is likely a 'Permit to Take' will be required by proponents of development. This should be done at the permit stage.<br><br>The VPA would consider the conservation of FFG Act listed spices and mitigation recommendations, aligning with the objectives of the FFG Act, as per their Public Authority Duty. |

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|---|---|
| ***Planning And Environment Act 1987 (P&E Act)*** | ***Guidelines for the removal, destruction or lopping of native vegetation***<br><br>EnSym testing has been undertaken to give an indication of maximum impacts and offset requirements. EnSym testing indicates that potential total impacts equate to a 56.429 ha extent, as per EnSym data standards (DELWP, 2017b). Associated offset requirements are detailed in Table 5.4, and at Appendix E. It is noted that these results are a scenario test only.<br><br>Following further efforts to avoid and minimise impacts to native vegetation, and finalisation of precinct design, an NVR report will need to be sourced from DEECA to officiate clearance and offset requirements.<br><br>The offset target for clearance of all native vegetation across the precinct would require a relatively small quantity (3.024) of General Habitat Units and 44 Large Trees, this is in addition to 2 large quantities of Species Units and 15 Large Trees in habitat units required to be protected. General habitat units are typically readily available, these general units may or may not be inclusive of a portion of the large trees required. Large tree offsets may need to be sourced separately to general units.<br><br>Species Units are not usually readily available, if at all. Species units may need to be created if required. It is recommended that effort be made to reduce impacts to native vegetation, in order to reduce the likelihood of species units being triggered.<br><br>***Zones and Overlays***<br><br>The study area is zoned Farming Zone – FZ in the northern section and as Urban Growth Zone – UGZ in the southern section. No zonation pertains to ecological matters.<br><br>There are numerous planning overlays across the study area, of particular ecological relevance are the Environmental Significance Overlay ESO2 – Streamside and Waterside Protection, ESO4 – Wastewater Treatment Plant Buffer Area.<br><br>There are no Vegetation Protection Overlays across the study area.<br><br>***Preparing an NVPP***<br><br>Sections 2.3 and 2.4 of *Preparing a Native Vegetation Precinct Plan* (DELWP, 2017f) detail the rational and reasoning for Native Vegetation Precinct Plans – NVPPs. According to guidance in section 2.3, a NVPP provides for up-front decision making, and the opportunity to inform key stakeholders regarding the retention and removal of native vegetation, avoidance and minimisation of higher value native vegetation, and offsetting clearance of native vegetation.<br><br>Section 2.4 details when a NVPP is appropriate. An assessment of the need for an NVPP against key guidance points in Section 2.4 has been provided in Table 5.5. Due to the possible clearance or retention of high value remnant vegetation, over numerous lots, an NVPP may be considered required for the Ballarat North PSP. |
| ***Water Act 1989*** | Under the *Water Act 1989* approval must be sort from the Glenelg Hopkins Catchment Management Authority and a "Works on Waterways Permit" is required to "construct, alter, operate, remove or decommission any works on a waterway, including works to deviate (temporarily or permanently) a waterway, or a bore. |

| | |
|---|---|
| ***Wildlife Act 1975*** | There are no implications of the *Wildlife Act 1975* relevant to precinct planning. During development, pre-clearing survey and clearance monitoring, including salvage and relocation, is recommended for any areas of key habitat which are proposed to be impacted. This should include all large trees, and shrubby vegetation, and wetland areas. The qualified and experienced ecologist undertaking this work much have a current management authorisation under this Act. |
| ***Catchment and Land Protection Act 1994 (CaLP ACt)*** | The field survey identified that study area supports four regionally controlled (C) and eight restricted weeds (R). Regionally Controlled weeds are usually widespread but it is important to prevent further spread. It is the responsibility of the landowner to control these weeds on their property and on adjacent roadside reserves. Restricted Weeds are considered to be a serious threat to primary production, Crown land, the environment and/or community health if they were traded in Victoria.<br><br>Measures to control both noxious weeds and pest animals during construction must be contained within the CEMP. |

# RECOMMENDATIONS

## *AVOID AND MINIMISE*

Based on the results of this assessment, the PSP should be developed to ensure that areas of ecological importance are retained and improved. Specifically, the following recommendations are made with regard to site-level planning:

- Avoid all direct and indirect impacts to the Burrumbeet Creek, and unnamed tributaries, including associated wetland habitat. This should include incorporation of a buffer of habitat to minimise disturbance impacts and water quality and flow impacts. It is understood that the buffer distance will be investigated via a geomorphology and vegetation assessment in consultation with the CMA, however recommendations are still provided herein. From an ecological perspective the buffer of watercourses should be in line with the sliding scale recommendations provided for calculating corridor widths in *Waterway Corridors; Guidelines for greenfield development areas within the Port Phillip and Westernport Region* (Melbourne Water, 2013), and retention should be combined with reinstatement/rehabilitation of these areas. Retention of the wetland habitat across the precinct should be retained, retention of all Seasonal Herbaceous Wetland (EPBC Act), and larger areas of Plains Grassy Wetland EVC 125, and Aquatic Herbland EVC 653 is recommended. Wetlands recommended for retention are shown in mapping at C2. Retention of wetlands to ensure maintenance of hydrology may be best guided by a water specialist, such advice may include:
  - Maintain a buffers around the wetlands as per the Waterway Corridors (Melbourne Water, 2013), such that proposed developments do not impact the integrity of the wetlands.
  - Proposed changes to the upstream catchment, such as an increase in surface permeability or changes to drainage patterns, should be mitigated to replicate the pre-development flow regime and to maintain connectivity between upstream catchment flow paths and the wetlands.
  - Proposed outfalls located upstream of the wetlands should be designed to limit erosion and sedimentation risks to the wetlands.
  - Water quality targets from urban developments within the upstream catchment of the wetland are to comply with EPA Victoria *Publication 1739.1 Urban Stormwater Management Guidelines* (EPA, 2021) and CSIRO publication *Urban stormwater best practice environmental guidelines* (VSC, 1999).

- Consider retention of ecological values mapped in C2, High priority areas are higher quality understory, threatened ecological communities, large canopy trees, watercourses, indigenous revegetation and habitat for threatened species. Areas to consider for retention have been highlighted in mapping. Buffers of watercourses are simply indicating watercourses that might be considered for retention, not ideal buffer distances yet to be determined, as per point 1 above.
- It is recommended that targeted surveys for migratory birds be undertaken at the permit stage, to better inform potential impacts and mitigation measures. To minimise likely implications, it is recommended that buffers of habitat for migratory birds be as per the Waterway Corridors (Melbourne Water, 2013), and likely noise levels be kept to below impact thresholds - refer to section 3.1.1.2.
- Provide for tree regeneration or recruitment around retained remnant trees, by retaining as much area around Tree Protection Zones as possible to allow for germination from parent plants.
- Given the highly modified state of the landscape, and overall low coverage of remnant vegetation, it is recommended that in this case consideration also be given to the retention of Victorian-native and Australian-native revegetation.
- Incorporate planting of local indigenous species into precinct design, including shrubby species along watercourses to provide habitat for small birds, and Platypus. Consider habitat connectivity in the design of parks and in planting plans. Planting of trees and shrubs over wetlands should be minimised so that the mature woodland canopy does not exceed 15% cover, in order to minimise shading of habitat, which is not preferred for many indigenous species.
- Utilise fauna-sensitive lighting in the design of the precinct and other measures to minimise light pollution, particularly at wetlands and creeks, but also for birds flying overhead to and from the Water Treatment Farm.
- Consider noise impacts on wetland habitat. Minimise noisy roads nearby, and utilise noise barriers where required. The requirement for noise barriers should be assessed during precinct design to limit noise below impact thresholds.
- There have been several attempts to identify a threshold level in traffic noise above which negative impacts occur, refer to section 3.1.1.2. Traffic noise should ideally be kept below 55–60 dBA (18 hr exposure), especially during the morning chorus. If larger, multi-carriage way, high-speed roads are proposed in proximity to wetlands, further noise studies may be required.
- Develop a timber re-use plan for any trees which must be felled, with preference given to re-use of timber for habitat (hollows for arboreal habitat or logs for terrestrial habitat). Install habitat timber in suitable retained woodland, and wetland habitat.
- Design the precinct to maintain the existing natural surface hydrology, so as to not significantly alter aquatic and ephemerally wet habitats associated with the Burrumbeet Creek and associated tributaries.
- It is recommended that an aquatic ecology assessment be undertaken to evaluate potential for threatened aquatic species, in particular Yarra Pygmy Perch *Nannoperca obscura* and Dwarf Galaxias *Galaxiella pusilla* (threatened fauna species) within Burrumbeet Creek, as identified previously (Biosis, 2023b). This should be undertaken at the permit stage by proponents at the site level, if impacts to habitat are anticipated, and not at the precinct scale as a part of the PSP.
- Maintenance or improvement of connectivity for fauna is recommended, particularly beneath roads along the Burrumbeet Creek. Consideration should be given to maximise connectivity across the precinct. Connectivity should be considered in terms of
    - Earthen substrate and vegetated underpasses should be maintained for fauna such as the Platypus, and frogs.
    - Where road widening is required, this should be minimised across watercourses to maximise vegetation growth beneath overpasses. Gaps between carriageways are beneficial where possible, also to maximise vegetation growth beneath overpasses.
    - Ensure that retained wetlands are allowed to experience current natural cycles of wetting and drying through the maintenance of current hydrological regimes.

- Culverts beneath roads should be designed in a way that provides for fauna likely to use these for dispersal. Particular reference should be given as appropriate to the following:
- Guidelines for fish passage at small structures (O'Connor et al., 2017)
- Growling Grass Frog Crossing Design Standards; Melbourne Strategic Assessment (DELWP, 2017c).
- Further exploration of mitigation explored in development of preliminary design.

## *NEXT STEPS*

- Following efforts to avoid and minimise impacts to native vegetation during the PSP design phase:
  - This report should be revised to include detail on the likelihood of an EES requirement.
  - This report should be revised to include Significant Impact Assessments for any MNES possibly impacted by the precinct, , or alternatively SIAs to be undertaken by proponents at permit stage.
  - A NVPP should be prepared to detail retention, removal and offsetting of native vegetation across the precinct.
- Properties not accessible at the time of the assessment, including properties 5, 7, 13, 15, 20, 28, 37, 38, 41, 46, 49, 68, 69, 77, 88 are likely to support low – moderate ecological values such as a scattered tree, or a small patch of native vegetation associated with an ephemeral depression or waterbody, and will likely require ecological assessment by proponents at permit stage. The remaining properties 34, 39, 49, 55, 56, 57, 59, 61 & 70 are unlikely to support any ecological values, however a due-diligence assessment to confirm this at permit stage would provide further assurance of this assumption, and guidance on any likely constraints and obligations under relevant biodiversity legislation.

# 1 INTRODUCTION

WSP Australia Pty Ltd (WSP) was commissioned by the Victorian Planning Authority (VPA) to prepare a Biodiversity Assessment Report. The Ballarat North Precinct Structure Plan (PSP) will primarily allow for residential development, supplemented by non-residential components to support a new community.

The PSP is split into two areas, the 'Core Area' and the 'Expanded Area'. Given that only the core area was initially assessed by Council, the Minister for Planning requires the VPA to determine the extent of the proposed precinct in terms of these two potential areas.

This Biodiversity Assessment Report identifies the biodiversity values of the entire site, determines the areas which are suitable for revegetation or restoration and assesses relevant legislative requirements which apply to the precinct.

This Biodiversity Assessment is the first stage of the assessment, with stage two being the development of the NVPP following further discussions with VPA.

## 1.1 PROJECT SCOPE

The following scope of work was defined for the Biodiversity Assessment Report:

- A desktop review of flora and fauna databases, aerial imagery, and relevant biodiversity policies and legislation
- Identify and map native vegetation, including mapping of patches and scattered trees, defined as per the Department of Environment Land Water and Planning's – DELWP, Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017d) (the Guidelines).
- Habitat hectare assessments on patches of native vegetation mapped as per the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectares scoring method* (DELWP, 2018).
- A preliminary habitat assessment of the project area to determine the targeted survey effort required.
- Map potential habitat for threatened species, and listed vegetation communities supported by the site.
- Record and map all incidental observations of native and exotic flora or fauna species.
- Advise on measures to protect retained vegetation, and areas to revegetate.
- Advise on avoidance and minimisation of impacts to native vegetation.
- Provide maps and data of the results.
- Targeted surveys for EPBC Act and FFG Act listed flora, fauna and ecological communities in accordance with the most appropriate Commonwealth survey guidelines. Targeted surveys involved:
  - Identifying, documenting and mapping the location of any threatened species recorded, threatened species habitat, and Threatened Ecological Communities
  - Providing location information, including GIS data of the targeted surveys
  - If threatened species are recorded during the targeted surveys, providing recommendations regarding:
    - Preliminary legislative implications and recommendations for more detailed assessments if required.
    - The necessary mitigation measures required to avoid and/or adverse impacts on these recorded species.

Species for which targeted surveys were undertaken were:

- Threatened flora including Matted Flax-lily *Dianella amoena,* Spiny Rice-flower Pimelea *spinescens subsp.. spinescens,* Button Wrinklewort *Rutidosis leptorhynchoides* and Large-headed Fireweed *Senecio macrocarpus*, Stiff Groundsel *Senecio behrianus.*

- Golden Sun Moth *Synemon plana*
- Growling Grass Frog *Litoria raniformis*
- Striped Legless Lizard *Delma impar.*

## 1.2 STUDY AREA

The Ballarat North PSP is located approximately 103 km north-west of Melbourne Central Business District (CBD), and less than 5 kms north of the Ballarat township, in central Victoria.

The study area spans over 832 hectares (ha) and consists of two main areas: The 'core' area comprises 561 ha that has been assessed in the Ballarat Long Term Growth Options Investigation paper (Hansen Partnership, 2018) and the 'expanded' area, which includes a proposed 271 ha to the north of the 'core' area. The study area is shown in Figure 1.1.

The study area includes 104 properties. Of these, VPA facilitated accesses to 75 of the properties for this Biodiversity Assessment. The remaining 29 properties could not be accessed due to access decline or landowner unresponsiveness. Results and implications of targeted surveys discussed in this report pertain only to the properties that were assessed and/or surveyed. This equates to approximately 643 ha of land out of the total 832 ha of the precinct. Properties assessed, and referenced in this report are referred to by the property number, detailed in Appendix A, Table 7.1.

The study area comprises large rural properties and agricultural land utilised for both cropping and grazing. In addition, there are several reserves located within the study area including North Common Wetland Reserve, Mount Rowan Reserve and Miners Rest Wetland Reserve, while Macarthur Park Wetlands borders the study area to the west. A combination of the Midland Highway, Western Highway and Ballarat-North Water Reclamation Plant border most of the study area to the east and south.

The study area is situated within the City of Ballarat Local Government Area (LGA), the Glenelg Hopkins Catchment Management Authority (CMA) region and the Victorian Volcanic Plain (VVP) bioregion. The southern 'core' area is zoned as an Urban Growth Zone (UGZ) while the 'expanded' area to the north is zoned as a Farming Zone (FZ) under the Ballarat Planning Scheme.

The study area is not located within the Melbourne Strategic Assessment (MSA), however it does include several parcels of crown land (refer to Figure 1.1).

wsp

# VPA Ballarat North PSP

**Ecology**
**Figure 1.1**
Study Area

**Legend**

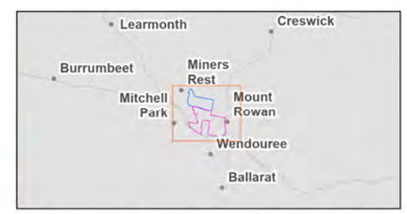
- Watercourse

**Study Areas**

- Core Area
- Expanded Area

**Properties (Property Number Labelled)**

- Surveyed
- No Access




0 250 500 750 1,000 Meters

Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:20,000 Date: 27/06/2024

GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# 2 METHODOLOGY

## 2.1 PERSONNEL

The contributors to this study, their qualifications and project roles are provided in Table 2.1.

Table 2.1 Contributors and their roles

| NAME | QUALIFICATIONS | POSITION AND ROLE/S ON PROJECT |
|---|---|---|
| Justin Pegg | BSc, M. Env&Sus | Associate Ecologist – project management, reporting, flora survey, fauna survey |
| Mark Shepherd | BSc | Principal Ecologist - Review |
| Nic McCaffrey | BSc | Principal Ecologist –guidance |
| Imogen Merlo | BSc, M. Env | Ecologist – fauna survey |
| Jess Baumann | BSc, M. Env | Ecologist – reporting, flora survey, fauna survey |
| Danelle Scicluna | BEnvSc | Ecologist – reporting, fauna survey |
| Pat Monarca | BSc (Hons) | Ecologist – flora survey, fauna survey |
| Emi Arnold | BSc | Ecologist – flora survey, fauna survey |
| Angus Houston | BEnvSc | Graduate Ecologist – flora survey, fauna survey |

## 2.2 DATABASE AND LITERATURE REVIEW

A database search and literature review were undertaken for an indication of the ecological values of the study area, and potential ecological impacts and subsequent constraints to the project. Relevant and available documents were reviewed for information on past land uses, presence of vegetation communities, as well as flora and fauna. Relevant databases were searched for records of threatened species within a five-kilometre radius of the study area. The following sources of information were consulted:

- Commonwealth Department of Climate Change, Energy, the Environment, and Water (DCCEEW) EPBC Act Protected Matters Search Tool (PMST) – 5 km buffer of the study area (DCCEEW, 2023b)
- Department of Energy, Environment and Climate Action (DECCA) Victorian Biodiversity Atlas (VBA) – 5 km buffer of the study area (DEECA, 2023e)
- DEECAs NatureKit 2.0 online tool (DEECA, 2023d)
- the Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines) (DELWP, 2017d)
- DCCEEWs online Species Profile and Threats Database (DCCEEW, 2023a)
- Biodiversity Information Tools used in Victoria's Native Vegetation Permitted Clearing Regulations and the Native Vegetation Information Management System (NVIM) (DELWP, 2021b)
- Vegetation Quality Assessment Manual (DSE, 2004)
- MapshareVIC database layers (https://mapshare.vic.gov.au/mapsharevic/) (DEECA, 2023b)
- MSA Mapshare database (https://mapshare.vic.gov.au/msa/map/) (DELWP, 2022)
- Relevant legislation, government policy and strategies including:

- Preparing a Native Vegetation Precinct Plan (DELWP, 2017f)
- Precinct Structure Planning Guidelines (VPA, 2021)
- Ballarat Long Term Growth Options Investigations (Hansen Partnership, 2018)
- Ballarat Strategy: Vision for 2040 (City Of Ballarat, 2015)
- BioSites, wetlands and any reports on sites of significanc
- Aerial imagery (Google, 2023) to determine habitat extents and linkages.

The database searches were undertaken on 29 August 2023. This review was used to prepare a list of threatened flora and fauna species, ecological communities, listed migratory species and any significant habitat previously recorded or predicted to occur in the study area and the broader locality. In addition, relevant reports and other documents provided by the VPA were also reviewed, including:

- Ballarat North Development Impacts to Biodiversity - Summary Report (DEECA, 2023a)
- Preliminary site investigation: Wyndholm Park, Miners Rest (Atma Environmental, 2022)
- Preliminary biodiversity constraints assessment: Ballarat Northern Growth Area (Biosis, 2019)
- Flora & Fauna Assessment and Net Gain Analysis: Ballarat Resort Site, Cardigan (Practical Ecology, 2009)
- Ballarat Long Term Growth Options Investigations (Hansen, 2018)
- Preliminary arboricultural assessment and report: 136 Howe Street, Miners Rest (TreeLogic, 2023)
- Arboricultural assessment and preliminary report: 171 Gillies Road, Miners Rest (TreeLogic, 2022)
- Flora and fauna assessment: Miners Rest (Biosis, 2023b)
- Growling Grass Frog Targeted Survey: 171 Gillies Road (Biosis, 2023a)
- Environmental Values of Burrumbeet Creek (Newall and Lloyd, 2007)
- Vegetation Management Plan Miners Rest Wetland, Miners Rest (Practical Ecology, 2014).

## 2.3 LIKELIHOOD OF OCCURRENCE

The presence or absence of a particular species cannot be definitively determined during a relative short survey timeline. For this assessment, the likelihood of occurrence of threatened and migratory species and populations was determined based on the criteria shown in Table 2.2 below. This method uses the habitat requirements of the species, outcomes of a habitat assessment, the state of habitat connectivity, and records of historical presence as identified in the VBA and PMST habitat modelling.

Table 2.2 Likelihood of occurrence criteria for threatened flora and fauna species

| LIKELIHOOD | DESCRIPTION |
|---|---|
| Negligible | Species considered to have a negligible likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria:<br>— rely exclusively on specific habitat types or resources that are not present in the study area<br>— are locally or regionally extinct. |

| LIKELIHOOD | DESCRIPTION |
|---|---|
| Low | Species considered to have a low likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria:<br>— have not been recorded previously in the study area and surrounds and for which the study area is beyond the current distribution range<br>— there is no preferred habitat in the study area but the species' habitat requirements are not well understood<br>— are considered to have the potential to be locally extinct<br>— are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.<br>— are cryptic flowering flora species that were specifically targeted by thorough seasonal surveys and that have not been recorded, and where habitat is suboptimal or there are no past records. |
| Moderate | Species considered to have a moderate likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria:<br>— have infrequently been recorded previously in the study area and surrounds<br>— use habitat types or resources that are present in the study area, although generally in a poor or modified condition<br>— are unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically during variable seasons or migration<br>— are cryptic flowering flora species that were targeted by seasonal surveys and that have not been recorded but where habitat is optimal or there are past records. |
| High | Species considered to have a high likelihood of occurrence include species not recorded that fit one or more of the following criteria:<br>— have frequently been recorded previously in the study area and surrounds<br>— use habitat types or resources that are present in the study area, that are abundant and/or in good condition within the study area<br>— are known or likely to maintain resident populations surrounding the study area<br>— are known or likely to visit the study area during regular seasonal movements or migration. |
| Recorded | Recorded/observed during field surveys. |

## 2.4 REVIEW OF PREVIOUS BIODIVERSITY ASSESSMENTS

Previous biodiversity assessments have been undertaken within the study area and surrounding areas including biodiversity assessments at 136 Howe Street Miners Rest, 171 Gillies Road and surrounding areas (Biosis, 2023b, Biosis, 2019, Practical Ecology, 2009), targeted Growling Grass Frog surveys (Biosis, 2023a), preliminary arborist reports (TreeLogic, 2023, Biosis, 2023a), a study investigating the environmental values of Burrumbeet Creek (Newall and Lloyd, 2007) and a vegetation management plan for Miners Rest Wetland (Practical Ecology, 2014). These assessments were reviewed for relevant information, and to inform determinations of threatening processes and likelihood of occurrence assessments.

## 2.5 SITE RECONNAISSANCE

An initial site reconnaissance survey was undertaken in June 2023. During this initial site assessment, the ecologists inspected the study area to examine the flora and fauna habitat present and visually assessed the cover and diversity of native vegetation, verifying the targeted survey effort required for the project. VPA and DEECA were consulted following this initial site assessment with regards to targeted survey efforts.

## 2.6 DETAILED SITE ASSESSMENT

Site assessment, including targeted surveys, was undertaken by WSP ecologists from August 2023 through to January 2024. The following sections detail the methodology of this site assessment.

### 2.6.1 CATEGORISING VEGETATION WITHIN THE STUDY AREA

Field validation (or ground-truthing) of extant vegetation modelling (DEPI, 2009) was undertaken to map and assess native vegetation as per the Guidelines (DELWP, 2017d).

Native vegetation is defined in planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The Guidelines further classify native vegetation as a patch or a scattered tree as follows.

A patch of native vegetation is:

- an area of vegetation where at least 25 per cent (%) of the total perennial understorey plant cover is native, or
- any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
- any mapped wetland included in the 'Current wetlands map', available in DEECA systems and tools.

A scattered tree is a native canopy tree that does not form part of a patch.

The location and Diameter at Breast Height (DBH) of canopy and scattered trees, as well as outlines of native vegetation patches, were recorded with a handheld GIS tablets and High accuracy (>50 cm) GNSS receivers. Where access was restricted, scattered trees and patches were digitised from aerial imagery and the DBH was estimated.

### 2.6.2 HABITAT HECTARE ASSESSMENTS

Habitat Hectare Assessments were undertaken on remnant patches of native vegetation to determine the condition of the vegetation in the context of the local area and the relevant bioregion (Victorian Volcanic Plain). This methodology is outlined in *Vegetation Quality Assessment Manual-Guidelines for applying the habitat hectares scoring method* (DSE, 2004). The Habitat Hectare method involves making visual and quantitative assessments on various characteristics of native vegetation according to established criteria that are set against an optimum benchmark. This process aims to establish the significance of native vegetation through an objective and repeatable methodology using working documents (benchmark data and field assessment score sheets) that are uniformly applied across Victoria.

In summary, this process begins with the identification of the Ecological Vegetation Class (EVC). Each EVC has a benchmark of optimal values which are found on DEECA's website (DELWP, 2021a). Site assessments are undertaken using the DSE *Vegetation Quality Field Assessment Sheet* (Version 1.3 October 2004) (DSE, 2004). Further to the site condition criteria, the Habitat Hectare process also requires an assessment of the site in a landscape context (DSE, 2004).

If a site meets or exceeds all benchmark criteria it will receive a total score of 100, which is a total of the above condition and landscape scores in pristine undisturbed condition. However, in many of the urban and agricultural influenced ecosystems, sites receive a score less than 60 due to their relatively high level of modification. The final habitat score is presented as a percentage and then converted to a score out of 1.00.

Habitat Hectare Assessments were undertaken on the following dates in 2023: 19 – 21 September, 2 – 3 November, 14 – 15 November, 22 November and 21 December by Nic McCaffrey, Imogen Merlot, Pat Monarca and Justin Pegg, who were accredited by DEECA in the Vegetation Quality Assessment (VQA) method.

### 2.6.3 REVEGETATION CATEGORISATION

Revegetation is extensive at some sites and can have different implications and exemptions under local planning laws under the local Council Planning Scheme. For the purposes of classifying vegetation in the study area, the following categories are used.

Table 2.3 Revegetation categories used for mapping

| REVEGETATION / PLANTING MAPPING CATEGORY | DESCRIPTION | PLANNING IMPLICATIONS |
|---|---|---|
| Indigenous | Indigenous to a local area. Described by Pysek et al (2004) and adopted by Royal Botanic Gardens Melbourne (2016), defined as 'taxa that have originated in a given area without human involvement or that have arrived there without intentional or unintentional intervention of humans from an area in which they are native'. | There are certain exemptions under all Victorian Planning Schemes, Clause 52.17 'planted vegetation', particularly if the vegetation has been planted for aesthetic or amenity purposes.<br>If the vegetation is also covered by an overlay, such as 'Environment Significance Overlay', it will likely require a permit for removal. |
| Native to Victoria | Non-indigenous to the local area but native to Victoria (e.g. Bangalay #*Eucalyptus botryoides*, Giant Honey-myrtle #*Melaleuca armillaris*).<br>Defined in Victorian Planning Provisions – Definitions – Clause 72 as '*Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses'*. | If vegetation is not exempt as above, it may require a permit for removal. |
| Native to Australia | Non-indigenous Australian native plants or vegetation (non-indigenous to Victoria) (e.g. Sugar Gums #*Eucalyptus cladocalyx*). | Usually do not require a permit for removal but are identified to show these have not been overlooked. |
| Exotic | Exotic plants evolving/originating oversees (e.g. Monterey Cypress **Hesperocyparis macrocarpa*). | Do not require a permit for removal for ecology related matters. These are identified to show these have not been overlooked. |

### 2.6.4 FAUNA HABITAT ASSESSMENT

Fauna habitats were assessed by examining characteristics such as the structure and floristics of the canopy, understorey and ground vegetation, the structure and composition of the litter layer, and other habitat attributes important for feeding, protection, roosting or breeding. Fauna habitat assessments were undertaken during the initial site walkovers in late July 2023, and then refined throughout the latter half of 2023 during later site visits. The identification of suitable fauna habitat helps to define the necessity of targeted survey for threatened fauna species and where these surveys should occur. Identification of non-threatened native fauna habitat informs avoidance, mitigation and salvage measures at the time of construction in accordance with the state *Wildlife Act 1975.*

## 2.7 TARGETED SURVEYS

### 2.7.1 FLORA

Targeted flora surveys were undertaken in the same pass as Vegetation Quality Assessments for species considered possible or likely to occur within the Study Area.

#### 2.7.1.1 TARGET SPECIES

Targeted surveys for significant flora were undertaken on foot across suitable habitat for the target species by suitably qualified and experienced botanists. The survey methods and timing for this project are based on the survey guidelines for the target species listed below.

— Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* (EPBC Act Critically Endangered, FFG Act critically endangered). Survey guidelines are detailed is the significant impact guidelines for the species (DEWHA, 2009b).

— Matted Flax-lily *Dianella amoena* (EPBC Act Endangered, FFG Act critically endangered). Survey guidelines are outlined on the Species Profile and Threats Database page (DAWE, 2020).

— Large-headed Fireweed *Senecio macrocarpus* (EPBC Act Vulnerable, FFG Act critically endangered).

— Button Wrinklewort *Rutidosis leptorhynchoides* EPBC Act Endangered, FFG Act critically endangered.

— Stiff Groundsel *Senecio behrianus* (EPBC Act Endangered, FFG Act critically endangered.

Surveys for spring flowering flora were undertaken at the same time as Vegetation Quality Assessments being 19 – 21 September, 2 – 3 November, 14 – 15 November, 22 November and 21 December 2023. Surveys for winter flowering flora – being Spiny Rice-flower, were undertaken on 16 & 24 August 2023.

Much of the precinct was unsuitable habitat for threatened flora – such as dense thickets of exotic woody species along watercourses & highly modified agricultural land. These areas were not targeted for survey.

#### 2.7.1.2 SURVEY METHOD

Surveys were undertaken systematically using a combination of area searches and parallel line traverses, across all potential habitat. Potential habitat for threatened species included:

— All areas of remnant understory across natural landform.

— Beneath overbearing structures providing potential harbour such as older fence lines, and older woody shrubs persisting across agricultural land such as Boxthorn **Lycium ferocissimum,* Briar Rose **Rosa rubiginosa* and Tree Violet *Melicytus dentatus.*

Survey effort was recorded and mapped using GPS tracks of all surveyors. All observations of significant flora species were recorded by a hand-held GPS with an accuracy of 1 - 3 m. Populations were mapped by points unless high densities were present in which case polygons or density points were used. Where any high-quality potential habitat was found or a target plant was detected, more rigorous survey effort was applied in that area (e.g. 5 - 10 m transects).

### *2.7.2 THREATENED ECOLOGICAL COMMUNITIES*

#### *EPBC ACT*

Surveys were also undertaken to qualify possible EPBC Act listed Threatened Ecological Communities (TEC), '*Natural Temperate Grassland & Grassy Eucalypt Woodland of the Victorian Volcanic Plain'* (NTGVVP & GEW), Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (SHW). These three TECs were identified as possibly occurring during initial site reconnaissance, where synonymous state EVCs showed potential to meet the TEC condition thresholds. Surveys were undertaken across higher quality areas within patches identified as possibly qualifying as TECs.

When assessing for TECs, determination of qualification with regards to vegetative cover was done by percentage cover estimates. Qualification of these communities was assessed against the most appropriate guidelines or listing advice for these communities (DSEWPaC, 2011b) (TSSC, 2009, TSSC, 2012).

Qualification of TECs was undertaken against assessment criteria provided or taken from the above-mentioned guidelines, as detailed below in Table 2.4 & Table 2.5.

Table 2.4 Natural Temperate Grassland of the Victorian Volcanic Plain assessment criteria

| **SCIENTIFIC DETERMINATION CRITERIA** |
|---|
| **Key Diagnostic Criteria** |

| SCIENTIFIC DETERMINATION CRITERIA |
|---|
| The distribution is limited to the Victorian Volcanic Plain Bioregion (Interim Biogeographical Regionalisation of Australia. |
| Occurrences are limited to Quaternary basalt soils on low elevation plains and stony rises on the basalt flows. |
| The tree canopy is typically dominated by Eucalyptus camaldulensis River Red-gum but may be dominated by other species, in response to variations in rainfall and/or localised landscape features. |
| The understorey is dominated by a native ground layer with these features:<br>— one or more of the following native grass genera typically dominates the perennial ground layer: *Themeda*, *Austrodanthonia*, *Austrostipa*, *Poa* and/or *Microlaena* spp.<br>— one or more of the following native herb genera are typically present: *Acaena, Arthropodium, Calocephalus, Chrysocephalum, Dianella, Dichondra, Geranium, Leptorhynchos or Solenogyne.* |
| Contra-indicative species: *Allocasuarina luehmannii*; a Chenopod shrub layer; *Eragrostis infecunda, Eucalyptus leucoxylon,* or *Muehlenbeckia florulenta.* |
| **Condition Thresholds** |
| — The total perennial tussock cover represented by the native grass genera *Themeda, Austrodanthonia, Austrostipa* or *Poa* is at least 50%;<br>OR<br>— If the total perennial tussock cover represented by the above 4 native grass genera is less than 50%, then the ground cover of native forbs (wildflowers) is at least 50% of total vegetation cover during spring-summer (September to February);<br>OR<br>— Natural Temperate Grassland of the Victorian Volcanic Plain listing advice - Page 3 of 22 The cover of non-grass weeds is less than 30% of total vegetation cover at any time of the year. |
| Area – the patch is required to be bigger than or equal to 0.5 ha. |
| The conservation value of a patch of the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community is enhanced if it shows any of the following features:<br>— a high native plant species richness;<br>— large patch size;<br>— minimal weed invasion;<br>— presence of threatened plant and/or animal species;<br>— presence of natural exposed rock platforms and outcrops; or<br>— presence of mosses, lichens or a soil crust on the soil surface. |

Table 2.5 Assessment of Seasonal Herbaceous Wetlands of the Temperate Lowland Plains

| SCIENTIFIC DETERMINATION CRITERIA |
|---|
| **Key Diagnostic Characteristics - biota** |
| Trees and shrubs are sparse to absent. When present, they mostly occur as fringing or scattered individuals. The cover of woody species accounts for no more than 10% projective foliage cover across the wetland. |
| The vegetative cover of the ecological community is dominated (>50 %) by a ground layer of native wetland graminoids and/or native wetland forbs. |

| SCIENTIFIC DETERMINATION CRITERIA |
|---|
| A range of graminoids is often present and typically includes one or more of the following taxa*: Amphibromus* spp.*, Carex tereticaulis, Deyeuxia* spp.*, Glyceria* spp.*, Lachnagrostis* spp.*, Poa labillardierei, and Rytidosperma duttonianum*. |
| At least one native wetland forb species must be present (preferably more) after the ecological community is inundated. The suite of forbs that may occur within the ecological community's range is variable and potentially large. |
| **Condition Thresholds – normal conditions** |
| 50% or more of the total cover of plants in the ground layer of the wetland is dominated by native species characteristic of the Seasonal Herbaceous Wetlands ecological community. |
| Minimum sizes are specified for certain listed national ecological communities as a guide to help determine national environmental significance:<br>A. Isolated wetland in landscape. Minimum size = 0.5 ha.<br>B. Fine-scale cluster of wetlands, e.g. in gilgai terrain. Minimum sizes are: the collective area of wetlands within the cluster = 0.5 ha; total area of the cluster polygon (wetland + non-wetland) = 5ha.<br>C. Wetland connected to, or part of, a native vegetation remnant. Minimum sizes are: wetland = 0.1 ha; wetland + native remnant = 1.0 ha. |
| Are three or more native plant taxa listed in Table 1 P.14 present within the wetland?<br>— If yes, the wetland is considered to be of very high quality.<br>— If no, the ecological community is still present if the criteria under Parts A to C are met but is not considered to be of very high quality. |

#### 2.7.2.1 FFG ACT

FFG Act listed communities are considered to align with the descriptions of vegetation as set out in state guidance *Characteristics of Threatened Communities - Flora and Fauna Guarantee Act 1988 – Threatened List* (DELWP, undated).

Higher quality areas of native vegetation have been assessed as aligning with the descriptions of these vegetation communities. Qualification metrics are assessed via vegetation coverage data where this information is included in FFG Act community descriptions.

### *2.7.3 FAUNA*

WSP undertook targeted surveys for species listed under the FFG Act and EPBC Act within the Study Area to inform the planning process and to:

- Identify, document and map the location of any threatened species recorded
- Provide maps and data of the results
- Provide location information, including GIS data of the targeted surveys
- Inform recommendations regarding further targeted surveys, legislative implications, and mitigation measures for threatened species recorded.

Surveys were undertaken in potential habitat identified for the following FFG Act and EPBC Act listed fauna species:

- Golden Sun Moth Synemon plana
- Striped Legless Lizard Delma impar
- Growling Grass Frog Litoria raniformis.

### *GOLDEN SUN MOTH*

Four repeat site visits, each at least a week apart, were undertaken between December 2023– January 2024. Where possible, surveys for Golden Sun Moth were conducted under the following conditions, in accordance with the guidelines stipulated in the *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (Synemon plana)* (DEWHA, 2009c).

- warm to hot day, generally above 20°C
- clear or mostly cloudless sky
- relatively still wind conditions
- surveys undertaken between 10:00 am and 3:00 pm.

Surveys were undertaken across potential suitable plains grassland and grassy woodland habitat using broad linear transects across the majority of mapped habitat. Surveys in these areas were undertaken as a mix of on-foot and vehicle-based survey. Surveys were undertaken by vehicle across lower quality potential habitat, on public land by two ecologists per vehicle driving at walking speed (approximately three to nine kilometres per hour), at a transect width of approximately 20 m. In areas of high-quality habitat, and across private land, transects were surveyed on-foot at transects approximately 10 m apart.

This methodology is informed by *A survey for the Golden Sun Moth Synemon plana on the Victorian Volcanic Plains* (Brown and Tolsma, 2009) and the Background Paper to EPBC Act Policy Statement 3.12 – Nationally Threatened Species and Ecological Communities *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (Synemon plana)* (DEWHA, 2009c). Guidance in these documents state:

- Transects are typically along the long axis of the site, and should be between 5 and 100 m apart, depending on the size and topography of the site. At very large sites 200 m intervals may be needed in order to cover the whole site in a reasonable time.
- Transects were driven in a car at <10 km/hr (Brown and Tolsma, 2009)
- On large sites multiple observers may be required starting at opposite sides of the site. Two observers walking transects 200 m apart would require about two hours to survey a 100 ha site (Dunford, 1999).

Surveys were ideally undertaken on days when moths were known to be flying, based on checks at two reference sites, and therefore would be detectable if present at the study area, or the most favourable days of the week in which survey was required to be undertaken to comply with seasonal survey window.

'Ballarat Aerodrome' is a treeless grassy area along Airport Drive, located west of the study area and 'Comadai Landcare Flanagan Drive' is a patch of grassland adjacent to the western side of Long Forest Reserve (refer to C3). These sites were chosen due to their vegetation cover and Golden Sun Moth having been recorded at both locations in previous years (DEECA, 2022).Where a positive observation was not obtained at the reference sites by WSP ecologists, the DEECA endorsed 'Golden Sun Moth Flight Diary' was utilised to confirm that weather conditions were suitable for undertaking surveys (see https://ecavic.org.au/resources/gsm/). Survey dates and conditions are detailed with results in REF.

The survey focused on areas of intact remnant understory vegetation, across properties 2, 45, 50, 62, 63, 90, 99 and higher quality areas of roadside vegetation adjacent to properties 4, 5, and 36. Golden Sun Moth effort is shown in C3.

### *GROWLING GRASS FROG*

Growling Grass Frogs are known to occur in creeks and dams south of Ballarat and may occur in creeks and artificial waterbodies throughout the study area. During the initial site assessment, seven wetlands (both permanent and periodically inundated wetlands) were identified to be potential habitat for the species and suitable for undertaking surveys. This includes Miners Rest Wetlands, a water treatment farm at the south of the study area, and sites along Burrumbeet Creek. Targeted Growling Grass Frog surveys have previously been conducted in a small section of the study area, specifically 171 Gillies Road, Miners Rest and nearby wetlands (Biosis, 2023a). The sites selected for this study do not overlap with the sites surveyed in the previous study.

Targeted surveys for the Growling Grass Frog were conducted in accordance with the *Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the EPBC Act* (DEWHA, 2010) and the significant impact guidelines for the species (DEWHA, 2009d).

Based on the initial site assessment and in accordance with the guidelines, survey effort involved:

- Seven identified survey locations over two nights, 5 and 12 December 2023, in the peak activity period (November – March).
- At each site, an initial listening period was observed, followed by call-playback, hand-searching and spotlighting.
- Timing of survey at each site depended on the size of the survey site. For this project, a majority of surveys were completed within 15 minutes.
- Where possible, surveys were undertaken on warm nights (over 12 degrees) following recent rain and when the species is known to be calling locally.

Growling Grass Frog survey locations are shown in C4.

### *STRIPED LEGLESS LIZARD*

Following the initial site reconnaissance survey, 10 locations across the study area that had been mapped as potential habitat were proposed for grids of artificial shelters for Striped Legless Lizard surveys. Surveys were undertaken using artificial shelters (terracotta roof tiles) in accordance with the *Referral guidelines for the Striped Legless Lizard* (DSEWPaC, 2011a) and the *Survey guidelines for Australia's threatened reptiles* (DSEWPC, 2011), as follows;

- Tile grids were installed early July 2023, approximately three months prior to the initial survey/checks.
- Tiles were placed in vegetated areas wherever possible (i.e. not on bare ground).
- Arrays consisted of 50 tiles, at 5 metre spacing between tiles, arranged in a grid of 10 tiles by five. The exception to this was Grid 1, where tiles were arranged in two rows of 25 to accommodate the narrow width of the road reserve.
- One array per three hectares for sites up to 30 hectares, at least 10 grids for sites over 30 hectares. A total of 10 grids were initially installed for the project due to the extent of potential habitat present.
- Shelter sites were checked when ambient temperatures did not exceed 28°C.

Refer to C5 for a map showing grid placement across the study area. We note that two grids (6 & 7) were cleared or stolen in both late September and October, leaving eight grids remaining for the full survey period, in both instances, habitat surveyed was low quality, and unlikely to support this species. No further survey across these areas are recommended, or anticipated to be required.

Grids were checked 10 times over 10 weeks between 6 September 2023 and 13 November 2023. The timing targeted peak survey season for the species (spring), when the lizards are most likely to be utilising the tiles for thermoregulation, and extended into late summer to check for skin sloughs. This is in accordance with the methodology stipulated in the guidelines (DSEWPaC, 2011a, DSEWPC, 2011).

On each check, an ecologist experienced in the identification of the target species lifted each tile and examined underneath. If possible, vertebrate fauna were captured for identification before being released next to the tile. Information regarding the time, weather conditions and presence of any fauna species was recorded. Tile checks were undertaken in the morning, but specific timing was dependant on the daily weather conditions and the time of year.

The project was awarded to WSP in time to install the tile grids in August 2023 with checks commencing in September 2023. This timing was in line with the survey guidance detailed in the Federal referral guidelines (DSEWPaC, 2011a) for this species specifying (p.11) tile grids are laid out at least one month prior to survey. We do not believe that this affected the survey results, as previously concluded (O'shea, 2005) – p. 120, recently laid out tiles appear as successfully unitised as tiles placed for longer periods prior to survey.

The period surveyed, from mid-September to early November covered what is reported to be the most active period for Stiped Legless Lizards, being October – November (O'shea, 2005). Where possible, surveys were undertaken on days

that temperatures were near or below the species preferred temperature range of ~ 24 – 27°C (refer to survey details provided in D7). In areas of survey, this temperature would likely be achieved via ceramic tiles, inferring it was likely Stiped Legless Lizards were utilising tiles during timing of surveys. The probabilities of detection may be reduced as ambient temperatures exceed 30°C (Thompson, 2006 via: (DELWP, 2016a)), which is often apparent, and occurs earlier in the day when surveys continue past December. Survey conditions are considered to broadly align with guideline conditions, and are considered adequate for the purposes of this assessment.  no further survey effort is considered to be required.

## 2.8 LEGISLATION AND POLICY

The project was assessed against the following key biodiversity-relevant legislation and policy including:

- EPBC Act
- FFG Act
- Environmental Effects Act 1978 (EE Act)
- *Planning and Environment Act 1987* (P&E Act) in relation to the Ballarat Planning Scheme (Planning Scheme)
    - Clause 52.17- *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017d)
    - Urban Growth Zone (UGZ)
    - Ballarat Long Term Growth Options
    - Ballarat Exceptional Tree Register
- Water Act 1989 (Water Act)
- Wildlife Act 1975
- Catchment and Land Protection Act 1994 (CaLP Act)

### *2.8.1 PREPARING A NATIVE VEGETATION PRECINCT PLAN*

*Preparing a Native Vegetation Precinct Plan* (DELWP, 2017f) provides guidance for the preparation of a Native Vegetation Precinct Plan (NVPP), including when to use an NVPP, the content of an NVPP, and how to implement an NVPP. Implications of this guidance document are discussed in Section 5.2.3.5. The NVPP will be developed following consultation with VPA on potential for native vegetation retention based on the findings of this assessment.

This legislation and policy are described in detail in Section 5.

## 2.9 PERMITS

All WSP staff are covered under and operate in accordance with the Department of Economic Development, Jobs, Transport and Resources Wildlife and Small Institutions Animal Ethics Committee approval (16.23) and Victorian *Wildlife Act 1975* Research Permit (10010999). Additionally, all relevant WSP staff are covered under the Victorian *Flora and Fauna Guarantee Act 1988* Permit to take/keep protected flora (10010998).

## 2.10 PLANT IDENTIFICATION

Flora species that could not be identified to species in the field were recorded to the nearest likely family or genus. These were then collected and identified as per protocols of the Flora and Fauna Guarantee Permit (10010998) for the collection of plant material.

## 2.11 NOMENCLATURE

In this document, common names are used for a plant or animal species followed by the scientific names in italics. Subsequent references may cite common names only. Introduced species are identified within the text with an asterisk before the scientific name, e.g. Quaking Grass **Briza maxima*, and non-indigenous native species are indicated with a # e.g. Tuart #*Eucalyptus gomphocephala.*

## 2.12 ECOLOGICAL LIMITATIONS

The specific limitations relevant to the surveys undertaken for this project include:

1. Not all properties were accessible for survey, due to landowners having not provided access to VPA for technical assessments to be undertaken. Land accessed is shown in Figure 1.1. A total of 26 land parcels totalling ~151 ha (18.6 %) were not covered by the biodiversity assessment.
2. While it is somewhat reasonable to broadly infer survey results and conclusions regarding species and communities presence or absence across these areas, residual risk of uncertainty remains in terms of regulatory and legislative implications of development across these areas. It is recommended that ecological impact assessments are similarly undertaken for the 26 parcels of land not covered by this assessment, by development proponents when access can be achieved.
3. While non-accessible properties were not traversed, aerial photography and observations from adjoining lands informed recommendations on areas identified for further assessment, and conversely, areas of low ecological value identified as not requiring further assessment.
4. Ecological surveys, including targeted surveys undertaken in accordance with the most current survey guidelines, can never definitively prove absence of a species from a site. However, by ensuring that surveys are undertaken in accordance with best practice and by ecologists with extensive experience with the target species, negative results are expected to provide strong evidence for absence. However, this can change with time, and any survey data used in decision-making should be recent (up to around five years, dependent on the community/species being surveyed).

# 3 RESULTS

## 3.1 DATABASE AND LITERATURE REVIEW

### *3.1.1 LITERATURE REVIEW*

#### 3.1.1.1 PREVIOUS ASSESSMENTS

A number of previous ecological and environmental studies have been undertaken within, nearby or in a broader area than the study area. A review of these studies has been undertaken to provide a brief historical context to this assessment in terms of the current and previous study areas. A comparison is also made between each report and the current assessment results.

*ENVIRONMENTAL VALUES OF BURRUMBEET CREEK (NEWALL AND LLOYD, 2007)*

A report on the environmental values of Burrumbeet Creek, commissioned by Glenelg Hopkins Catchment Management Authority (GHCMA) in 2007, found Burrumbeet Creek had limited environmental values, having been impacted by agricultural land use and elevated nutrient inputs, removal of riparian vegetation, and exotic weed species in the riparian zone. Significant fauna species (Growling Grass Frog and Flat-headed galaxias *Galaxias rostratus*) were considered unlikely to be present in the creek.

*FLORA & FAUNA ASSESSMENT AND NET GAIN ANALYSIS, BALLARAT RESORT SITE, CARDIGAN (PRACTICAL ECOLOGY, 2009)*

Practical Ecology was commissioned by Tiga (Ballarat) Pty Ltd to undertake a flora and fauna assessment and Net Gain analysis for a proposed subdivision and development within several conjoined blocks of agricultural land in Cardigan. This area is not included within the current study area for this report, but is located nearby, within the City of Ballarat. Natural Temperate Grassland of the Victorian Volcanic Plain, listed as Critically Endangered under the EPBC Act, was recorded within the study area. 60 flora species considered to be regionally significant, were also recorded in the study area.

*VEGETATION MANAGEMENT PLAN MINERS REST WETLAND, MINERS REST (PRACTICAL ECOLOGY, 2014)*

Practical Ecology was commissioned by the City of Ballarat to prepare a Vegetation Management Plan for the Miners Rest Wetland. This assessment occurred in 2014 in the same area as the current study area for this report. A site assessment confirmed the wetland consisted of EVC 125: Plains Grassy Wetland, rather than EVC 647: Plains Sedgy Wetland which had been previously mapped. One flora species of state and national significance was also recorded: Stiff Groundsel *Senecio behrianus*.

*BALLARAT STRATEGY: VISION FOR 2040 (CITY OF BALLARAT, 2015)*

The Ballarat Strategy outlines the vision and plan for managing the forecast growth and change in Ballarat to 2040. It includes goals for improving biodiversity outcomes in the Ballarat municipality, such as undertaking an inventory of current natural values and developing a biodiversity conservation strategy.

*BALLARAT LONG TERM GROWTH OPTIONS INVESTIGATIONS (HANSEN PARTNERSHIP, 2018)*

The Ballarat Long Term Growth Options Investigations (the Northern Greenfield Investigation Area (GIA)) assessed the capability of the land to potentially accommodate future urban development. The report identified fewer constraints from flora and fauna considerations than in other investigation areas, however, it noted the presence of Endangered EVCs in the GIA. The assessment recommends protecting and enhancing areas of significant vegetation, incorporating significant vegetation into proposed allotments, road reserves and open space areas.

*PRELIMINARY BIODIVERSITY CONSTRAINTS ASSESSMENT: BALLARAT NORTHERN GROWTH AREA (BIOSIS, 2019)*

Biosis was commissioned by APD Projects to undertake a preliminary biodiversity constraints assessment for future development opportunities in Ballarat's Northern Growth Area. The area surveyed encompasses Ballarat Town Common, 171 Gillies Road Miners Rest and a smaller area of land near Gillies Road Miners Rest, covering approximately 300 hectares. This assessment occurred in 2019 in the same area as the current study area for this report. Biosis recorded three small patches of Plains Grassy Woodland (EVC 55), two patches of Tall Marsh (EVC 821), remnant scattered trees, and potential habitat for Growling Grass Frog.

*PRELIMINARY SITE INVESTIGATION: WYNDHOLM PARK, MINERS REST (ATMA ENVIRONMENTAL, 2022)*

Atma Environmental was engaged by APD Projects to conduct a preliminary site (contamination and surface/subsurface water) investigation at Wyndholm Park, Miners Rest. This assessment occurred in 2022 in the same area as the current study area for this report. Atma Environmental found no existing, or previous EPA notices, for the site, and it is not within 500 m of a former landfill. However, they recorded several areas of potential environmental concern for contamination, and water quality at Burrumbeet Creek was rated poor.

*171 GILLIES ROAD, MINERS REST PRELIMINARY ARBORICULTURAL ASSESSMENT AND REPORT (TREELOGIC, 2022)*

TreeLogic was engaged by Biosis to conduct a preliminary arboricultural assessment at 171 Gillies Road, Miners Rest. This assessment occurred in 2022 in the same area as the current study area for this report. TreeLogic recorded 124 tree species that were predominantly of planted origin, including both exotic and Indigenous species.

*COMMONWEALTH GAMES 2026 MAJOR VENUES AND VILLAGES INFRASTRUCTURE PROGRAM: MINERS REST FLORA AND FAUNA ASSESSMENT (BIOSIS, 2023B)*

Biosis was commissioned by Development Victoria to undertake a flora and fauna assessment of land proposed to be used as a village for the 2026 Commonwealth Games. Surveys were undertaken at 136 Howe Street, Miners Rest and adjacent road reserves, an area encompassing 17.86 hectares of public land. This assessment occurred in 2023 in the same area as the current study area for this report. Biosis recorded 0.03 ha of Plains Grassy Wetland (EVC 125), 0.04 hectares of Tall Marsh (EVC 821), scattered trees, and potential habitat for Yarra Pygmy Perch *Nannoperca obscura* and Dwarf Galaxias *Galaxiella pusilla* (threatened fauna species) within Burrumbeet Creek.

*136 HOWE STREET, MINERS REST PRELIMINARY ARBORICULTURAL ASSESSMENT AND REPORT (TREELOGIC, 2023)*

TreeLogic was engaged by APD Projects to conduct a preliminary arboricultural assessment at 136 Howe Street, Miners Rest in 2023. This assessment occurred in 2023 in the same area as the current study area for this report. TreeLogic recorded 60 tree species that were all of planted origin, including both exotic and Indigenous species.

*171 GILLIES ROAD, GROWLING GRASS FROG TARGETED SURVEY (BIOSIS, 2023A)*

Biosis was commissioned by APD Projects to undertake targeted survey for the threatened Growling Grass Frog *Litoria raniformis* at 171 Gillies Rd, Miners Rest and adjacent wetlands (Burrumbeet Creek and the Macarthur Park Wetlands). This assessment occurred in 2023 in the same area as the current study area for this report. No Growling Grass Frogs were recorded at any survey site during the targeted survey, and the study area was considered to contain limited suitable habitat.

#### 3.1.1.2 NOISE IMPACT THRESHOLDS

There have been several attempts to identify a threshold level in traffic noise above which negative impacts occur. As mentioned earlier, Dooling & Popper (2007) suggested limits of 93–110 dB(A) for continuous traffic noise to prevent temporary hearing loss in birds and pulses (presumably equivalent to Lmax) to not exceed 125 dB(A) to prevent permanent damage to hearing. Dooling and Popper (2007) also tentatively suggested that noise levels from roads should not exceed 50–60 dB(A) to prevent masking and other similar effects while a more recent study suggested the threshold

was 49 dB(A) (Wiacek et al. 2015). Importantly, McClure et al (2013) and Ware et al. (2015) both found a significant effect to propagated road noise at 55 dB(A)Leq within a road-free landscape with a background noise level of 41 dB(A), demonstrating a maximum threshold (i.e. 55 dB(A)) that should be avoided. Unfortunately, no studies have evaluated a range of noise levels to identify where thresholds might occur, and thus the 55 dBA Leq should be considered a maximum threshold. Much lower thresholds in acceptable noise levels for all species of breeding birds in woodland (42–52 dB(A)) and open grassland (47 dB(A)) in The Netherlands were suggested by Reijnen et al. (1997). Numerous studies that compared noisy environments with quieter ones had quiet environments around the 31 L10 18 h dB(A) SPL (Parris, K. M. & Schneider 2009), and 42 dB(A) (Wiacek & Polak 2015) levels. A study of wetland birds in Finland found a negative effect where noise levels exceeded 56dB, implying that this SPL may represent a threshold in that study (Hirvonen, Heikki 2001). From this body of evidence, and relying largely on the comprehensive review by Dooling and Popper (2007), traffic noise should ideally be kept below 55–60 dBA (18 hr exposure), especially during the morning chorus.

### 3.1.2 AERIAL IMAGERY

The study area is situated north of Ballarat town and the Western Freeway, and west of the Midland Highway. A review of aerial imagery and street imagery (Google, 2024) indicates that much of the study area and surrounding land appear to be predominantly cleared and utilised for agricultural purposes. The closest intact native vegetation appears to be located at Creswick State Forest approximately 1.7 km from the study area. Burrumbeet Creek runs through both the north and south sections of the study area, connecting with a wetland in the south-west of the study area, and both Macarthur Park Wetlands and the Water Treatment Farm located directly adjacent to the project boundary. Miners Rest Wetlands is located in the northern most point of the study area. Several farm dams are also present.

Biodiversity values in the broader landscape include Lake Wendouree approximately 2.8 km south of the study area, Mullawallah Wetlands approximately 3.1 km south-west of the study area, Yarrowee River approximately 4.6 km south-west of the study area, Lake Learmonth approximately 8.5 km north-west of the study area, and Lake Burrumbeet approximately 12 km west of the study area.

While non-accessible properties were not traversed, aerial photography and observations from adjoining lands informed recommendations on areas identified for further assessment, and conversely, areas of low ecological value identified as not requiring further assessment. Properties 5, 7, 13, 15, 20, 28, 37, 38, 41, 46, 49, 68, 69, 77, 88 are likely to support low – moderate ecological values such as a scattered tree, or a small patch of native vegetation associated with an ephemeral depression or waterbody, and will likely require ecological assessment by proponents at permit stage. The remaining properties 34, 39, 49, 55, 56, 57, 59, 61 & 70 are unlikely to support any ecological values, however a due-diligence assessment to confirm this at permit stage would provide further assurance of this assumption, and guidance on any likely constraints and obligations under relevant biodiversity legislation.

### 3.1.3 VEGETATION MODELLING

NatureKit (DEECA, 2023d) was queried on 5 September 2023 to determine the past and present native vegetation cover modelled to occur within the study area and the surrounding landscape. Results of this query are as follows:

- The study area is located within the Victorian Volcanic Plain (VVP) bioregion.
- Pre-1750s modelling (DELWP, 2016c) indicates that most of the study area likely supported vegetation attributable to Ecological Vegetation Class (EVC) Plains Grassy Woodland (EVC 55). The exception is a small patch of Plains Sedgy Wetland (EVC 647) located in the north west corner of the study area, over Miners Rest Recreation Reserve.
- 2005 extant vegetation modelling (DEPI, 2009) indicates a highly fragmented landscape, evident by the persistence of only small and scattered patches of Plains Grassy Woodland across the site and two considerably smaller areas of Plains Sedgy Wetland in the north west. Highly fragmented patches of Plains Grassy Woodland are also modelled in the area immediately surrounding the site (refer to Figure 1 in Appendix C).
- Both EVCs are considered Endangered within the VVP bioregion. A map of the modelled EVCs is provided in 84C1.

### 3.1.4 VBA AND PMST RECORDS

The VBA and PMST were queried on 29 August 2023 to build a list of species of state and/or national conservation significance modelled to occur or with records within 5 km of the study area. The results are summarised below and the full likelihood of occurrence assessment is provided in Appendix B.

#### 3.1.4.1 FLORA SPECIES

VBA and PMST searches retuned a total of 31 significant flora species recorded, or predicted to occur, within a 5 km radius of the study area. Of these, 21 species are listed under the EPBC Act and 10 are listed under the FFG Act only. Four threatened flora species are considered to have a moderate or higher likelihood of occurring within the study area based on desktop assessment.

Brooker's Gum *Eucalyptus brookeriana*, Yarra Gum *Eucalyptus yarraensis* and Fragrant Leek-orchid *Prasophyllum suaveolens* are considered to have a moderate likelihood of occurring, with the study area supporting habitat for this species. Stiff Groundsel *Senecio behrianus* is considered to have a high likelihood of occurring based on previous records which occur within the study area. Consideration of significant flora species returned by database searches is done with reference to the habitat values of the study area. Summaries of species considered likely to occur are provided in Section B1.1.

#### 3.1.4.2 FAUNA SPECIES

VBA and PMST searches retuned a total of 66 significant fauna species recorded, or predicted to occur, within 5 kms of the study area. Of these, 42 species are listed under the EPBC Act. This includes 15 species which are also listed under the EPBC Act as migratory. An additional 4 species listed under the EPBC Act as migratory without a threatened conservation status were also recorded. Of the 66 species, 24 are listed under the FFG Act only.

15 threatened fauna species are considered to have a moderate likelihood of occurring within the study area based on desktop assessment. Threatened fauna species which may occur are predominantly likely to be highly mobile vagrant birds that utilise wetland areas such as Eastern Great Egret *Ardea alba modesta* and Australasian Shoveler *Spatula rhynchotis*, which have previously been recorded within the study area and surrounding areas. EDNA samples have also shown the presence of Platypus *Ornithorhynchus anatinus* in the waterways that intersect the study area (DEECA, 2023e). The Platypus *Ornithorhynchus anatinus* was not returned in the VBA query, this is presumably due to this species being recently listed as vulnerable under the FFG Act, The VBA was subsequently searched for this species, returning records ~ 11 km north-west of the study area from the 1970s - 1980s. This species has subsequently been considered in the Likelihood of Occurrence assessment - Appendix B1.2.

Striped Legless Lizard *Delma impar*, Growling Grass Frog *Litoria raniformis* and Golden Sun Moth *Synemon plana* are considered to have a moderate likelihood of occurring with the study area potentially supporting habitat for these species. Consideration of significant fauna species returned by database searches is done with reference to the habitat values of the study area. Summaries of species considered likely to occur based on site assessment are provided in Section B1.2.

### 3.1.5 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

#### 3.1.5.1 EPBC ACT LISTED THREATENED ECOLOGICAL COMMUNITIES

The PMST identified five threatened ecological communities (TECs), listed under the EPBC Act that may occur within the study area. These are listed in Table 3.1 below.

EVC 55, modelled to occur within the study area, is synonymous with the TEC, 'Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia', Plains Grassy Wetland is synonymous with Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. No other EVCs are modelled within the study area that could qualify as the remaining four TECs. However the presence or absence of these EPBC Act listed communities must be based on the site assessment – refer Section 3.2.3.

Table 3.1 EPBC Act listed communities and presence as per the PMST report

| COMMUNITY NAME | STATUS | PRESENCE IN 5 KM OF STUDY AREA (PMST) | PRESENCE |
|---|---|---|---|
| Grassy Eucalypt Woodland of the Victorian Volcanic Plain | Critically Endangered | Community known to occur within area | Not identified during assessments |
| Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia | Endangered | Community may occur within area | Not identified during assessments |
| Natural Temperate Grassland of the Victorian Volcanic Plain | Critically Endangered | Community may occur within area | Not identified during assessments |
| Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains | Critically Endangered | Community likely to occur within area | Present – see section 3.2.3.1 |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | Community likely to occur within area | Not identified during assessments |

### 3.1.6 FFG ACT LISTED THREATENED ECOLOGICAL COMMUNITIES

The EPBC Act listed '*Grassy Eucalypt Woodland of the Victorian Volcanic Plain'* and Plains Grassy Woodland EVC 55 are synonymous with the FFG Act Threatened Community '*Western Basalt Plains (River Red Gum) Grassy Woodland* Community'. This includes elements of the FFG Act listed '*Victorian temperate woodland bird community.'* EVC 55 which is modelled to occur within the study area.

The actual presence/ extent of FFG Act listed communities within the study area must be based on site assessment (refer to Section 3.2.3.22.7.1.1).

### 3.1.7 WETLANDS AND WATERWAYS

Wetlands and waterways present within the study area are described in 3.1.2. There are no Ramsar wetlands mapped to occur within the study area or surrounding landscape. However, the Miner's Rest Wetlands and Lake Wendouree were considered Biosites in the now decommissioned database BioSite 100 (DELWP, 2014).

In addition to the wetlands in the study area previously described, the DELWP Victorian Wetland Inventory (Current) (DELWP, 2021d) indicates periodically-inundated natural wetlands occur in north and west sections of the study area, adjacent to Burrumbeet Creek and Macarthur Park Wetlands.

## 3.2 DETAILED ASSESSMENT RESULTS

### 3.2.1 GENERAL SITE CONDITION

The study area is, in general, predominantly modified from its likely condition pre-European settlement. Prior to colonial settlement the study area would have been a diverse mosaic of grassland and grassy woodland. The study area now consists predominantly of agricultural land, small patches of native vegetation along watercourses and roadsides, and the occasional scattered tree along property boundaries. The largest patch of native vegetation is that associated with the Miners Rest Recreation Reserve on properties 1, & 2.

### 3.2.2 FLORA

A total of 115 vascular plant species were recorded across the study area during the site assessment, of which 63 were indigenous (55%), 49 were introduced species (42%) and three were non-indigenous native species (3%). A list of the species recorded has been provided in D1.

#### 3.2.2.1 VEGETATION DESCRIPTIONS

Vegetated areas supported by the study area are best described by being either:

- modified exotic understorey
- planted woody species
- scattered trees
- remnant patches.

These vegetation types are discussed below are represented across the study area.

##### *MODIFIED EXOTIC UNDERSTOREY*

Understory over much of the study area is dominated by exotic herbs and grasses typical of land modified by a long history of agricultural use. These areas are primarily either cropped land, or highly modified uncultivated areas. Uncultivated areas support a suite of opportunistic colonising species, the majority being exotic. Sporadic and scattered occurrences of indigenous species are present at low (below 25%) coverage.

Exotic graminoids dominate highly modified uncultivated areas including Toowoomba Canary Grass **Phalaris aquatica,* Cocksfoot **Dactylis glomeratus*, Brown-top Bent-grass *A*grostis capillaris,* Couch **Cynodon dactylon*, Prairie Grass **Bromus Catharticus* and Paspalum **Paspalum dilatatum* and Annual Rye Grass **Lolium perenne.*

Exotic herbs across these areas are predominantly Ribwort **Plantago lanceolata*, Cat's Ear **Hypochoeris radicata,* Onion Grass **Romulea rosea* and Carpet Weed **Galenia pubescens*.

Opportunistic colonising indigenous species occur sporadically amongst exotic species in these areas, including Wallaby Grasses *Rytidosperma* spp., Native Millet *Panicum decompositum* and Windmill Grass *Chloris truncata.* Coverage of indigenous understory species occurring amongst modified exotic understory is patchy, sporadic and below 25% of vegetative cover (the % cover required to form a patch).

##### *PLANTED WOODY SPECIES*

Exotic, non-indigenous native, and indigenous woody species have been planted around the residential dwellings, in windrows along fence lines and property boundaries, and sporadically throughout paddocks. Species planted, in order of abundance, are primarily Southern Blue-gum *#Eucalyptus globulus ssp. bicostata,* Manna Gum *Eucalyptus viminalis subsp. viminalis,* Monterey Cyprus **Hesperocyparis macrocarpa* , Radiata Pine **Pinus radiata,* Sugar Gum *# Eucalyptus cladocalyx,* Giant Honey-myrtle *#Melaleuca armillaris,* Peppercorn **Schinus molle,* Weeping Willows **Salix babylonica,* and River Red-gums *Eucalyptus camaldulensis.*

##### *REMNANT PATCHES – VEGETATION QUALITY ASSESSMENTS*

There were approximately 26.6 ha of patches of remnant native vegetation identified across the study area. In addition to this, there are 25.72 hectares of Current Wetland (DELWP, 2013) modelled across the study area. This native vegetation is most attributable to six EVCs as detailed in Table 3.2 below. Occurrences of these patches are described in the paragraphs below and mapped in C2.

Table 3.2 Ecological Vegetation Classes mapped by WSP within the study area with associated state conservation significances

| ECOLOGICAL VEGETATION CLASS | STATUS | AREA | MEAN VQA | NUMBER OF PATCHES |
|---|---|---|---|---|
| Aquatic Herbland 653 | E | 2.51 | 39.83 | 11 |
| Creekline Grassy Woodland 68 | E | 1.48 | 9.69 | 13 |
| Plains Grassy Wetland 125 | E | 16.73 | 28.41 | 19 |
| Plains Grassy Woodland 55 63 | E | 1.63 | 12.18 | 49 |
| Tall Marsh 821 | V | 4.30 | 27.93 | 15 |
| Current Wetland | E | 25.72 | 44.00 | 10 |
| Totals | - | 52.36 | 18.12 | 117 |

*Status = Conservation status in the Victorian Volcanic Plain Bioregion*

*Area = hectares*

*Mean VQA = Mean vegetation quality score*

### *PLAINS GRASSY WOODLAND*

Forty-nine patches of Higher Rainfall Plains Grassy Woodland EVC 55_63 were mapped within the study area. Plains Grassy Woodland is defined as:

*'An open, eucalypt woodland to 15 m tall or acacia/sheoak woodland to 10 m tall. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer. This variant occupies areas receiving greater than 700 mm annual rainfall..'* (DELWP, 2016b)

*Recruiting indigenous Wattles most attributable to EVC 55*

*A scattered Swamp Gum Eucalyptus ovata on property 45 most attributable to EVC 55*

Patches of Plains Grassy Woodland within the study area were primarily due to occurrence of a naturally recruiting woodland understory being Blackwoods *Acacia melanoxylon* or Silver Wattles *Acacia dealbata*. These patches are not archetypal representations of EVC 55_63, being generally without canopy, or a relatively intact understory.

### *AQUATIC HERBLAND*

11 patches of aquatic native vegetation were mapped within the study area most attributable to Aquatic Herbland EVC 653. Aquatic Herbland is best descripted as:

*'Herbland of permanent to semi-permanent wetlands, dominated by sedges (especially on shallower verges) and/or aquatic herbs. Occurs on fertile paludal soils, typically heavy clays beneath organic accumulations.'* (DELWP, 2016b)

Aquatic Herbland occurs along watercourses and around farm-style dams across the study area. Higher quality patches occur within the Ballarat Common, and properties 35 & 40. Higher quality patches of Aquatic Herbland are dominated by Water Plantain *Alisma plantago-aquatica,* Tall Spike-rush

*Aquatic Herbland EVC 653*

*Aquatic Herbland EVC 653 on property 45*

*Eleocharis sphacelata,* Common Spike-sedge *Eleocharis acuta,* River Buttercup *Ranunculus inundatus,* Red Pondweed *Potamogeton ochreatus,* Slender Know-weed *Persicaria decipiens,* Common Nardoo *Marsilea drummondii* and Mud Dock *Rumex brownii.* Fringing vegetation was predominantly exotic being, for the most part, Towoomba Canary Grass.

### *TALL MARSH*

Tall Marsh EVC 821 was identified in the study area. Tall Marsh is described as:

*'Wetland dominated by tall emergent graminoids (rushes, sedges, reeds), typically in thick species-poor swards. Competitive exclusion in core wetland habitat - of optimum growing conditions for species tolerant of sustained shallow inundation. Occupies wetlands usually associated with anabranch creeks. Soils are almost permanently moist. Dominant species are tolerant of relatively deep and sustained inundation, but not total immersion for any sustained period.'* (DELWP, 2016b)

Tall marsh is well represented across the study area, with the largest patch on property 45 – Ballarat Common, across the Burrumbeet Creek, supports high coverage of Common Reed *Phragmites australis* and Narrowleaf Cumbungi *Typha domingensis*, along with some patches along the Burrumbeet Creek on properties 60, 74, 75, 78, 82, 92 & 101 with high coverage of River Club-sedge *Schoenoplectus tabernaemontani.*

*EVC 821 – Tall Marsh on property 45*

### *CREEKLINE GRASSY WOODLAND*

Creekline Grassy Woodland EVC 68 occurs along watercourses dominated by River Red-gums. Creekline Grassy Woodland is described as:

*'Eucalypt-dominated woodland to 15 m tall with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. Occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds.'* (DELWP, 2016b)

*Creekline Grassy Woodland EVC 68*

Higher quality Creekline Grassy Woodland occurs along a tributary of the Burrumbeet Creek on Property 45, inclusive of River Red-gums, Swamp-gums *Eucalyptus ovata,* and Woolly Tea-tree *Leptospermum lanigerum.* Less archetypal occurrences of EVC 68 occur along seasonally wet areas associated with the Burrumbeet Creek across properties 82, 92, 93, & 101 with coverage of indigenous species primarily due to Tall-sedge *Carex appressa*, Poong'ort *Carex tereticaulis* and Rushes *Juncus spp.*. Other species present include Common Spike Rush *Eleocharis acuta,* Small Loosestrife *Lythrum hyssopifolia* and Willow Herb *Epilobium hirtigerum.* These areas give way to vegetation dominated by Toowoomba Canary Grass **Phalaris aquatica*, Cooch **Cynodon dactylon,* Prairie Grass **Bromus catharticus* and other weedy exotics common to agricultural land.

### *PLAINS GRASSY WETLAND*

Plains Grassy Wetland EVC 125 was identified on properties 43, 44 & 35. Plains Grassy Wetland is described as:

*'This EVC is usually treeless, but in some instances can include sparse River Red Gum Eucalyptus camaldulensis or Swamp Gum Eucalyptus ovata. A sparse shrub component may also be present. The characteristic ground cover is 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, 2016b)

*Plains Grassy Wetland EVC 125 on property 43*

*Plains Grassy Wetland EVC 125 on property 43 with White Purslane Montia australasica and River Buttercup Ranunculus inundatus*

EVC 125 occurs throughout agricultural land within the study area across seasonally wet depressions. Higher quality patches of EVC 125 include high coverage of White Purslane *Montia australasica,* Amphibious Water-milfoil *Myriophyllum simulans,* Common Swamp Wallaby-grass *Amphibromus nervosus,* River Buttercup *Ranunculus inundatus,* Red Pondweed *Potamogeton ochreatus,* Common

Spike-sedge *Eleocharis acuta*, Common Nardoo *Marsilea drummondii*, and Mud Dock *Rumex bidens*. Weeds present include Wimmera Rye-grass **Lolium rigidum.* Buck's-horn Plantain **Plantago coronopus*, and Clustered Dock **Rumex conglomeratus.*

### 3.2.2.2 CANOPY TREES

Overall, 90 canopy trees occur within the study area, other than small trees in patches. Of these, 84 are Scattered trees, including 53 qualifying as large as per the most appropriate EVC benchmark. The remaining 6 Large canopy trees occurred within patches.

From the 59 Large Trees, 14 were recorded as providing arboreal habitat in the form of hollows or cracks, or bird nests.

Trees mapped are summarised in Table 3.3 below. This table includes whether each tree would be counted as Scattered tree (ST) or within a patch (canopy tree – large tree (LT)) as per the Guidelines (DELWP, 2017d). The full tree table, including habitat, arboreal habitat, Tree Protection Zone (m) and the attributed size class as per the most appropriate EVC is provided in D3.

*Scatterd Swamp Gum Eucalyptus ovata on property 74*

Table 3.3 Summary of indigenous canopy trees recorded within the study area

| SPECIES | LARGE TREES IN PATCHES | LARGE SCATTERED TREES | SMALL SCATTERED TREES | SCATTERED TREE TOTALS | TOTAL TREES |
|---|---|---|---|---|---|
| Black Sheoak *Allocasuarina littoralis* | | 1 | | 1 | 1 |
| River Red-gum *Eucalyptus camaldulensis* | 6 | 25 | 17 | 42 | 48 |
| Yellow Gum *Eucalyptus leucoxylon* | | 1 | 1 | 2 | 2 |
| Yellow Box *Eucalyptus melliodora* | | | 3 | 3 | 3 |
| Swamp Gum *Eucalyptus ovata* | | 14 | 4 | 18 | 18 |
| Peppermint *Eucalyptus radiata s.l.* Narrow-leaf | | 1 | | 1 | 1 |
| Candlebark *Eucalyptus rubida subsp. rubida* | | | 2 | 2 | 2 |
| Eucalypt *Eucalyptus spp.* | | 4 | 1 | 5 | 5 |
| Manna Gum *Eucalyptus viminalis subsp. viminalis* | | 7 | 3 | 10 | 10 |
| Totals | 6 | 53 | 31 | 84 | 90 |

### 3.2.2.3 THREATENED FLORA SPECIES

Target species, being Spiny Rice-flower *Pimelea* spinescens ssp. *spinescens,* Button Wrinklewort *Rutidosis leptorhynchoides,* Large-headed Fireweed *Senecio macrocephalus* or Matted Flax-lily *Dianella amoena* were not observed. Stiff Groundsel *Senecio behrianus* – EPBC Act Endangered, was also not observed, whoever are considered present amongst EVC 125 on property 2 where VBA records (DEECA, 2023e) indicate the presence of this species. River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable was observed on property 43. No other EPBC Act listed flora species were observed. Two FFG Act listed threatened, and four FFG Act Protected flora species were observed, these are detailed in Similarly all SHW totalling on properties 43 & 44 (2.143 ha) & 35 (0.845 ha), is considered habitat for River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable.

Table 3.4 below. Observations of flora species of conservation significance are mapped in C6.

Stiff Groundsel *Senecio behrianus* is considered present within a large patch of Plains Grassy Wetland EVC 125. All native vegetation comprising Plains Grassy Wetland EVC 125 – 12.901 ha, on property 2 is considered potential habitat for this species.

Similarly all SHW totalling on properties 43 & 44 (2.143 ha) & 35 (0.845 ha), is considered habitat for River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable.

Table 3.4 Flora species of conservation significance observed during targeted survey across Ballarat North Precinct

| SPECIES | COMMON NAME | CONSERVATION STATUS | PROPERTY |
|---|---|---|---|
| *Senecio behrianus*^ | Stiff Groundsel | cr En | 2 |
| *Amphibromus fluitans* | River Swamp Wallaby-grass | Vu | 43 – observed<br>35 & 44 – likely habitat. |
| *Senecio campylocarpus* | Floodplain Fireweed | en, P | 2 |

***Key:***
**Status under the *Flora and Fauna Guarantee Act 1988:*** cr = critically endangered, en = endangered, vu = vulnerable, P = protected.
**Status under the *Environment Protection and Biodiversity Conservation Act 1999:*** En = Endangered, Vu = Vulnerable.
^ – VBA records (DEECA, 2023e) of Stiff Groundsel *Senecio behrianus* are considered present on property 2.

## 3.2.3 THREATENED ECOLOGICAL COMMUNITIES

Threatened Ecological Communities were assessed to determine their presence within the study area. The results of these assessments are provided below.

### 3.2.3.1 EPBC ACT THREATENED ECOLOGICAL COMMUNITIES

The EPBC Act community identified within the study area are:

- 'Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains' – SHW, which is analogous with Plains Grassy Wetland EVC 125.

During the site assessment, none of the other EVCs mapped indicated that any other TECs were likely to occur on-site as listed in Table 3.1.

#### *SEASONAL HERBACEOUS WETLANDS (FRESHWATER) OF THE TEMPERATE LOWLAND PLAINS*

Overall, 15.889 ha of SHW was identified across seasonally wet depressions supporting native vegetation across 7 patches. All these patches are considered to qualify as this community, these Patches of SHW are listed in Table 3.5 below, along with areas, and *site conditions score* from VQA assessments. Vegetation qualifying as SHW is most attributable to EVC 125 and 653, all occurrences of SHW were around and across both artificial and natural land formation. There were 6 patches – Patches 35, 48, 72, 101, 102, & 107, of native vegetation supported by seasonally wet depressions that were identified as potentially qualifying as SHW, however these patches were all discounted for qualification as this community due to size and situation, as per page 13 of the listing advice (TSSC, 2012). Native vegetation qualifying as SHW are mapped in C2.

*Seasonal Herbaceous Wetland on Property 2*

Table 3.5 Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains identified across the Ballarat North Precinct

| ECOLOGICAL VEGETATION CLASS | PATCH NUMBER | AREA | SITE CONDITION SCORE | PROPERTY |
|---|---|---|---|---|
| Plains Grassy Wetland 125 | 6 | 1.570 | 28 | 43 |
| Plains Grassy Wetland 125 | 7 | 0.573 | 28 | 44 |
| Plains Grassy Wetland 125 | 62 | 12.127 | 33 | 2 |
| Plains Grassy Wetland 125 | 64 | 0.706 | 33 | 2 |
| Plains Grassy Wetland 125 | 65 | 0.068 | 33 | 2 |
| Aquatic Herbland 653 | 94 | 0.077 | 30 | 35 |
| Plains Grassy Wetland 125 | 111 | 0.768 | 28 | 35 |
| Totals | 7 | 15.89 | 30.43 | - |

#### 3.2.3.2 FFG ACT LISTED COMMUNITIES

There were no patches of native vegetation identified that were considered to align with any FFG Act listed ecological communities.

### *3.2.4 FAUNA*

#### 3.2.4.1 OBSERVATIONS

During field assessments, a total of 59 species were recorded, with a higher diversity observed where there are areas of native and planted vegetation and around wetland and creek habitats. Species commonly observed included Little Raven *Corvus mellori*, Australian Magpie *Gymnorhina tibicen*, and Red Wattlebird *Anthochaera carunculate*. Species such as Superb Fairy-wren *Malurus cyaneus*, White-plumed Honeyeater *Lichenostomus penicillatus*, and Grey Fantail *Rhipidura albiscarpa* were more commonly observed in native vegetation. In wetland habitat, Common Froglet *Crinia signifera,* Southern Brown Tree Frog *Litoria ewingii* and Pobblebonk *Limnodynastes dumerilii dumerilii* were commonly recorded, as well as birds such as White-faced Heron *Egretta novaehollandiae,* Purple Swamphen *Porphyrio porphyrio* and Australian White Ibis *Threskiornis molucca*. Exotic species observed include European Rabbit * *Oryctolagus cuniculus,* Common Blackbird * *Turdus merula* and Red Fox * *Vulpes vulpes*. Most of the species recorded are common in agricultural lands in the area.

*Southern Brown Tree Frog Litoria ewingii recorded along Sims Road*

Two threatened species were recorded, including Hardhead *Aythya australis* (listed as vulnerable under the FFG Act) and Tussock Skink *Pseudemoia pagenstecheri* (listed as endangered under the FFG Act). A full fauna species list is provided in D4.

#### 3.2.4.2 HABITAT

Fauna habitats were assessed by examining characteristics such as the structure and floristics of the canopy, understorey and ground vegetation, the structure and composition of the litter layer, and other habitat attributes important for feeding, protection, roosting or breeding. Fauna habitat assessments were undertaken during the initial site walkovers in late July

2023, and the refined throughout the latter half of 2023 when further site visits occurred. The identification of suitable fauna habitat helped to define the necessity of targeted survey for threatened fauna species and where these surveys should occur. Results of targeted fauna surveys are described in Section 3.2.4.6.

Identification of non-threatened native fauna habitat informs avoidance, mitigation measures, and salvage measures at the time of construction in accordance within the state *Wildlife Act 1975.*

The habitat identified for fauna within the study area are described in Table 3.6.

Table 3.6 Fauna habitat descriptions

| HABITAT | DESCRIPTION | VALUES |
|---|---|---|
| Trees and shrubs | Indigenous, native and exotic trees are supported by the study area. | Trees, including individual planted trees, may provide limited roosting, foraging and refuge habitat for native birds and microbats.<br>Shrubs may support smaller bird species which prefer less open areas and provide nesting and foraging habitat as well as connectivity for these species in the landscape. |
| Native understory | Small patches of planted tussocks and revegetated grasses. | Grassy understory, with organic litter, rocks and logs, provides various habitat resources for smaller indigenous reptiles and birds, or refuge for frogs where wet depression occur. However, this was limited in the study area. |
| Wooded Watercourses | Watercourses wooded with remnant vegetation such as Creekline Grassy Woodland EVC 68, recruiting indigenous species such as Silver Wattle *Acacia dealbata*, and Blackwoods *Acacia melanoxylon*, and planted and recruiting native and exotic revegetation. | These areas provide potential habitat for Platypus *Ornithorhynchus anatinus.* |
| Exotic grassy understory | This habitat is highly modified by agricultural use and is dominated by exotic noxious and environmental weedy species. There is generally minimal if any native species, and a general absence of tussock structure with these areas largely dominated by Brown-top Bent-grass **Agrostis capillaris*. | These areas provide foraging resources for common bird species and exotic fauna, such as House Mouse. **Mus musculus.*<br>Some common native species may utilise this habitat, however due to the degree of modification it has little potential value. It is unlikely to be habitat for threatened grassland fauna. |
| Ephemeral Shallow Marsh | An ephemeral habitat which is periodically inundated.<br>High quality examples are dominated by Common Spike-rush *Eleocharis acuta,* Nardoo *Marsilea drummondii,* and Slender Knotweed *Persicaria decipiens.* Low quality examples are dominated by Phalaris and other exotic grasses, with a lower native component. | Habitat likely to be utilised by a range of birds, frogs and other fauna. At the study area, this habitat may be utilised for foraging by some of the migratory waders, particularly species which do not require large open mudflat habitats e.g. Latham's Snipe. Other secretive wetland birds including Lewin's Rail may also utilise this habitat for foraging.<br>This habitat (and associated areas of deep marsh and deep open water) has the potential to support the threatened Growling Grass Frog. |

| HABITAT | DESCRIPTION | VALUES |
|---|---|---|
| Aquatic - Deep Marsh | A wetland habitat which is usually inundated. Deep Marsh species are present including Cumbungi *Typha domingensis,* Common Swamp Wallaby-grass *Amphibromus nervosus,* Curly Pondweed *Potamogeton crispus*. | At the study area, this habitat may be utilised by wetland birds, frogs and reptiles. Some threatened duck species may utilise this habitat periodically.<br>The Burrumbeet Creek and adjacent vegetation provides habitat for native frogs, reptiles, aquatic mammals (platypus and rakali) and birds local to the study area and dispersing throughout the landscape. |

#### 3.2.4.3 HABITAT CONNECTIVITY

Aside from some isolated dams and ponds, there is generally good connectivity of wetland/marsh habitat, particularly along Burrumbeet Creek in the study area. However, some parts of the creek are in poor condition, due to stock access and weed encroachment. Grassland and woodland habitat connectivity is generally poor across the study area, with patches of grassland being isolated from one another by large areas of cropped or modified agricultural land. Many of the remnant trees are isolated paddock trees. Although isolated, these may be important stepping stone habitat for birds and other more mobile fauna.

Many of the threatened and migratory species are highly mobile and are likely to utilise patches of habitat across the landscape even without direct connectivity.

It is noted in unofficial communications from DEECA, being the Natural Environment Program Ballarat North PSP Pitch, that Precinct development provides an opportunity to link the Miners Rest Wetland Reserve, Macarthur Park Wetlands, and the Ballarat Town Commons Wetlands. And that the role of Burrumbeet Creek as a valuable habitat corridor supporting wetland fauna and flora communities, and the creek between these wetlands can be enhanced through design and appropriate plantings (DEECA, 2023c).

#### 3.2.4.4 PLATYPUS HABITAT

Platypus *Ornithorhynchus anatinus* – listed as vulnerable under the FFG Act, has been recorded ~ 11 km north-west of the study area from the 1070s - 1980s. This species has subsequently been assumed to have a moderate likelihood of occurrence in in areas of suitable habitat. Suitable habitat is considered wooded vegetation along watercourses within the study area. Wooded vegetation has been classified as either medium quality – comprising indigenous vegetation being recruiting or remnant wattles or eucalyptus along watercourses, whilst woody exotic vegetation has been considered low quality. Assumed Platypus habitat is summarised in Table 3.7, and shown in mapping provided at C2.

*Assumed platypus habitat along the Burrumbeet Creek on property 23*

Table 3.7 Platypus assumed habitat

| PLATYPUS HABITAT CLASSIFICATION | AREA - HA | COUNT - HABITAT PATCHES |
|---|---|---|
| Low quality - exotic | 2.168 | 4 |
| Medium quality - indigenous woody vegetation | 1.145 | 6 |
| Total | 3.313 | 10 |

### 3.2.4.5 MIGRATORY BIRDS HABITAT

Targeted surveys for Migratory, Marine and threatened wetland bird species were not undertaken, however, potential habitat for migratory, and marine birds returned in the desktop VBA & PMST queries, for which there is suitable habitat resources, such as larger wetlands and farm style dams with fringing aquatic shallow and deep marsh vegetation, including those on properties 2, 35, 40, 41 & 45, have been considered to have at least a moderate likelihood of occurrence. Suitable wetland habitat should be considered potential habitat for the following migratory bird species listed in

Table 3.8 below.

*Migratory bird habitat on property 45*

Table 3.8 Wetland migratory and threatened birds considered to have at least a moderate likelihood of occurrence across the study area.

| Scientific Name | Common Name | Source | Conservation Status | | Likelihood of Occurrence |
|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | PMST | Mr | en | **Moderate** – may forage around larger perennial wetlands on property 45 whilst dispersing throughout the landscape |
| *Gallinago hardwickii* | Latham's Snipe, Japanese Snipe | PMST | M, Mr, V | | **Moderate –** possible habitat around wetlands and farm style dams on properties 2, 35, 40, 41 & 45. |
| *Anseranas semipalmata* | Magpie Goose | VBA | | vu | **High -** Species likely to periodically utilise habitat within the study area. |
| *Antigone rubicunda* | Brolga | VBA | | en | **Moderate** - Species may periodically utilise habitat within the study area. |
| *Ardea alba modesta* | Eastern Great Egret | VBA | | vu | **High -** Species likely to periodically utilise habitat within the study area. |
| *Hieraaetus morphnoides* | Little Eagle | VBA | | vu | **Moderate** - Species may periodically utilise habitat within the study area. |
| *Ixobrychus dubius* | Australian Little Bittern | VBA | | en | **Moderate** - Species may periodically utilise habitat within the study area. |
| *Oxyura australis* | Blue-billed Duck | VBA | | vu | **High -** Species likely to periodically utilise habitat within the study area. |
| *Spatula rhynchotis* | Australasian Shoveler | VBA | | vu | **High -** Species likely to periodically utilise habitat within the study area. |
| *Stictonetta naevosa* | Freckled Duck | VBA | | en | **High -** Species likely to periodically utilise habitat within the study area. |
| *Lewinia pectoralis* | Lewin's Rail | VBA | | vu | **Moderate** - Species may periodically utilise wetland habitat within the study area. |
| *Aythya australis* | Hardhead | VBA | | vu | **Observed** |
| *Biziura lobata* | Musk Duck | VBA | | vu | **High -** Numerous species records local to the study area. Individuals may periodically utilise deep marsh, wetlands and farm-style dams within the study area. |

### 3.2.4.6 TARGETED FAUNA SURVEYS

#### *GOLDEN SUN MOTH*

No Golden Sun Moth – GSM, were recorded during targeted survey undertaken for the species in the 2023-24 survey season. This was somewhat expected given the low quality of what was considered potential habitat. Potential habitat areas were identified in late June 2023 following seasonal senescence of Brown-top Bent-grass **Agrostis capillaris*, when the high coverage of this plant was non-apparent. At the time of GSM survey being December 2023, However, it was observed that much of the potential habitat within the study area was high in biomass, without the inter-tussock space required by the species for breeding (DEWHA, 2009a, DCCEEW, 2021) with much of what was considered potential habitat was dominated by Brown-top Bent-grass **Agrostis capillaris*.

Based on the results of the survey, and low quality of potential habitat present it is considered Golden Sun Moth are considered effectively absent across the study area. GSM survey results are shown in D5.

#### *GROWLING GRASS FROG*

No Growling Grass Frogs were recorded during targeted surveys. Similarly, no Growling Grass Frogs were recorded in previous targeted Growling Grass Frogs surveys within the study area (Biosis, 2023a). However, 5 non-target species were recorded during surveys, including four amphibians and one mammal. These species, and the number of individuals recorded during the survey period, are outlined in Table 3.9 below. Full results including weather conditions, times of survey, and species recorded at each site per survey round are provided as D6.

Table 3.9 Growling Grass Frog targeted survey results

| COMMON NAME | SCIENTIFIC NAME | NUMBER RECORDED | CONSERVATION STATUS |
|---|---|---|---|
| **AMPHIBIAN** | | | |
| Eastern Common Froglet | *Crinia signifera* | 9 | |
| Eastern Banjo Frog | *Limnodynastes dumerili* | 1 | |
| Spotted Marsh Frog | *Limnodynastes tasmaniensis* | 12 | |
| Whistling Tree Frog | *Litoria verreauxii* | 6 | |
| **MAMMAL** | | | |
| Rakali | *Hydromys chrysogaster* | 1 | |

Based on the results of targeted surveys, Growling Grass Frog is considered unlikely to currently occur within the study area. However, the creeks and associated wetlands are connected with known habitat ~8.6 km upstream via the Burrumbeet Creek and Slattery Creek in Creswick State Forest. It is reasonable to assume that under the right conditions (e.g. high rainfall/flooding) this species would be likely to utilise aquatic riparian habitat across the study area whilst dispersing throughout the landscape. As such, this species should be considered to have a moderate likelihood of occurrence along the Burrumbeet Creek and associated tributaries and riparian habitat. This should be taken into consideration for the design and mitigation strategy for the precinct – Section 4, and section 5 detailing potential regulatory and legislative implications.

#### *STRIPED LEGLESS LIZARD*

No Striped Legless Lizards were recorded during targeted surveys undertaken for this species. However, 11 non-target species were recorded during surveys, including five reptiles and six amphibians. These species, and the number of individuals recorded during the survey period, are outlined in Table 3.10 below. Full results including weather conditions, times of survey, and species recorded at each grid per check are provided as D7.

The majority of potential habitat for this species surveyed across the study area is considered to be generally low quality with weedy exotic graminoids providing excess biomass and shade, beyond what is described as ideal habitat structure for this species being remnant grassland. Although it is noted that the potential for this species to be present should not necessarily be excluded from secondary grassland, and areas dominated by exotic species if sufficient shelter is available (TSSC, 2016). In addition, there are no records of Striped Legless Lizard in the VBA within a 10km radius since 1990 (DELWP, 2021c). This species is considered effectively absent across Ballarat North Precinct.

Table 3.10 Striped Legless Lizard targeted survey results

| COMMON NAME | SCIENTIFIC NAME | NUMBER RECORDED | Conservation Status |
|---|---|---|---|
| **Reptiles** | | | |
| Common Garden Skink | *Lampropholis guichenoti* | 1 | |
| Lowland Copperhead | *Austrelaps superbus* | 4 | |
| Tussock Skink | *Pseudemoia pagenstecheri* | 99 | Endangered |
| Unidentified Skink | | 65 | |
| Unidentified Snake | | 1 | |
| **Amphibians** | | | |
| Common Froglet | *Crinia signifera* | 3 | |
| Southern Brown Tree Frog | *Litoria ewingii* | 10 | |
| Spotted Marsh Frog | *Limnodynastes tasmaniensis* | 107 | |
| Striped Marsh Frog | *Limnodynastes peronii* | 4 | |
| Whistling Tree Frog | *Litoria verreauxii* | 1 | |
| Unidentified Frog | | 3 | |

*TUSSOCK SKINK*

Of note are the number of records of Tussock Skink *Pseudemoia pagenstecheri*, which is listed as Endangered under the FFG Act, recorded during Striped Legless Lizard surveys. This species is difficult to quickly differentiate from the Southern Grass Skink and hybrids have been found where they co-occur (Coventry, 2019). However, the presence of paravertebral stripes on some individuals, prominent pale dorso-lateral stripes, continuous pale mid-lateral stripe, and breeding colours extending on to the tail, indicate Tussock Skink over Southern Grass Skink (refer Figure 3.1). Some individuals with intermediate characteristics were observed and were conservatively recorded as Tussock Skinks.

Tussock Skink were recorded at all grids except for grid 7 (which had been fully removed by week 3). It is reasonable to assume that Tussock Skink is present within exotic grassy understory across the precinct.

# 4 MITIGATION

The Guidelines (DELWP, 2017d), *Planning for biodiversity* (DELWP, 2017e), *Preparing a Native Vegetation Precinct Plan* (DELWP, 2017f), and other legislation and policy (such as the EPBC Act) require that all efforts must be made to avoid and minimise impacts to native vegetation and habitat before resorting to offsets. Recommended measures to avoid, minimise and mitigate impacts to both native vegetation and other ecological values observed during the field surveys (or otherwise considered likely to occur) are detailed in this section below, along with recommendations for further assessment that may be required, depending on the proposed PSP design.

It should be noted that these implications and recommendations only pertain to the properties surveyed.

## 4.1 AVOIDANCE AND MINIMISATION OF IMPACTS ON NATIVE VEGETATION - PLANNING

Avoidance and minimisation should be considered for the development of the site as per the Assessors' Handbook (DELWP, 2017a), including the development of a refined construction footprint. The Assessors' Handbook requires that the proponent demonstrates avoidance and minimisation in the following ways:

- any strategic level planning over the study area
- site level planning
- that no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

### *4.1.1 STRATEGIC LEVEL PLANNING*

Due to the potential for the project to avoid key habitat and the small amount of native vegetation present, strategic level planning (e.g. avoiding this site in lieu of another) is not considered applicable. It is likely that study area level planning can be used to ensure the project has minimal impact.

### *4.1.2 STUDY AREA (SITE) LEVEL PLANNING*

Based on the results of this assessment, the PSP should be developed in a manner that ensures areas of ecological importance are retained and improved. Specifically, the following recommendations are made with regard to site-level planning:

- Avoid all direct and indirect impacts to the Burrumbeet Creek, and unnamed tributaries, including associated wetland habitat. This should include incorporation of a buffer of habitat to minimise disturbance impacts and water quality and flow impacts. It is understood that the buffer distance will be investigated via a geomorphology and vegetation assessment in consultation with the CMA, however recommendations are still provided herein. The buffer distance should be determined based on habitat value and visibility in consultation with the Catchment Management Authority. From an ecological perspective, the buffer of watercourses should be in line with the sliding scale recommendations provided for calculating corridor widths in *Waterway Corridors; Guidelines for greenfield development areas within the Port Phillip and Westernport Region* (Melbourne Water, 2013), and retention should be combined with reinstatement/rehabilitation of these areas. Retention of the wetland habitat across the precinct should be retained, retention of all Seasonal Herbaceous Wetland (EPBC Act), and larger areas of Plains Grassy Wetland EVC 125, and Aquatic Herbland EVC 653 is recommended. Wetlands recommended for retention are shown in mapping at C2. Retention of wetlands to ensure maintenance of hydrology may be best guided by a water specialist, such advice may include:
  - Maintain a buffers around the wetlands as per the Waterway Corridors (Melbourne Water, 2013), such that proposed developments do not impact the integrity of the wetland.

  - Proposed changes to the upstream catchment, such as an increase in surface permeability or changes to drainage patterns, should be mitigated to replicate the pre-development flow regime and to maintain connectivity between upstream catchment flow paths and the wetlands.
  - Proposed outfalls located upstream of the wetlands should be designed to limit erosion and sedimentation risks to the wetlands.
  - Water quality targets from urban developments within the upstream catchment of the wetland are to comply with EPA Victoria *Publication 1739.1 Urban Stormwater Management Guidelines* (EPA, 2021) and CSIRO publication *Urban stormwater best practice environmental guidelines* (VSC, 1999).
- Consider retention of ecological values mapped in C2, High priority areas are higher quality understory, threatened ecological communities, large canopy trees, watercourses, indigenous revegetation and habitat for threatened species. Areas to consider for retention have been highlighted in mapping. Areas to consider for retention have been highlighted in mapping. Buffers of watercourses are simply indicating watercourses that might be considered for retention, not ideal buffer distances yet to be determined, as per point 1 above.
- It is recommended that targeted surveys for migratory birds be undertaken at the permit stage, to better inform potential impacts and mitigation measures. To minimise likely implications, it is recommended that buffers of habitat for migratory birds be as per the Waterway Corridors (Melbourne Water, 2013), and likely noise levels be kept to below impact thresholds - refer to section 3.1.1.2.
- Provide for tree regeneration or recruitment around retained remnant trees, by retaining as much area around Tree Protection Zones as possible to allow for germination from parent plants.
- Given the highly modified state of the landscape, and overall low coverage of remnant vegetation, it is recommended that in this case consideration also be given to the retention of Victorian-native and Australian-native revegetation.
- Incorporate planting of local indigenous species into precinct design, including shrubby species along watercourses to provide habitat for small birds, and Platypus. Consider habitat connectivity in the design of parks and in planting plans. Planting of trees and shrubs over wetlands should be minimised so that the mature woodland canopy does not exceed 15% cover, in order to minimise shading of habitat, which is not preferred for many indigenous species.
- Utilise fauna-sensitive lighting in the design of the precinct and other measures to minimise light pollution, particularly at wetlands and creeks, but also for birds flying overhead to and from the Water Treatment Farm.
- Consider noise impacts on wetland habitat. Minimise noisy roads nearby and utilise noise barriers where required. The requirement for noise barriers should be assessed during precinct design to limit noise below impact thresholds.

  There have been several attempts to identify a threshold level in traffic noise above which negative impacts occur, refer to section 3.1.1.2. Traffic noise should ideally be kept below 55–60 dBA (18 hr exposure), especially during the morning chorus. If larger, multi-carriage way, high-speed roads are proposed in proximity to wetlands, further noise studies may be required.
- Develop a timber re-use plan for any trees which must be felled, with preference given to re-use of timber for habitat (hollows for arboreal habitat or logs for terrestrial habitat). Install habitat timber in suitable retained woodland habitat.
- Design the precinct to maintain the existing natural surface hydrology, so as to not significantly alter aquatic and ephemerally wet habitats associated with the Burrumbeet Creek and associated tributaries.
- It is recommended that an aquatic ecology assessment be undertaken to evaluate potential for threatened aquatic species, in particular Yarra Pygmy Perch *Nannoperca obscura* and Dwarf Galaxias *Galaxiella pusilla* (threatened fauna species) within Burrumbeet Creek, as identified previously (Biosis, 2023b). This should be undertaken at the permit stage by proponents at the site level, if impacts to habitat are anticipated, and not at the precinct scale as a part of the PSP.

- Maintenance or improvement of connectivity for fauna is recommended, particularly beneath roads along the Burrumbeet Creek. Consideration should be given to maximise connectivity across the precinct. Connectivity should be considered in terms of:
  - Earthen substrate and vegetated underpasses should be maintained for fauna such as the Platypus, and frogs.
  - Where road widening is required, this should be minimised across watercourses to maximise vegetation growth beneath overpasses. Gaps between carriageways are beneficial where possible, also to maximise vegetation growth beneath overpasses.
  - Ensure that retained wetlands are allowed to experience current natural cycles of wetting and drying through the maintenance of current hydrological regimes.
  - Culverts beneath roads should be designed in a way that provides for fauna likely to use these for dispersal. Particular reference should be given as appropriate to the following:
  - *Guidelines for fish passage at small structures* (O'Connor et al., 2017)
  - *Growling Grass Frog Crossing Design Standards; Melbourne Strategic Assessment* (DELWP, 2017c).
- Further exploration of mitigation explored in development of preliminary design.

## 4.2 CONTROLS AND PROCEDURES FOR CONSTRUCTION

Although this project is in the early stages, measures to consider for construction have been included in this section of the report for early consideration. It is expected that these would be further developed following detailed design of the precinct.

Prior to, during and after construction, the mitigation process is typically managed through a Construction Environmental Management Plan (CEMP). A CEMP typically outlines all practicable measures to minimise and mitigate impacts on biodiversity from the construction and operational phase to the management and maintenance phases. The contractors will develop a CEMP that will include standard flora and fauna mitigation measures.

Prior to the commencement of any works, adequate briefing and induction of construction crews should occur to ensure that environmental values are given due consideration during construction. The following measures should be considered for inclusion within any CEMP for the project.

### *4.2.1 MINIMISING LOSS OF VEGETATION, HABITAT AND CONNECTIVITY*

#### 4.2.1.1 VEGETATION RETENTION AND PROTECTION

To ensure that any vegetation identified for retention is not damaged or inadvertently removed during the works, the following steps should be taken into consideration:

- Brief contractors regarding the protection of vegetation and habitat (particularly creeks and associated wetlands) and the purpose for avoidance and minimisation.
- Select the appropriate type and size of machine so that disturbance and impact to tree roots in proximity to works are minimised.
- Ensure No-go Zones are adequately fenced prior to any impacts occurring nearby in accordance with approved impact areas and retention areas. All No-go Zones should be clearly labelled.
- Utilise the services of an arborist on site to minimise impact to trees and check off on TPZ fencing. Utilise the services of an ecologist to check off on any other vegetation and habitat No-go Zone fencing.

#### 4.2.1.2 MINIMISING HABITAT DEGREDATION

Environmental controls during construction should include:

- No dewatering of the wetlands or creeks, or release of water into them.
- No stockpiles or ground disturbance in proximity to wetlands and creeks.
- No stockpiles within TPZs or No-go Zones.
- Include waste management measures such as ensuring waste and recycling bins are located at all construction sites and break areas as well as measures to avoid waste from construction materials entering habitat.
- Consider the impact of construction lighting and noise on fauna and utilise fauna-sensitive lighting and other measures such as temporary barriers where required.
- Measures to avoid sediment-laden run-off and other pollutants entering waterways during the clearing and construction phase of the proposal in line with the Victoria EPA Principals of Best Practice Guidelines.

#### 4.2.1.3 MINIMISING IMPACTS TO NATIVE FAUNA

- Pre-clearance inspections and clearance monitoring by an ecologist are recommended to minimise impacts to species of conservation significance as well as to minimise mortality of non-listed vertebrate fauna. The services required will depend upon the proposed impacts. Where possible, works around waterbodies providing aquatic habitat should be scheduled outside of the nesting period of most bird species, and outside of the window in which migratory shorebirds are present in Australia (i.e. undertake clearing Autumn-Winter where possible).
- If reinstatement of indigenous vegetation is to occur along watercourses, removal of exotic woody vegetation along watercourses should be somewhat staged, and coordinated with revegetation using indigenous woody species along watercourses so that habitat for Platypus is not significantly displaced or fragmented.

#### 4.2.1.4 WEED AND DISEASE MANAGEMENT

To ensure weeds and diseases are not brought onto work sites, or existing weeds and diseases (if they occur) are not spread to other sites, the following steps should be taken:

- Prepare a contractor environmental hygiene manual (or follow an existing one) outlining the necessary actions required to prevent weeds and diseases entering and/or leaving the site including:
- all machinery and vehicles should be free of weed propagules and/or material carrying potential diseases prior to commencement of work.
- if possible, begin work in areas close to native vegetation and move to areas dominated by introduced species or ensure machinery is thoroughly cleaned between sites.
- Where possible, avoid working at times of prolific seed set of noxious weeds to avoid their spread by machinery (generally summer for most of the noxious weeds present on site).

If areas of frog habitat are to be impacted, Chytrid Fungus controls for construction vehicles and personnel should also be implemented.

# 5 LEGISLATION AND POLICY

This section addresses any permits, approvals, management plans and offset requirements that may be required for the project under federal, State and local government environmental legislation, following implementation of the specified mitigation measures and containing all works to the designated construction footprint.

## 5.1 COMMONWEALTH

### 5.1.1 *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999* (EPBC ACT)

The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance (MNES). There are nine matters of national environmental significance to which the EPBC Act applies. These are:

- World heritage sites
- National heritage places
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- Listed threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

A 'significant impact' is defined under the EPBC Act as 'an impact that is important, notable, or of consequence, having regard to its context or intensity'(DoEE, 2013). If a project is likely to have a significant impact on one of the nine MNES, the 'action' must be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). This 'referral' is then released to the public for comment.

Two types of MNES have the potential to be impacted by the proposed project. These are:

Listed threatened species and communities:

- Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains (SHW) – 15.89 ha over 7 patches. – EPBC Act Critically Endangered. See Table 3.5.
- Stiff Groundsel *Senecio behrianus* is considered present within a large patch of SHW – 12.901 ha, on property 2 is considered potential habitat for this species – EPBC Act Endangered
- Similarly all SHW totalling on properties 43 & 44 (2.143 ha) & 35 (0.845 ha), is considered habitat for River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable.

Migratory and Marine bird species:

- White-bellied Sea-Eagle *Haliaeetus leucogaster* – Marine, is considered to have a moderate likelihood of occurrence around Property 45 – where it may forage whilst dispersing throughout the landscape.

- Latham's Snipe, Japanese Snipe *Gallinago hardwickii* – Threatened, Migratory and Marine, is considered to have a moderate likelihood of occurrence around Properties 2, 35, 40, 41 & 45 – where it may forage whilst dispersing throughout the landscape.

If impacts to identified habitat for the above listed MNES are anticipated, significant impact assessments will be required. If a significant impact on any of these MNES is likely based on the precinct design, a referral to DCCEEW under the EPBC Act would be recommended to determine implications under the EPBC Act.

It is recommended that all patches of SHW inclusive of wetland habitat for all identified MNES is avoided as per 4.1.2, It is expected that significant impacts can be avoided through sensitive design.

#### *LATHAM'S SNIPE*

As a precautionary measure, it is recommended that targeted surveys be undertaken for migratory wetland birds, in particular Latham's Snipe. For this species, only 18 birds need to regularly utilise an area for the habitat to be considered 'important' to that species (DoEE, 2017). For all others, numbers of birds likely to visit the habitat within the study area would be well below the threshold, which is: at least 0.1 per cent of the flyway population of a single migratory shorebird species, at least 2000 migratory shorebirds, or at least 15 migratory shorebird species (DoEE, 2017).

Should impacts be avoided to wetlands, and other mitigation measures detailed in Section 4 be incorporated in the design, it is preliminarily considered that the project is unlikely to significantly impact on these species, including Latham's Snipe. Once a design is proposed, an impact assessment should be undertaken for Latham's Snipe in accordance with the relevant significant impact criteria for shorebirds.

## 5.2 STATE

The following sections details potential implications under State law. It should be noted that although State Law is non applicable to Crown Land, regulators will still require impacts to be considered cumulatively, particularly in terms of the *Environment Effects Act 1978* and the *Planning And Environment Act 1987.*

### *5.2.1 ENVIRONMENT EFFECTS ACT 1978* (EE ACT)

Under the *Environment Effects Act 1978*, projects that could have a 'significant effect' on Victoria's environment can potentially require an Environmental Effect Statement. This Act applies to any public works 'reasonably considered to have or be capable of having a significant effect on the environment'. The Minister for Planning is the responsible person for assessing whether this Act applies.

Before commencing any public works to which this Act applies, the proponent must initiate an Environmental Effects Statement to be prepared and submit it to the Minister for the Minister's assessment of the environmental effects of the works.

The triggering of an Environment Effects Statement is dependent on the extent of impact within the study area and whether the impact triggers one or more of the referral criteria. A preliminary assessment based on the ecological aspects has been undertaken in accordance with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Ministerial Guidelines) (DTP, 2023, DSE, 2006) .

In order to undertake this assessment, a simple rating system was used to assess environmental aspects of the proposal against each EES Referral criterion outlined in the Ministerial Guidelines with commentary included to explain the basis for the assigned rating. The ratings were:

- **Criteria not met** – the proposal is unlikely to meet this criterion and would not trigger the need to submit a referral under the EES Act.
- **Uncertain** – based on current information it is unclear whether the proposal would meet the criteria.
- **Criteria met** – the proposal is likely to meet this criterion and may trigger the need for a referral.

— **Not applicable** – not applicable to an assessment of ecological values. Requires assessment by other disciplines.

Following precinct design, an assessment against both individual assessment individual and combined criteria (relating to ecological matters) set out in the Ministerial Guidelines (DTP, 2023) should be undertaken. EES Assessment criteria is provided for consideration in in Table 5.1 & Table 5.2 below.

With the recommendations in Section 4, it is unlikely the project will need to be referred as a result of proposed biodiversity-related impacts, as it is assumed much of the mapped habitat will be retained. However, this assessment will need to be revised once there is a proposed design.

Table 5.1 Individual ecologically relevant environmental effects assessment criteria

| **INDIVIDUAL CRITERIA** |
|---|
| Potential clearing of **10 ha** or more of native vegetation from an area that:<br>is of an Ecological Vegetation Class (EVC) identified as endangered; or<br>is, or is likely to be, of very high conservation significance; and<br>is not authorised under an approved Forest Management Plan or Fire Protection Plan. |
| Potential long-term loss of a significant proportion (e.g. 1 to 5 per cent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria. |
| Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term. |

Table 5.2 Combined ecologically relevant environmental effects assessment criteria

| **COMBINED CRITERIA** |
|---|
| Potential clearing of **10 ha** or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan. |
| Matters listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act):<br>— Potential loss of a significant area of a listed ecological community; or<br>— Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or<br>— Potential loss of critical habitat; or<br>— Potential significant effects on habitat values of a wetland supporting migratory bird species. |
| Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the National Parks Act 1975. |
| Potential extensive or major effects on beneficial uses of water bodies over the long term due to changes in water quality, stream flows or regional groundwater levels. |

### *5.2.2 FLORA AND FAUNA GUARANTEE ACT 1988* (FFG ACT)

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. FFG Act listed species which occur, or are likely to occur, in the study area are detailed in sections 3.2.2.3 (flora) and 3.2.4 (fauna).

#### 5.2.2.1 LISTING OF SPECIES AND COMMUNITIES

One of the main features of the Act is the listing process, whereby native species and communities of flora and fauna, and the processes that threaten native flora and fauna, are listed in the schedules of the Act. This assists in identifying those

species and communities that require management to survive and identifies the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.

**Protected flora**

Under the FFG Act, a permit from DEECA is required to 'take' (to kill, injure, disturb or collect) flora species that are members of protected taxa from public land. This does not apply to private land unless listed species are present and the land is declared 'critical habitat' for the species.

Protected flora are:

— plants that have been declared to be protected under section 46 of the FFG Act

— plants that are listed as threatened under section 10 of the FFG Act

— plants that belong to communities that are listed as threatened under section 10 of the FFG Act.

The FFG Act Amendment Act 2019 introduced changes to the categories of protected flora and the way they are regulated, including introducing two categories: 'restricted use protected flora' and 'generally protected flora'. Restricted use protected flora are exclusively threatened by take for commercial/personal use, and the taking of these species incidental to clearing for development works will not require a permit. Generally protected flora are threatened by take for reasons other than or additional to commercial/personal use (e.g. development clearing) and will require a permit to take for any purpose. The protected flora list is currently being reviewed, but for now, all protected flora are classified as generally protected flora.

The permit requirement under Section 47 of the FFG Act does not apply to the majority of the study area as it is private land, unless the landowner is managed or controlled by a public authority.

A permit will be required for impacts FFG Act listed species and communities across public land – properties. Should impacts to native vegetation on public land in the western part of the study area be proposed a permit is likely to be required for protected flora.

A number of parcels are owned by Ballarat City Council including parcels 1, 2, 23, 24, 62, 63, 64, 65,66, 67, 78, 79, 80, 81, 82, 83, 84, 85, 92, 93, 94, 95, 98, 99, 100, 101, 102, 103, 104. It is understood this land is considered public land, to which the FFG Act would apply. It is also understood the State department of Environment owns parcel 45 which would be public land to which the FFG Act would apply. Much of the study area is also Crown Land Many including many of the road reserves, and large parcels including properties 1, 2, & 45. Crown Land is shown on mapping at C1. Crown Land is effectively Public Land to which state law applies. A permit will be required for impacts FFG Act listed species across public land.

#### *FFG ACT CRITICAL HABITATS*

The *Flora and Fauna Guarantee Amendment Act 2019* expands the concept of critical habitat in the FFG Act and provides an inclusive list of factors which may contribute to an area being critical habitat. Critical habitats are areas determined under the FFG Act which make a significant contribution to the conservation of listed threatened species or communities. They may also include areas that support ecological processes or ecological integrity that significantly contribute to the conservation of listed species or communities. They can be on public or private land (DELWP, 2020).

Regulatory protection of critical habitat is provided by Habitat Conservation Orders (HCO). HCOs may be made by the Minister to conserve, protect or manage critical habitat. HCOs can prohibit damage to critical habitat or require

To date, no Critical Habitat Determinations have been produced in Victoria. It is unlikely any other habitat across the Ballarat North Precinct would be considered critical habitat for any FFG Act listed species.

### 5.2.2.2 FFG ACT PUBLIC AUTHORITY DUTY

The recently amended *Flora and Fauna Guarantee Act 1988* contains an obligation or duty on public authorities and ministers to consider potential biodiversity impacts, with consideration given to the act's objectives, when exercising their functions (DELWP, 2021a).

The objectives of the FFG Act are:

> (a) to guarantee that all taxa of Victoria's flora and fauna, other than taxa specified in the Excluded List, can persist and improve in the wild and retain their capacity to adapt to environmental change; and
>
> (b) to prevent taxa and communities of flora and fauna from becoming threatened and to recover threatened taxa and communities so their conservation status improves; and
>
> (c) to protect, conserve, restore and enhance biodiversity, including—
>
> (i) flora and fauna and their habitats; and
>
> (ii) genetic diversity; and
>
> (iii) ecological communities; and
>
> (iv) ecological processes; and
>
> (d) to identify and mitigate the impacts of potentially threatening processes to address the important underlying causes of biodiversity decline; and
>
> (e) to ensure the use of biodiversity as a natural resource is ecologically sustainable; and (f) to identify and conserve areas of Victoria in respect of which critical habitat determinations are made.

Guidance recommended to be considered, giving clarity to the act's objectives, are the Biodiversity Strategy, relevant action statements, Management Plans or critical habitat determinations. Potential impacts on biodiversity that should be considered include: long and short term impacts, detrimental and beneficial impacts, direct and indirect impacts, cumulative impacts and potentially threatening processes (DELWP, 2021a).

The VPA should consider the conservation of FFG Act listed spices and mitigation recommendations, aligning with the objectives of the FFG Act, as per their Public Authority Duty.

### 5.2.3 *PLANNING AND ENVIRONMENT ACT 1987* (P&E ACT)

The P&E Act provides the legal framework for the operation of Victoria's planning system, commonly referred to as *the Planning Scheme*. Sections of the Ballarat Planning Scheme of relevance to ecological matters are brought about by Clause 12.01, and subsequently Clause 52.17.

The objective of Clause 12.01-2S is to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This clause calls for policy documents to be considered as relevant:

- *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017d) (the Guidelines).
- *Assessor's handbook – applications to remove, destroy or lop native vegetation* (DELWP, 2018) (the Assessors handbook).

Clause 52.17 of the Ballarat Planning Scheme requires a permit for the clearance of native vegetation as per the Guidelines, and specifically with respect to the three-step approach of *avoidance, minimisation* and *offsetting* of native vegetation clearance.

Ecological maters are also required to be considered under Clauses 42.01 pertaining to an Environmental Significance Overlay (ESO), and clause 42.02 pertaining to a Vegetation Protection Overlay, where these overlays are mapped across land.

#### 5.2.3.1 PLANNING ZONES

The study area is zoned Farming Zone – FZ in the northern section and as Urban Growth Zone – UGZ in the southern section. No zonation pertains to ecological matters.

#### 5.2.3.2 PLANNING OVERLAYS

There are numerous planning overlays across the study area, of particular ecological relevance are the Environmental Significance Overlay ESO2 – Streamside and Waterside Protection, and ESO4 – Wastewater Treatment Plant Buffer Area.

There are no Vegetation Protection Overlays across the study area.

##### *ESO2 – STREAMSIDE AND WATERSIDE PROTECTION*

*STATEMENT OF ENVIRONMENTAL SIGNIFICANCE*

The quality and quantity of water within streams and watercourses is an issue of significance in relation to potable water supply, recreation and tourism, industry, agriculture and many other areas.

*ENVIRONMENTAL OBJECTIVE TO BE ACHIEVED*

- To maintain the quality and quantity of water within watercourses.
- To maintain the ability of streams and watercourses to carry natural flows.
- To prevent erosion of banks, stream beds and adjoining land and the situation of watercourses, drains and other features.
- To protect and support the long term future of flora and fauna habitats along watercourses.
- To ensure that development does not occur on land liable to flooding.

*PERMIT REQUIREMENTS*

- to construct any buildings or works.
- for any earthworks.

##### *ESO4 – WASTEWATER TREATMENT PLANT BUFFER AREA*

*STATEMENT OF ENVIRONMENTAL SIGNIFICANCE*

Ballarat is a large producer of wastewater which requires effective treatment before it can be released into the environment without detrimental impacts. This overlay seeks to provide for the ongoing operation of wastewater treatment plants.

*ENVIRONMENTAL OBJECTIVE TO BE ACHIEVED*

Preventing development within proximity to wastewater treatment plants which may have a detrimental impact on the ongoing operation of the plant.

*PERMIT REQUIREMENT*

None specified.

#### 5.2.3.3 BALLARAT EXCEPTIONAL TREE REGISTER

There is one tree, a Dutch Elm 134 Gillies Road identified on the Ballarat Exceptional Tree Register. There are no anticipated implications under any ecologically relevant legislation for impacts to this tree.

#### 5.2.3.4 GUIDELINES FOR THE REMOVAL, DESTRUCTION OR LOPPING OF NATIVE VEGETATION (THE GUIDELINES)

*The Guidelines* (DELWP, 2017d) have been designed to manage the risk to Victoria's biodiversity associated with the removal of native vegetation. The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria under the *Planning and Environment Act 1987.*

### *ASSESSMENT PATHWAY*

The assessment pathway determines the information that accompanies an application and the decision guidelines that are considered in determining the outcome of an application (DELWP, 2017d). The assessment pathway for an application to remove native vegetation reflects its potential impact on biodiversity and is determined from the location and extent of the native vegetation to be removed. The three assessment pathways are:

1 Basic – limited impacts on biodiversity.

2 Intermediate – could impact on large trees, endangered EVCs, and sensitive wetlands and coastal areas.

3 Detailed – could impact on large trees, endangered EVCs, sensitive wetlands and coastal areas, and could significantly impact on habitat for rare or threatened species.

The assessment pathway of an application is determined in accordance with Table 5.3.

Table 5.3 Permit application pathway determination

| EXTENT | LOCATION CATEGORY | | |
|---|---|---|---|
| | Location 1 | Location 2 | Location 3 |
| <0.5 hectares and not including any large trees | Basic | Intermediate | Detailed |
| <0.5 hectares and including one or more large trees | Intermediate | Intermediate | Detailed |
| ≥ 0.5 hectare | Detailed | Detailed | Detailed |

*Source: Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017d)*

Impacts to native vegetation within the project area fall in 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 state-wide EVC map); and a wetland designated under the Convention on Wetlands of International Importance (the Ramsar Convention). As such, vegetation removal will follow a Detailed Assessment Pathway.

### *ALL ASSESSMENT PATHWAYS*

Application requirements for all applications for a permit to remove native vegetation involve the following:

1 Information about the vegetation to be removed including:

- **a** the assessment pathway and reason for the assessment pathway. This includes the location category of the native vegetation to be removed. See paragraph above.
- **b** a description of the native vegetation to be removed accounted for as per the Guidelines – see section 3.2.2.1.
- **c** maps showing the native vegetation and property in context and vegetation to be removed as accounted for by the Guidelines. See C2.
- **d** the offset requirement, determined in accordance with the Guidelines.

2 Topographic and land information relating to the native vegetation to be removed.

3 Recent, dated photographs of the native vegetation to be removed. See section 3.2.2.1.

4 Details of any other native vegetation approved to be removed, or that was removed without the required approvals within 5 years of the permit application. Not applicable.

5 An avoid and minimise statement. See Section 4.1

6 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.

*NATIVE VEGETATION REMOVAL REPORT*

EnSym testing has been undertaken to give an indication of maximum hypothetical impacts and offset requirements. EnSym testing indicates that potential total impacts equate to a 56.291 ha extent, as per EnSym data standards (DELWP, 2017b). Associated offset requirements are detailed in Table 5.4 below and at Appendix E. It is noted that these results are a scenario test only.

Following further efforts to avoid and minimise impacts to native vegetation, and finalisation of precinct design, an NVR report will need to be sourced from DEECA to officiate clearance and offset requirements.

Table 5.4 Summarised vegetation clearance calculations and offset requirements

| **VEGETATION CLEARANCE** | |
|---|---|
| Assessment pathway | Detailed Assessment Pathway |
| Extent including past and proposed | 56.291 ha |
| Extent of past removal | 0 |
| Extent of proposed removal | 56.291 ha |
| No. Large trees proposed to be removed | 59 |
| Location category | Location 2<br>The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species. |
| **OFFSET REQUIREMENTS (IF PERMIT WAS GRANTED)** | |
| **General offset amount**[1] | 3.024 general habitat units |
| Vicinity | Glenelg Hopkins Catchment Management Authority (CMA) or Ballarat City Council |
| Minimum strategic biodiversity value score[2] | 0.313 |
| Large trees* | 44 large trees |
| Species offset amount[3] | 30.357 species units of habitat for Fragrant Leek-orchid, *Prasophyllum suaveolens*<br>17.493 species units of habitat for White Sunray, *Leucochrysum albicans subsp. tricolor* |
| Large trees* | 15 Trees |
| * The total number of large trees that the offset must protect | 59 large trees to be protected in either the general, species or combination across all habitat units protected |

*Source: EnSym report dated 12/03/2024 -*

*[1] The general offset amount required is the sum of all general habitat units in*

*[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.*

### 5.2.3.5 OFFSETING REQUIREMENTS

The offset target for clearance of all vegetation across the precinct would require a small amount (3.024) of General Habitat Units and 44 Large Trees, this is in addition to 2 onerous Species Units requirements and 15 Large Trees in

Species Habitat units protected. General habitat units are typically readily available, these general units may or may not be inclusive of a portion of the large trees required. Large tree offsets may need to be sourced separately to general units.

Species Units are not usually readily available, if at all. Species units may need to be created if required. It is recommended that effort be made to reduce impacts to native vegetation, in order to reduce the likelihood of species units being triggered.

#### 5.2.3.6 PREPARING AN NVPP

Sections 2.3 and 2.4 of *Preparing a Native Vegetation Precinct Plan* (DELWP, 2017f) detail the rational and reasoning for Native Vegetation Precinct Plans – NVPPs. According to guidance in section 2.3, a NVPP provides for up-front decision making, and the opportunity to inform key stakeholders regarding the retention and removal of native vegetation, avoidance and minimisation of higher value native vegetation, and offsetting clearance of native vegetation.

Section 2.4 details when an NVPP is appropriate. An assessment of the need for an NVPP against key guidance points in Section 2.4 has been provided in Table 5.5 below. Due to the possible clearance or retention of high value remnant vegetation, over numerous lots, an NVPP may be considered necessary for the Ballarat North PSP.

Table 5.5 Requirement for an NVPP – Ballarat North Precinct Structure Plan

| NVPP PURPOSE | BALLARAT NORTH NVPP RELEVENCE |
|---|---|
| NVPP used to map and assess significant native vegetation areas and define the size and location of regional and local parks, trail networks, waterway corridors and habitat links. | Significant native vegetation, wetland and watercourses supported by the study area. |
| The Precinct contains high value native vegetation and a clear direction about the extent of the vegetation loss is needed to inform the overall planning of the precinct. | Significant native vegetation supported by the study area. Clear direction about the extent of the proposed native vegetation loss is needed to inform the overall planning of the precinct. |
| Decisions about what vegetation is to be retained and the nature and location of offsets are needed at an early stage to inform and integrate with the preparation of a precinct structure plan or other strategic plan. | Advice regarding vegetation retention, beyond what is provided in this report – section 4.1, may be considered required. |
| There is an opportunity to consolidate offset requirements onto fewer sites or a preferred site, and maximise development on others. | Offset requirements, and lots/properties involved are yet to be determined. There does appear the opportunity to declare larger contiguous tracts of native vegetation for retention and smaller low quality occurrences for removal via an NVPP. |
| A precinct contains a number of properties and land managers and an NVPP is needed to coordinate development and native vegetation management. | Numerous properties and land managers involved. Including Private, Ballarat City Council and DEECA. It may be appropriate to undertaken an NVPP for Ballarat North Precinct. |

#### 5.2.3.7 AVOID AND MINIMISE

The three-step approach (avoid, minimise, offset) is the key policy in relation to the removal of native vegetation to achieve no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. It is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to only what is reasonably necessary, and that biodiversity is appropriately compensated for any removal of native vegetation that is approved (DELWP, 2017d).

The assessors' handbook (DELWP, 2017a) calls for the avoidance and minimisation statement to describe:

— any strategic level planning over the site,

— what site level planning has been done,

— that no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

Recommendations for avoidance and minimisation of impacts are provided in Section 4.1.

### 5.2.4 *WATER ACT 1989*

The Victorian *Water Act 1989* provides the framework for allocating surface water and groundwater throughout Victoria. Section 67 states that work on waterways, such as the construction of dams, weirs and erosion control structures, are licensed in accordance with the Water Act. The Act allows conditions to be included in a works licence to protect the "environment, including the riverine and riparian environment".

A key purpose of the Water Act is to "*provide formal means for the protection and enhancement of the environmental qualities of waterways*".

Under the Act approval must be sort from the Glenelg Hopkins Catchment Management Authority and a "Works on Waterways Permit" is required to "construct, alter, operate, remove or decommission any works on a waterway, including works to deviate (temporarily or permanently) a waterway, or a bore.

### 5.2.5 *WILDLIFE ACT 1975*

The *Wildlife Act 1975* is a key piece of legislation in Victoria for the protection of wildlife. The Act requires that wildlife research including fauna salvage and relocation is regulated through a permit system, which is managed by DEECA.

Authorisation for fauna removal/relocation must be obtained under the *Wildlife Act 1975* through a licence granted by DEECA. Any persons involved in fauna removal, salvage capture or relocation of fauna during mitigation measures must hold a current management authorisation under the *Wildlife Act 1975*.

There are no implications of the Wildlife Act 1975 relevant to the precinct planning stage. During development, pre-clearing survey and clearance monitoring, including salvage and relocation, is recommended for any areas of key habitat which are proposed to be impacted. This should include all large trees, and shrubby vegetation, and wetland areas. The qualified and experienced ecologist undertaking this work much have a current management authorisation under this Act.

### 5.2.6 *CATCHMENT AND LAND PROTECTION ACT 1994* (CALP ACT)

#### 5.2.6.1 DECLARED NOXIOUS WEEDS

The study area supports several weeds that are declared noxious under the CaLP Act. Plants occurring on this list are known to, or have the potential to, result in detrimental environmental and/or economic impact.

Under the CaLP Act, declared noxious weeds are categorised into four groups depending on their known and potential impact and specific circumstances for each region. These categories are:

— State Prohibited Weeds (S)

— Regionally Prohibited Weeds (P)

— Regionally Controlled Weeds (C)

— Restricted Weeds (R)

The field survey identified that study area supports four regionally controlled (C) and eight restricted weeds (R). These weeds are listed in Table 5.6 below.

Regionally Controlled weeds are usually widespread, but it is important to prevent further spread. It is the responsibility of the landowner to control these weeds on their property and on adjacent roadside reserves. Restricted Weeds are

considered to be a serious threat to primary production, Crown land, the environment and/or community health if they were traded in Victoria.

Measures to control both noxious weeds and pest animals during construction must be contained within the CEMP.

Table 5.6 CaLP Act weed species recorded within the study area

| SCIENTIFIC NAME | COMMON NAME | CALP ACT |
|---|---|---|
| *Allium vineale* | Crow Garlic | R |
| *Cirsium vulgare* | Spear Thistle | R |
| *Conium maculatum* | Hemlock | R |
| *Crataegus monogyna* | Hawthorn | R |
| *Cytisus scoparius* | English Broom | R |
| *Foeniculum vulgare* | Fennel | R |
| *Genista monspessulana* | Montpellier Broom | R |
| *Lycium ferocissimum* | African Box-thorn | C |
| *Rosa rubiginosa* | Sweet Briar | C |
| *Rubus fruticosus spp. agg.* | Blackberry | C |
| *Silybum marianum* | Variegated Thistle | R |
| *Ulex europaeus* | Gorse | C |

# 6 CONCLUSIONS AND RECOMMENDATIONS

The study area is, in general, predominantly modified from its likely condition pre-European settlement. Prior to colonial settlement the study area would have been a diverse mosaic of grassland and grassy woodland. The study area now is predominantly agricultural land, small patches of native vegetation along watercourses and roadsides, and the occasional scattered tree along property boundaries.

There were approximately 26.6 ha of patches of remnant native vegetation identified across the study area. In addition to this, there are 25.72 hectares of Current Wetland (DELWP, 2013) modelled across the study area. This native vegetation is attributable to six EVCs.

VBA records (DEECA, 2023e) of Stiff Groundsel *Senecio behrianus* – EPBC Act Endangered, are considered present on property 2. River Swamp Wallaby-grass *Amphibromus fluitans* – EPBC Act Vulnerable was observed on property 43. No other EPBC Act listed flora species were observed. Two FFG Act listed threatened, and four Protected flora species were observed.

Overall, 15.889 ha of *'Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains'* – SHW, was identified across 7 seasonally wet depressions supporting native vegetation.

No Golden Sun Moths, Growling Grass Frogs or Striped Legless Lizards were recorded during targeted survey.

Based on the results of targeted surveys, Growling Grass Frog is considered unlikely to currently occur within the study area. However, the creeks and associated wetlands are connected with known habitat ~8.6 km upstream via the Burrumbeet Creek and Slattery Creek in Creswick State Forest. It is reasonable to assume that under the right conditions (e.g. high rainfall/flooding) this species would be likely to utilise aquatic riparian habitat across the study area whilst dispersing throughout the landscape.

Two threatened species were recorded, including Hardhead *Aythya australis* (listed as vulnerable under the FFG Act) and Tussock Skink *Pseudemoia pagenstecheri* (listed as endangered under the FFG Act).

Platypus *Ornithorhynchus anatinus* – listed as vulnerable under the FFG Act, has been recorded ~ 11 km north-west of the study area from the 1070s - 1980s. This species has subsequently been assumed to have a moderate likelihood of occurrence in in areas of suitable habitat. Suitable habitat is considered wooded vegetation along watercourses within the study area.

Migratory, Marine and threatened wetland bird species were not undertaken, however, potential habitat for migratory, and marine birds returned in the desktop VBA & PMST queries, for which there is suitable habitat resources, such as larger wetlands and farm style dams with fringing aquatic shallow and deep marsh vegetation, including those on properties 2, 35, 40, 41 & 45.

If impacts to identified habitat for the above listed MNES are anticipated, significant impact assessments will be required. If a significant impact on any of these MNES is likely based on the precinct design, a referral to DCCEEW under the EPBC Act would be recommended to determine implications under the EPBC Act.

EnSym testing has been undertaken to give an indication of maximum impacts and offset requirements. EnSym testing indicates that potential total impacts equate to a 56.291 ha extent, as per EnSym data standards (DELWP, 2017b). The offset target for the clearance of all vegetation across the precinct would require a small amount (3.024) of General Habitat Units and 44 Large Trees, this is in addition to 2 onerous Species Units requirements and 15 Large Trees in Species Units protected.

# RECOMMENDATIONS

## *AVOID AND MINIMISE*

Based on the results of this assessment, the PSP should be developed to ensure that areas of ecological importance are retained and improved. Specifically, the recommendations in section 4.1.2, with regard to site-level planning, particularly the *avoidance and minimisation* of impacts to ecological values, should be considered.

## *NEXT STEPS*

- Following efforts to avoid and minimise impacts to native vegetation during the PSP design phase:
  - This report should be revised to include detail on the likelihood of an EES requirement.
  - This report should be revised to include Significant Impact Assessments (SIA) for any MNES possibly impacted by the precinct, or alternatively SIAs to be undertaken by proponents at permit stage.
  - an NVPP should be prepared to detail retention, removal and offsetting of native vegetation across the precinct.
- Properties 5, 7, 13, 15, 20, 28, 37, 38, 41, 46, 49, 68, 69, 77, 88 are likely to support low – moderate ecological values such as a scattered tree, or a small patch of native vegetation associated with an ephemeral depression or waterbody, and will likely require ecological assessment by proponents at permit stage. The remaining properties 34, 39, 49, 55, 56, 57, 59, 61 & 70 are unlikely to support any ecological values, however a due-diligence assessment to confirm this at permit stage would provide further assurance of this assumption, and guidance on any likely constraints and obligations under relevant biodiversity legislation.

# 7 LIMITATIONS

This report is provided by WSP Australia Pty Limited (WSP) for Victorian Planning Authority (*Client*) in response to specific instructions from the Client and in accordance with WSP's proposal dated 28 June 2023 and the standing agreement for the provision of Services between WSP and VPA dated 17 December 2021.

### *PERMITTED PURPOSE*

This Report is provided by WSP for the purpose described in the Agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (*Permitted Purpose*).

### *QUALIFICATIONS AND ASSUMPTIONS*

The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to the Client.

Except as otherwise stated in the Report and to the extent that statements, opinions, facts, conclusion and / or recommendations in the Report (*Conclusions*) are based in whole or in part on information provided by the Client and other parties identified in the report (*Information)*, those Conclusions are based on assumptions by WSP of the reliability, adequacy, accuracy and completeness of the Information and have not been verified. WSP accepts no responsibility for the Information.

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expenses (including any indirect, consequential or punitive losses or damages or any amounts for loss of profit, loss of revenue, loss of opportunity to earn profit, loss of production, loss of contract, increased operational costs, loss of business opportunity, site depredation costs, business interruption or economic loss) of any kind whatsoever, suffered on incurred by a third party.

# REFERENCES


ATMA ENVIRONMENTAL 2022. Preliminary site investigation: Wyndholm Park, Miners Rest *Prepared for APD Projects Pty Ltd.* Melbourne VIC: Atma Environmental Pty Ltd.

BIOSIS 2019. Preliminary biodiversity constraints assessment – Ballarat Northern Growth Area. *Report for APD Projects.* Melbourne VIC: Biosis Pty Ltd.

BIOSIS 2023a. 171 Gillies Road, Miners Rest: Growling Grass Frog Targeted Survey. *Report prepared for APD Projects.* Ballarat VIC: Biosis Pty Ltd.

BIOSIS 2023b. Commonwealth Games 2026 Major Venues and Villages Infrastructure Program: Miners Rest flora and fauna assessment. *Report to Development Victoria.* Melbourne VIC: Biosis Pty Ltd.

BROWN, G. W. & TOLSMA, A. D. 2009. A survey for the Golden Sun Moth Synemon plana on the Victorian Volcanic Plains. Melbourne: Arthur Rylah Institute for Environmental Research.

CITY OF BALLARAT 2015. The Ballarat Strategy: Our Vision for 2040 City Of Ballarat.

COVENTRY, R. A. 2019. *Retpiles of Victoria; A Guide to Identification and Ecology*, CSIRO.

DAWE 2020. Species Profile and Threats Database (SPRAT). *In:* COMMONWEALTH DEPARTMENT OF AGRICULTURE, W. A. T. E. (ed.). Online.

DCCEEW 2021. Conservation Advice for Synemon plana (Golden Sun Moth). Australian Government Department of Agriculture, Water and the Environment.

DCCEEW. 2023a. *the DCCEEW online Species Profile and Threats Database* [Online]. Available: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl [Accessed].

DCCEEW. 2023b. *Protected Matters Seach Tool* [Online]. Canberra. : Department of Agriculture Water and Environment. Available: http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf [Accessed].

DEECA. 2022. *Victorian Biodiversity Atlas (VBA)* [Online]. East Melbourne: Department of Energy, Environment and Climate Action. Available: https://vba.dse.vic.gov.au/vba/ [Accessed].

DEECA 2023a. Ballarat North Development Impacts to Biodiversity - Summary Report. Melbourne VIC: The Department of Energy, Environment and Climate Action.

DEECA. 2023b. *MapShare Vic* [Online]. Available: https://mapshare.vic.gov.au/mapsharevic/ [Accessed].

DEECA. Natural Environment Program Ballarat North PSP Pitch. 2023c.

DEECA 2023d. NatureKit. East Melbourne: Department of Energy, Environment and Climate Action.

DEECA. 2023e. *Victorian Biodiversity Atlas (VBA)* [Online]. East Melbourne: Department of Energy, Environment and Climate Action. Available: https://vba.dse.vic.gov.au/vba/ [Accessed].

DELWP 2013. Victorian Wetland Environments and Extent - up to 2013 (WETLAND_CURRENT/). *In:* DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).

DELWP 2014. Biosite database: BIOSITE_25 and BIOSITE_100. Department of Environment, Land, Water and Planning.

DELWP 2016a. Evaluation of the Melbourne Strategic Assessment Striped Legless Lizard Program. *In:* THE STATE OF VICTORIA DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).

DELWP 2016b. EVC Benchmarks for Vegetation Quality Assessment. Department of Environment Land Water and Planning.

DELWP 2016c. Native Vegetation - Modelled 1750 Ecological Vegetation Classes (with Bioregional Conservation Status). DataVic.

DELWP 2017a. Assessor's handbook; Applications to remove, destroy or lop native vegetation. *In:* PLANNING, D. O. E. L. W. A. (ed.).

DELWP 2017b. EnSym native vegetation regulation tool spatial data standards; For applications to remove native vegetation and protect native vegetation at an offset site. *In:* DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).

DELWP 2017c. Growling Grass Frog Habitat Design Standards - Melbourne Strategic Assessment. *In:* DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.). Melbourne, Victoria.

DELWP 2017d. Guidelines for the removal. destruction or lopping of native vegetation. Department of Environment Land Water and Planning.

DELWP 2017e. Planning for Biodiversity; Guidance.

DELWP 2017f. Preparing a Native Vegetation Precinct Plan. *In:* PLANNING, D. O. E. L. W. A. (ed.).

DELWP 2018. Assessor's handbook: Applications to remove, destroy or lop native vegetation. Department of Environment Land Water and Planning.

DELWP 2020. Flora and Fauna Guarantee Act 1988; Critical habitat and habitat conservation orders. *In:* DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).

DELWP 2021a. Flora and Fauna Guarantee Act 1988; Public authority duty. *In:* DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).

DELWP. 2021b. *Native Vegetation Information Management System (NVIM)* [Online]. Department of Environment, Land, Water and Planning. Available: https://nvim.delwp.vic.gov.au/ [Accessed].
DELWP. 2021c. *Victorian Biodiversity Atlas (VBA)* [Online]. East Melbourne: Department of Environment, Land, Water and Planning. Available: https://vba.dse.vic.gov.au/vba/ [Accessed].
DELWP 2021d. Victorian Wetland Inventory (Current). *In:* DEPARTMENT OF ENVIRONMENT, L., WATER & PLANNING (ed.).
DELWP 2022. MSA MapShare.
DELWP undated. Characteristics of Threatened Communities - Flora and Fauna Guarantee Act 1988 – Threatened List. Department of Environment, Land, Water and Planning.
DEPI 2009. Native Vegetation - Modelled Extent 2005. *In:* ARTHUR RYLAH INSTITUTE (ed.). Biodiversity and Ecosystem Services (DEPI).
DEWHA 2009a. Background Paper to EPBC Act Policy Statement 3.12 – Nationally Threatened Species and Ecological Communities: Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*) *In:* DEPARTMENT OF ENVIRONMENT, W., HERITAGE AND ARTS (ed.). Canberra.
DEWHA 2009b. *EPBC Act policy statement 3.11 Significant impact guidelines for the critically endangered Spiny Rice Flower. . In:* AUSTRALIA, C. O. (ed.). Australian Government Department of Environment Water Heritage and the Arts.
DEWHA 2009c. Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*) *Background paper to teh EPBC Act policy statement 3.12 - Nationally threatened species and ecological communities.* Canberra: Department of Environment Water Heritage and the Arts,.
DEWHA 2009d. Significant Impact Guidelines for the Vulnerable Growling Grass Frog (Litoria raniformis). Nationally threatened species and ecological communities EPBC Act Policy Statement 3.14. . *In:* AUSTRALIAN GOVERNMENT, D. O. T. E., WATER, HERITAGE AND THE ARTS. (ed.). Canberra. .
DEWHA 2010. Survey guidelines for Australia's threatened frogs - guidelines for detecting frogs listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. *In:* DEPARTMENT OF THE ENVIRONMENT, W., HERITAGE AND THE ARTS (ed.). Department of the Environment, Water, Heritage and the Arts.
DOEE 2013. Matters of National Environmental Significance - Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999. Canberra: Commonwealth Department of the Environment.
DOEE 2017. Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. Commonwealth of Australia, Department of Environment and Energy.
DSE 2004. Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – guidelines for applying the habitat hectares scoring method version 1.3 East Melbourne: Department of Sustainability and Environment.
DSE 2006. Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978. Department of Sustainability and Environment.
DSEWPAC 2011a. Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable striped legless lizard, Delma impar. Canberra: Department of Sustainability, Environment, Water, Populations and Communities.
DSEWPAC 2011b. Nationally Threatened Ecological Communities of the Victorian Volocanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland. *In:* DEPARTMENT OF SUSTAINABILITY , E., WATER, POPULATIONS AND COMMUNITIES (ed.). Commonwealth of Australia.
DSEWPAC 2011c. Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act 1999., . *In:* DEPARTMENT OF THE ENVIRONMENT, W., HERITAGE AND THE ARTS., (ed.).
DSEWPC 2011. Survey guidelines for Australia's threatened reptiles. Canberra: Department of Sustainability, Environment, Water, Populations and Communities.
DTP 2023. Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978. *In:* PLANNING, D. O. T. A. (ed.).
EPA 2021. EPA Victoria Publication 1739.1 Urban Stormwater Management Guidelines. *In:* VICTORIA, E. P. A. (ed.).
GOOGLE. 2023. *Google Maps* [Online]. Imagery 2015 Sinclair Knight Merz: Google. Available: https://www.google.com.au/maps/place/Melbourne+VIC/@-37.971237,144.4926947,9z/data=!3m1!4b1!4m5!3m4!1s0x6ad646b5d2ba4df7:0x4045675218ccd90!8m2!3d-37.8136276!4d144.9630576 [Accessed].
GOOGLE. 2024. *Google Maps* [Online]. Imagery 2015 Sinclair Knight Merz: Google. Available: https://www.google.com.au/maps/place/Melbourne+VIC/@-37.971237,144.4926947,9z/data=!3m1!4b1!4m5!3m4!1s0x6ad646b5d2ba4df7:0x4045675218ccd90!8m2!3d-37.8136276!4d144.9630576 [Accessed].
HANSEN 2018. The Northern Greenfield Investigation Area: Ballarat Long Term Growth Options Investigations. VIC: Hansen Partnership Pty Ltd.

HANSEN PARTNERSHIP 2018. Ballarat Long Term Growth Options Investigations: the Northern GIA. Ballarat: Hansen Partnership Pty Ltd.
MELBOURNE WATER 2013. Waterway Corridors; Guidelines for greenfield development areas within the Port Phillip and Westernport Region
NEWALL, P. & LLOYD, L. 2007. Environmental Values of Burrumbeet Creek. *Preapred for Glenelg Hopkins Catchment Management Authority (GHCMA).* Victoria: Lloyd Environmental.
O'CONNOR, J., STUART, I. & CAMPBELL-BESCHORNER, R. 2017. Guidelines for fish passage at small structures. Heidelberg, Victoria: Arthur Rylah Institute for Environmental Research. Technical Report Series No. 276. Department of Environment, Land, Water and Planning.
O'SHEA, M. B. 2005. *Methods for Assessment and Techniques for Management of Striped Legless Lizard Delma impar Populations in South-eastern Australia* Bacholor of Applied Science (Honours), Victoria University, Australia.
PRACTICAL ECOLOGY 2009. Flora & Fauna Assessment and Net Gain Analysis, Ballarat Resort Site, Cardigan. *Report prepared on behalf of the Tiga (Ballarat) Pty Ltd.* Melbourne VIC: Practical Ecology Pty Ltd.
PRACTICAL ECOLOGY 2014. Vegetation Management Plan Miners Rest Wetland, Miners Rest. *Prepared for the City of Ballarat.* Melbourne VIC: Practical Ecology Pty Ltd.
PYŠEK, P., RICHARDSON, D. M. & WILLIAMSON, M. 2004. Predicting and explaining plant invasions through analysis of source area floras: some critical considerations. *Diversity and Distributions,* 10**,** 179-187.
ROYAL BOTANIC GARDENS MELBOURNE. 2016. *Flora of Victoria* [Online]. National Herbarium of Victoria, Royal Botanic Gardens Melbourne. Available: https://vicflora.rbg.vic.gov.au/ [Accessed].
TREELOGIC 2022. 171 Gillies Road, Miners Rest. *Prepared for Wyndholm Park Developer Pty Ltd.* Melbourne VIC: TreeLogic.
TREELOGIC 2023. Commonwealth Games Site 6 - 136 Howe Street, Miners Rest: Preliminary arboricultural assessment and report *Prepared for Biosis Pty Ltd.* Ringwood VIC: TreeLogic.
TSSC 2009. Commonwealth Listing Advice on Grassy Eucalypt Woodland of the Victorian Volcanic Plain. *In:* DEPARTMENT OF THE ENVIRONMENT, W., HERITAGE AND THE ARTS (ed.). Threatened Species Scientific Committee.
TSSC 2012. Commonwealth Listing Advice on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. *In:* THREATENED SPECIES SCIENTIFIC COMMITTEE, D. O. S., ENVIRONMENT, WATER, POPULATION AND COMMUNITIES (ed.). Canberra.
TSSC 2016. Approved Conservation Advice for Delma impar (striped legless lizard). *In:* ENERGY, D. O. T. E. A. (ed.). Canberra.
VPA 2021. Precinct Structure Planning Guidelines. Victorian Planning Authority.
VSC 1999. Urban Stormwater; Best Practice Environmental Management Guidelines. *In:* COMMITTEE, V. S. (ed.). CSIRO Publishing.

# APPENDIX A

## PROPERTY ACCESS DETAILS

# A1.1 PROPERTY ACCESS DETAILS

Table 7.1 Cadastre details of properties accessed for surveys within the Ballarat North Precinct

| VPA_LOTNO | PARCEL_SPI | AREA (HA) | ACCESSED |
|---|---|---|---|
| 1 | 90A~B\PP5531 | 1.816 | Yes |
| 2 | 18B~5\PP2542 | 17.25 | Yes |
| 3 | 18A~5\PP2542 | 1.065 | Yes |
| 4 | 19~5\PP2542 | 1.847 | Yes |
| 5 | 50~5\PP2542 | 12.556 | No |
| 6 | 1\TP97362 | 6.058 | Yes |
| 7 | 1\TP5407 | 6.517 | No |
| 8 | 1\TP909412 | 9.742 | Yes |
| 9 | 1\TP848231 | 1.856 | Yes |
| 10 | 46~5\PP2542 | 6.507 | Yes |
| 11 | 47~5\PP2542 | 1.527 | Yes |
| 12 | 42~5\PP2542 | 5.323 | Yes |
| 13 | 41~5\PP2542 | 5.205 | No |
| 14 | 2\PS818238 | 7.15 | Yes |
| 15 | 33~5\PP2542 | 6.082 | No |
| 16 | 2\PS321647 | 9.5 | No |
| 17 | 1\PS321647 | 2.004 | No |
| 18 | 31~5\PP2542 | 5.838 | Yes |
| 19 | 1\TP113226 | 0.572 | Yes |
| 20 | 30~5\PP2542 | 6.207 | No |
| 21 | 29~5\PP2542 | 5.492 | Yes |
| 22 | 2042\PP2542 | 0.417 | N/A |
| 23 | 51~5\PP2542 | 10.174 | Yes |
| 24 | 52~5\PP2542 | 7.703 | Yes |
| 25 | 45~5\PP2542 | 10.411 | Yes |
| 26 | 43~5\PP2542 | 5.834 | Yes |
| 27 | 2043\PP2542 | 0.166 | N/A |
| 28 | 40~5\PP2542 | 6.08 | No |
| 29 | 1\PS818238 | 2.026 | Yes |
| 30 | 34~5\PP2542 | 4.885 | Yes |
| 31 | 36~5\PP2542 | 4.888 | Yes |
| 32 | 1\TP167559 | 0.492 | Yes |
| 33 | 37~5\PP2542 | 5.149 | Yes |
| 34 | 38~5\PP2542 | 4.664 | No |
| 35 | 44~5\PP2542 | 7.169 | Yes |
| 36 | 1\TP14481 | 61.257 | Yes |
| 37 | 1\PS419033 | 4.794 | No |
| 38 | S2\PS419033 | 2.498 | No |
| 39 | 3\LP119240 | 0.405 | No |
| 40 | 42A\PP2542 | 9.07 | Yes |
| 41 | 43A\PP2542 | 9.453 | Yes |
| 42 | 1\TP908367 | 40.947 | Yes |

| VPA_LOTNO | PARCEL_SPI | AREA (HA) | ACCESSED |
|---|---|---|---|
| 43 | 2\TP908367 | 63.485 | Yes |
| 44 | 3\TP908367 | 51.886 | Yes |
| 45 | R2\PP2542 | 87.921 | Yes |
| 46 | 1\PS331091 | 25.678 | No |
| 47 | RES1\PS519824 | 5.867 | Yes |
| 48 | 1\TP19007 | 0.252 | No |
| 49 | 35\PP2046 | 24.622 | No |
| 50 | 2100\PP2046 | 4.292 | N/A |
| 51 | 2\PS622085 | 50.484 | Yes |
| 52 | 1\PS622085 | 3.78 | Yes |
| 53 | 1\LP98602 | 2.028 | Yes |
| 54 | 2\PS503069 | 8.891 | Yes |
| 55 | 1\PS503069 | 0.405 | No |
| 56 | 1\LP143916 | 7.699 | No |
| 57 | 2\LP143916 | 9.995 | No |
| 58 | 1\TP832588 | 22.508 | Yes |
| 59 | 1\TP962488 | 0.08 | No |
| 60 | 2\TP832588 | 7.211 | Yes |
| 61 | 1\TP960919 | 0.111 | No |
| 62 | 1\TP682346 | 2.072 | Yes |
| 63 | 2\TP682346 | 2.047 | Yes |
| 64 | 5\TP682346 | 1.152 | Yes |
| 65 | 4\TP682346 | 0.851 | Yes |
| 66 | 7\TP749301 | 1.132 | Yes |
| 67 | 1\TP749301 | 1.979 | Yes |
| 68 | B~25\PP2046 | 2.025 | No |
| 69 | 25C\PP2046 | 2.023 | No |
| 70 | 1\TP551446 | 7.735 | No |
| 71 | 5\TP805211 | 7.72 | Yes |
| 72 | 4\TP805211 | 5.426 | Yes |
| 73 | 3\TP805211 | 2.306 | Yes |
| 74 | 2\TP805211 | 3.242 | Yes |
| 75 | 1\TP805211 | 2.562 | Yes |
| 76 | H~26\PP2046 | 1.23 | Yes |
| 77 | G~26\PP2046 | 0.817 | No |
| 78 | 3\TP682346 | 2.065 | Yes |
| 79 | 6\TP682346 | 0.855 | Yes |
| 80 | 5\TP749301 | 1.126 | Yes |
| 81 | 3\TP749301 | 1.979 | Yes |
| 82 | 7\TP682346 | 0.858 | Yes |
| 83 | 6\TP749301 | 1.122 | Yes |
| 84 | 2\TP749301 | 1.982 | Yes |
| 85 | 4\TP749301 | 0.491 | Yes |
| 86 | 1\LP115325 | 2.022 | Yes |
| 87 | 2\LP115325 | 2.022 | No |
| 88 | 1\TP832150 | 1.12 | No |
| 89 | 1\TP846572 | 0.425 | Yes |

| VPA_LOTNO | PARCEL_SPI | AREA (HA) | ACCESSED |
|---|---|---|---|
| 90 | 3\TP846568 | 2.059 | Yes |
| 91 | 2047\PP2046 | 0.391 | Yes |
| 92 | 1\TP846568 | 1.977 | Yes |
| 93 | A~18\PP2046 | 2.004 | Yes |
| 94 | 4\TP846568 | 2.02 | Yes |
| 95 | 5\TP846568 | 2.018 | Yes |
| 96 | 1\TP854190 | 17.99 | Yes |
| 97 | 1\TP10145 | 7.161 | Yes |
| 98 | 1\TP940287 | 0.279 | Yes |
| 99 | F~17\PP2046 | 0.765 | Yes |
| 100 | 8\TP846568 | 1.957 | Yes |
| 101 | 2\TP846568 | 2.024 | Yes |
| 102 | 9\TP846568 | 0.237 | Yes |
| 103 | 7\TP846568 | 0.841 | Yes |
| 104 | 6\TP846568 | 0.919 | Yes |

# APPENDIX B

## LIKELIHOOD OF OCCURRENCE ASSESSMENTS

## B1.1 FLORA LIKELIHOOD OF OCCURRENCE

| SCIENTIFIC NAME | COMMON NAME | SOURCE | CONSERVATION STATUS | | COUNT OF SIGHTINGS | LAST RECORD | HABITAT DESCRIPTION | LIKELIHOOD OF OCCURRENCE |
|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Acacia howittii* | Sticky Wattle | VBA | | vu # | 8 | 23/04/2012 | Confined to eastern Victoria from the upper Macalister River area near Mt Howitt south to near Yarram and east to near Tabberabbera. Collections from near Daylesford and Melbourne are presumably of cultivated origin. Grows in moist forest. | **Low** - No suitable habitat to support this species. |
| *Amphibromus fluitans* | River Swamp Wallaby-grass | VBA PMST | VU | | 1 | 11/07/2006 | Largely confined to permanent swamps, principally along the Murray River between Wodonga and Echuca, uncommon to rare in the south (e.g. Casterton, Moe, Yarram), probably due to historic drainage of wetlands. | **Present -** property 43. High likelihood property 35 & 44. |
| *Amphibromus sinuatus* | Wavy Swamp Wallaby-grass | VBA | | en | 3 | 11/12/1990 | Rare and apparently confined to permanent swamps in cool, sometimes elevated sites, and disjunctly distributed (e.g. near Casterton, Warrnambool, Phillip Island, Wonthaggi, Bairnsdale, Suggan Buggan and Bendoc). | **Low** - No suitable habitat to support this species. |
| *Caladenia ornata* | Ornate Pink Fingers | PMST | VU | en | | | Apparently endemic to Victoria, where known only from the south-west in heathy forest on seasonally moist sandy loam. | **Low** - No suitable habitat to support this species. |
| *Comesperma polygaloides* | Small Milkwort | VBA | | cr | 1 | 1/09/1992 | Occasional on heavier soils (clays, alluvium) supporting grassland and grassy woodland communities in central and south-western areas. | **Low** - Lack of abundant and recent records within the locality. |
| *Coronidium gunnianum* | Pale Swamp Everlasting | VBA | | cr | 1 | 19/12/1990 | Widespread throughout the state except for the north-west and the alpine and adjacent mountainous areas, and usually at low elevations (under c. 100m) where mostly in grasslands and riverine *Eucalyptus camaldulensis* woodland on soils that are prone to inundation. | **Low** - Lack of abundant and recent records within the locality. |
| *Dianella amoena* | Matted Flax-lily | VBA PMST | EN | cr | 1 | 29/11/2012 | Occurs mainly in lowland grasslands, grassy woodlands, valley grassy forest and creeklines of herb-rich woodland. | **Low** - Lack of abundant and recent records within the locality. |
| *Diuris behrii* | Golden Cowslips | VBA | | en | 6 | 3/10/2008 | Locally common in grassland and open woodland mostly in western Victoria. | **Low** - Lack of abundant and recent records within the locality. |
| *Dodonaea procumbens* | Trailing Hop-bush | PMST | VU | | | | Largely confined in Victoria to the south-west (Penola-Dergholm area, Grampians, Lake Fyans) with outlying occurrences near Castlemaine, Avoca, Skipton, Camperdown and extraordinary disjunctions near Sale. Grows in low-lying, often winter-wet areas in woodland, low open-forest and grasslands on sands and clays. | **Low** - No suitable habitat to support this species. |
| *Eucalyptus aggregata* | Black Gum | PMST | VU | vu | | | Black gum is endemic to south-eastern Australia and is found in the ACT, NSW and in a small isolated sub-population in Victoria. In Victoria, known stands are restricted to within four kilometres of Woodend-Gisborne region, occurring primarily along roadsides and streamlines. | **Low** - Species not known to occur in the area. |
| *Eucalyptus brookeriana* | Brooker's Gum | VBA | | en | 20 | 5/05/2023 | It occurs in two areas, on the northern foothills of the Otway Ranges, and north of the Great Dividing Range in the Bells Reef-Trentham area. | **Moderate -** study area may support potential habitat for this species. |
| *Eucalyptus crenulata* | Buxton Gum | VBA | EN | en # | 1 | 4/03/2011 | Species is endemic in Victoria, naturally occurring at only two sites in central Victoria. Habitat includes swampy areas in foothills just north and south of the Great Dividing Range, near Buxton, Narbethong and Yarra Glen. Species can form hybrids at points of contact with Swamp Gum. | **Low** - Species not known to occur in the area. |

| SCIENTIFIC NAME | COMMON NAME | SOURCE | CONSERVATION STATUS | | COUNT OF SIGHTINGS | LAST RECORD | HABITAT DESCRIPTION | LIKELIHOOD OF OCCURRENCE |
|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Eucalyptus yarraensis* | Yarra Gum | VBA | | cr | 6 | 29/11/2012 | Extending west from Glengarry (near Traralgon) to Melbourne and north-west to Daylesford and Ararat. | **Low –** not observed. |
| *Glycine latrobeana* | Clover Glycine, Purple Clover | PMST | VU | vu | | | Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands. | **Low** - No previous records within a 5km radius. |
| *Lachnagrostis adamsonii* | Adamson's Blown-grass | PMST | EN | en | | | Occurs in and around saline depressions on the Volcanic Plain where recorded from Portarlington west almost to the South Australian border. | **Low** - No previous records within a 5km radius. |
| *Lepidium aschersonii* | Spiny Peppercress | PMST | VU | en | | | Typically found on Volcanic Plains on heavy clay soil near salt lakes. There are some outlying records near the Grampians and Lake Omeo. | **Low** - No previous records within a 5km radius. |
| *Lepidium hyssopifolium* | Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed | VBA PMST | EN | en | 1 | 15/05/2018 | In Victoria the species occurs mostly west of Melbourne within the Victorian Midlands and Victorian Volcanic Plain Bioregions. Previously it was known to occur in Eucalypt woodlands and open casuarina woodlands with grassy ground cover but recent records are from highly modified and heavily disturbed environments with open, bare ground such as road and rail verges. | **Low** - Lack of abundant and recent records within the locality. |
| *Leucochrysum albicans subsp. tricolor* | Hoary Sunray, Grassland Paper-daisy | PMST | EN | en | | | Very rare in Victoria, the only recent collections from roadside verges near Wickliffe, Willaura, Streatham, Inverleigh and Creswick. All other collections were gathered last century, from Mt Cole, the Grampians and the Port Fairy district. | **Low** - No previous records within a 5km radius. |
| *Melaleuca armillaris subsp. armillaris* | Giant Honey-myrtle | VBA | | en # | 8 | 26/04/2012 | Mainly confined to near-coastal sandy heaths, scrubs slightly raised above saltmarsh, riparian scrubs, rocky coastlines and foothill outcrops eastwards from about Marlo. Occurrences to the west are naturalized from cultivated stock. Commonly grown for ornament, as a windbreak or street tree and sometimes giving rise to seedlings, particularly after fire. | **Moderate** - Any occurrence is naturalised from cultivated stock. |
| *Pimelea spinescens subsp. spinescens* | Plains Rice-flower, Spiny Rice-flower | PMST | CR | cr | | | Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Mostly west of Melbourne (to near Horsham), but extending as far north as Echuca. | **Low -** No previous records within a 5km radius. |
| *Prasophyllum suaveolens* | Fragrant Leek-orchid | VBA PMST | EN | cr | 19 | 8/11/2018 | Endemic to the basalt plains of south-western Victoria where it grows in grassland and open grassy woodland environments on poorly drained red-brown soil. Habitat is usually dominated by a ground layer of tussock-forming perennial grasses (e.g. Kangaroo Grass) with a wide variety of wildflowers and herbs and embedded basalt boulders. | **Low –** unlikely habitat within study area. |
| *Prasophyllum validum* | Sturdy Leek-orchid | PMST | VU | | | | Apparently endemic to Victoria, where scattered across northern, north-eastern (Chiltern area) and western open forest and woodland communities on stony and sandy soils. | **Low** - No previous records within a 5km radius. |
| *Pterostylis chlorogramma* | Green-striped Greenhood | PMST | VU | en | | | Apparently localized in Victoria, but exact range uncertain due to confusion with closely allied species. Grows in moist areas of heathy and shrubby forest, on well-drained soils. | **Low** - No suitable habitat to support this species. |
| *Pterostylis rubescens* | Inland Red-tip Greenhood | VBA | | en | 1 | 5/05/2023 | Widespread across northern Victoria on slopes and ridges in drier open forests and woodlands on well-drained soils. | **Low** - No suitable habitat to support this species. |
| *Rutidosis leptorhynchoides* | Button Wrinklewort | PMST | EN | en | | | In Victoria confined to basaltic grasslands between Rokewood and Melbourne where endangered due to loss of habitat (formerly occurring as far west as Casterton, and on the Gippsland Plain near Newry). | **Low** - No previous records within a 5km radius. |

| SCIENTIFIC NAME | COMMON NAME | SOURCE | CONSERVATION STATUS | | COUNT OF SIGHTINGS | LAST RECORD | HABITAT DESCRIPTION | LIKELIHOOD OF OCCURRENCE |
|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Senecio behrianus* | Stiff Groundsel | VBA PMST | EN | cr | 5 | 9/05/2007 | Apparently confined to heavy, winter-wet, clayey soils. Formerly known from Casterton, Swan Hill, Barham areas, with specimens from the 'Wimmera', and You Yangs near Lara of uncertain affinity, but closest to *S. behrianus*. | **High** - Previous records of this species within the study area, from Miners Rest Recreation Reserve. |
| *Senecio macrocarpus* | Large-fruit Fireweed, Large-fruit Groundsel | PMST | VU | cr | | | In Victoria largely confined to remnant *Themeda* grasslands on loamy clay soils derived from basalt from near Melbourne west to Skipton area. Also known from auriferous ground near Stawell. | **Low** - No previous records within a 5km radius. |
| *Senecio psilocarpus* | Swamp Fireweed, Smooth-fruited Groundsel | PMST | VU | | | | In Victoria, the species is restricted to the south of the state. It grows in high quality herb rich wetlands where tree canopy is mostly absent on volcanic clays and peaty soils. | **Low** - No suitable habitat to support this species. |
| *Swainsona murrayana* | Slender Darling-pea, Slender | PMST | VU | en | | | Often grows in depressions on heavy soils in Bladder Saltbush herbland, Black Box woodland and grassland communities. Species is frequently associated with Maireana species. | **Low** - No suitable habitat to support this species. |
| *Thelymitra matthewsii* | Spiral Sun-orchid | PMST | VU | en | | | Widely distributed but rare, in coastal sandy flats or slightly elevated sites (to 400 metres) in well-drained soils (sandy loams to gravelly limestone soils) in open forest. Plants colonise disturbed sites and slowly disappear as these sites stabilise. | **Low -** No suitable habitat to support this species. |
| *Xerochrysum palustre* | Swamp Everlasting, Swamp Paper Daisy | PMST | VU | cr | | | Occurs in lowland swamps, usually on black cracking clay soils, scattered from near the South Australian border north-west of Portland to Bairnsdale district, but rare due to habitat depletion. | **Low** - No previous records within a 5km radius. |

**Conservation Status used in the table above:**

Conservation Status in Australia (Environment Protection and Biodiversity Conservation Act 1999)

CR = Critically Endangered, EN = Endangered, VU = Vulnerable

Conservation Status in Victoria (Flora and Fauna Guarantee Act 1988)
cr = critically endangered, en= endangered, vu = vulnerable, # = Native but some stands may be alien

## B1.2 FAUNA LIKELIHOOD OF OCCURRENCE

| SCIENTIFIC NAME | COMMON NAME | SOURCE | CONSERVATION STATUS | | COUNT OF SIGHTINGS | LAST RECORD | HABITAT DESCRIPTION | LIKELIHOOD OF OCCURRENCE |
|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| **BIRDS** | | | | | | | | |
| *Accipiter novaehollandiae* | Grey Goshawk | VBA | | en | 5 | 4/03/2019 | Found in most forest types, especially tall, closed forests, including rainforests. | **Low** - Non preferential or required habitat resources for this species across the study area. |
| *Actitis hypoleucos* | Common Sandpiper | VBA PMST | M, Mr | vu | 2 | 4/12/2003 | The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. | **Low** – unlikely habitat for this species. Low salinity wetlands and a general absence of mudflats. |
| *Anseranas semipalmata* | Magpie Goose | VBA | | vu | 54 | 14/07/2019 | It is found in open wetlands across lowland Victoria where it feeds on the corms and leaves of sedges, rushes and other wetland plants. Mainly inhabits shallow wetlands with dense growth of rushes or sedges. | **High -** Species likely to periodically utilise habitat within the study area. |
| *Anthochaera phrygia* | Regent Honeyeater | VBA PMST | CR | cr | 2 | 30/10/1980 | Occurs mostly in box-ironbark forests and woodland and prefers wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with *Casuarina cunninghamiana* and *Amyema cambagei* are important for feeding and breeding. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Antigone rubicunda* | Brolga | VBA | | en | 10 | 25/08/2018 | The Brolga inhabits large open wetlands, grassy plains, coastal mudflats and irrigated croplands and, less frequently, mangrove-studded creeks and estuaries. It is less common in arid and semi-arid regions, but will occur close to water. | **Moderate** - Species may periodically utilise habitat within the study area. |
| *Aphelocephala leucopsis* | Southern Whiteface | PMST | VU | | | | Dry open forests and woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat of Southern Whiteface, especially areas with fallen timber or dead trees and stumps. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Apus pacificus* | Fork-tailed Swift | PMST | M, Mr | | | | It is almost exclusively aerial, flying from less than one metre to at least 300 metres above ground. It mostly occurs over inland plains but sometimes above foothills or in coastal areas over cliffs, beaches, islands and well out to sea. It also occurs over towns and cities. It mostly occurs over dry and/or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, grassland, spinifex sandplains, farmland and sand-dunes. | **Low** - No previous records within a 5km radius. |
| *Ardea alba modesta* | Eastern Great Egret | VBA | | vu | 145 | 20/07/2019 | Prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. | **High -** Species likely to periodically utilise habitat within the study area. |
| *Ardea intermedia plumifera* | Plumed Egret | VBA | | cr | 3 | 18/12/2018 | Habitat preferences for this species include freshwater swamps, billabongs, floodplains and wet grasslands with dense aquatic vegetation. The species is only occasionally seen in estuarine or intertidal habitats. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Aythya australis* | Hardhead | VBA | | vu | 360 | 25/06/2021 | On terrestrial wetlands and occasionally sheltered estuarine and inshore waters. Almost entirely aquatic, preferring large deep fresh waters with abundant aquatic vegetation; particularly deep swamps, lakes, creeks, billabongs and alluvial plains. | **Observed.** |

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|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Biziura lobata* | Musk Duck | VBA | | vu | 969 | 20/08/2021 | Widespread in Southeast and Southwest parts of continent, on terrestrial wetlands, estuarine habitats and sheltered inshore waters. Almost entirely aquatic, preferring deep water of large permanent swamps, lakes and estuaries, where conditions stable and aquatic flora abundant. | **High -** Numerous species records local to the study area. Individuals may periodically utilise deep marsh, wetlands and farm-style dams within the study area. |
| *Botaurus poiciloptilus* | Australasian Bittern | VBA PMST | EN | cr | 1 | 16/11/2019 | Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spike rushes. Whilst it can be found feeding in more open areas, the species relies on dense vegetation cover to breed and roost. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Bubulcus ibis* | Cattle Egret | PMST | Mr (as *Ardea Ibis*) | | | | Occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It is commonly associated with the habitats of farm animals, particularly cattle. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. | **Low** - No previous records within a 5km radius. |
| *Calidris acuminata* | Sharp-tailed Sandpiper | PMST | M, Mr | | | | Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. | **Low** - unlikely habitat for this species. Low salinity wetlands and a general absence of mudflats. |
| *Calidris ferruginea* | Curlew Sandpiper | VBA PMST | CR, M, Mr | cr | 1 | 24/01/2010 | Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes. | **Low** - unlikely habitat for this species. Low salinity wetlands and a general absence of mudflats. |
| *Calidris melanotos* | Pectoral Sandpiper | PMST | M, Mr | | | | Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands. | **Low** - unlikely habitat for this species. Low salinity wetlands and a general absence of mudflats. |
| *Callocephalon fimbriatum* | Gang-gang Cockatoo | PMST | EN | en | | | The Gang-gang Cockatoo can be seen throughout many parts of south-eastern Australia. In the summer months, they are mostly found at higher elevations, where they breed in tree-hollows in the moist eucalyptus forests of the mountainous Great Divide. After breeding has finished, and the days grow cooler and shorter, they undertake altitudinal movements, leaving the mountains and flying to lower elevations to spend the autumn and winter, when they are especially common in suburban gardens of lowland towns and cities. | **Low** - No previous records within a 5km radius. |
| *Calyptorhynchus banksii graptogyne* | Red-tailed Black-Cockatoo (south-eastern) | VBA | EN | en | 1 | 01/01/1896 | Estimated population of just 1000 individuals across south-east south Australia and south-west Victoria. The species habitat consists of woodlands where they feed exclusively on seeds of stringybark and Buloke trees. The species requires deep hollow in old eucalypt trees for nesting. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Chalcites osculans* | Black-eared Cuckoo | PMST | Mr (as *Chrysococcyx osculans*) | | | | Mainly open vegetation associations, especially open woodlands and open shrublands. Often in open woodlands dominated by Eucalyptus, particularly stunted Mallee communities; Open woodlands of River Red Gum or Coolabah along rivers or round other wetlands in otherwise open grasslands. | **Low** - Non preferential or required habitat resources for this species across the study area |

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|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Climacteris picumnus victoriae* | Brown Treecreeper (south-eastern) | PMST | VU | | | | Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly in habits woodlands dominated by stringybarks or other rough-barked eucalypts. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Egretta garzetta* | Little Egret | VBA | | en | 1 | 19/04/2006 | Little Egrets inhabit mudflats, saltworks and shallow margins of tidal estuaries and inland rivers and lakes. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Gallinago hardwickii* | Latham's Snipe, Japanese Snipe | PMST | M, Mr, TH | | | | Occurs in freshwater or brackish wetlands generally near protective vegetation cover. | **Moderate –** possible habitat around wetlands and farm style dams on properties 2, 35, 40, 41 & 45. |
| *Grantiella picta* | Painted Honeyeater | PMST | VU | vu | | | Lives in dry forests and woodlands. Primary food is the mistletoes in the genus *Amyema*, though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | PMST | Mr | en | | | Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. | **Moderate** – may forage around larger wetlands on property 45 whilst dispersing throughout the landscape |
| *Hieraaetus morphnoides* | Little Eagle | VBA | | vu | 7 | 26/09/2019 | The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest. | **Moderate** - Species may periodically utilise habitat within the study area. |
| *Hirundapus caudacutus* | White-throated Needletail | VBA PMST | VU, M, Mr | vu | 3 | 10/01/2019 | Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. | **Low** - Species is predominately aerial and unlikely to utilise habitat within the study area. |
| *Hydroprogne caspia* | Caspian Tern | VBA | | vu | 2 | 10/09/2017 | Occur in most coastal regions, with scattered records throughout the western half of the state, including the Murray Valley. They usually forage in open wetlands, including lakes and rivers and prefer sheltered shallow water near the margins, but can also be found in open coastal waters. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Ixobrychus dubius* | Australian Little Bittern | VBA | | en | 10 | 25/11/2017 | Species is found in a range of freshwater swamp habitats that are inundated by at least 30cm of water and support tall rushes, reeds, Typha, shrub thickets or other dense cover. Being cryptic in nature, the species prefers smaller patches of dense vegetation along drains or small urban lakes where it remains within or on the edge of wetland vegetation. | **Moderate** - Species may periodically utilise habitat within the study area. |
| *Lathamus discolor* | Swift Parrot | PMST | CR, Mr | cr | | | In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering *Acacia pycnantha*. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Lewinia pectoralis* | Lewin's Rail | VBA | | vu | 4 | 3/12/2018 | Mostly inhabits wetland areas such as swamps, river flats and dams where there is dense vegetation cover. They can also occur in coastal saltwater areas. | **Moderate** - Species may periodically utilise wetland habitat within the study area. |

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|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Lophoictinia isura* | Square-tailed Kite | VBA | | vu | 2 | 13/01/2018 | This species hunts primarily over open forest, woodland and Mallee communities as well as over adjacent heaths and other low scrubby habitats in wooded towns. | **Low** - Species is predominately aerial and unlikely to utilise habitat within the study area. |
| *Melanodryas cucullata cucullata* | South-eastern Hooded Robin, Hooded Robin (south-eastern) | PMST | EN | vu (as *Melanodryas cucullate)* | | | Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and Mallee and acacia shrubland. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Merops ornatus* | Rainbow Bee-eater | PMST | Mr | | | | Usually occur in open or lightly timbered areas, often near water. Breed in open areas with friable, often sandy soil, good visibility, convenient perches and often near wetlands. Nests in embankments including creeks, rivers and sand dunes. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Motacilla flava* | Yellow Wagtail | PMST | M, Mr | | | | This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams. | **Low** - No previous records within a 5km radius. |
| *Myiagra cyanoleuca* | Satin Flycatcher | PMST | M, Mr | | | | Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Neophema chrysostoma* | Blue-winged Parrot | PMST | VU, Mr | | | | The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. Blue-winged Parrots can also be seen in altered environments such as airfields, golf-courses and paddocks. | **Low** - No previous records within a 5km radius. Species unlikely to rely on habitat within the study area. |
| *Neophema elegans* | Elegant Parrot | VBA | | vu | 1 | 01/05/1886 | Found in dry environments. Feeds on open woodland, grassland, saltmarsh and rough pasture. | **Low** - Lack of abundant and recent records within the locality. |
| *Ninox strenua* | Powerful Owl | VBA | | vu | 1 | 5/02/2008 | Typically found in open forests and woodlands, sheltered gullies in wet forests with dense understoreys along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. | **Low** - Lack of abundant and recent records within the locality. |
| *Numenius madagascariensis* | Eastern Curlew, Far Eastern Curlew | PMST | CR, M, Mr | cr | | | Primarily coastal in distribution, commonly associated with sheltered coasts, estuaries, harbours and lagoons. Breeds in the northern hemisphere, returning to Australia for the non-breeding season. | **Low** - No previous records within a 5km radius. Non preferential or required habitat resources for this species across the study area |
| *Oxyura australis* | Blue-billed Duck | VBA | | vu | 505 | 2/09/2020 | Found on temperate, fresh to saline, terrestrial wetlands, and occupies artificial wetlands. Prefers deep permanent open water, within or near dense vegetation. Nest in rushes, sedge, Lignum, (*Muehlenbeckia cunninghami*) and paperbark Melaleuca. | **High -** Species likely to periodically utilise habitat within the study area. |
| *Pedionomus torquatus* | Plains-wanderer | PMST | CR | cr | | | Sparse grasslands that have 50% bare ground, widely spaced plants up to 10 cm high and remaining standing vegetation less than 5 centimetres in height. Occasionally uses cereal stubble but cannot persist in agricultural landscape. Suitable habitat tends to be restricted to small (50-300 ha) patches that do not support dense pasture growth under any seasonal conditions. | **Low** - No previous records within a 5km radius. Non preferential or required habitat resources for this species across the study area |

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| | | | EPBC ACT | FFG ACT | | | | |
| *Rhipidura rufifrons* | Rufous Fantail | PMST | M, Mr | | | | Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Rostratula australis* | Australian Painted Snipe | PMST | EN, Mr | cr | | | Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as River Red Gum and Poplar Box or shrubs such as Lignum or Samphire. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Spatula rhynchotis* | Australasian Shoveler | VBA | | vu | 67 | 27/07/2019 | Uses a wide variety of wetlands but prefer large permanent lakes or swamps that have abundant cover. | **High -** Species likely to periodically utilise habitat within the study area. |
| *Stagonopleura guttata* | Diamond Firetail | PMST | VU | vu | | | Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and Mallee. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Stictonetta naevosa* | Freckled Duck | VBA | | en | 349 | 20/08/2021 | In most years this species appear to be nomadic between ephemeral inland wetlands. In dry years they congregate on permanent wetlands while in wet years they breed prolifically and disperse widely, generally towards the coast. | **High** - Species may periodically utilise habitat within the study area. |
| *Tringa glareola* | Wood Sandpiper | VBA | | en | 1 | 24/01/2010 | Found in well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes with emergent aquatic plants and taller fringing vegetation. | **Low** - Lack of abundant and recent records within the locality. |
| *Tringa nebularia* | Common Greenshank | VBA PMST | M, Mr | en | 1 | 24/01/2010 | The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. | **Low** – A lack of local records within study area. Suboptimal habitat for his species available. |
| *Tringa stagnatilis* | Marsh Sandpiper | VBA | | en | 2 | 24/01/2010 | Permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. | **Low** - Non preferential or required habitat resources for this species across the study area. |
| **MAMMALS** | | | | | | | | |
| *Dasyurus maculatus maculatus (SE mainland population)* | Spot-tailed Quoll | PMST | EN | en | | | Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Ornithorhynchus anatinus* | Platypus | VBA | | vu | 1 | 15/09/1981 | Occurs along the east coast of Australia where it inhabits freshwater aquatic ecosystems in tropical rainforest lowlands and plateaus in far northern Queensland to colder environments at higher altitudes in Tasmania and the Australian Alps. The platypus prefers rivers and streams with a coarse bottom substrate for increased microinvertebrate fauna (food) as well as earth banks for burrows and native vegetation for shade. | **Moderate** - EDNA samples showed species presence in the waterways that intersect the study area. Potentially present, more likely amongst vegetated (woody) areas of the Burrumbeet Creek. |
| *Petauroides volans* | Greater Glider (southern and central) | PMST | EN | en | | | The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. | **Low** - Non preferential or required habitat resources for this species across the study area |

| SCIENTIFIC NAME | COMMON NAME | SOURCE | CONSERVATION STATUS | | COUNT OF SIGHTINGS | LAST RECORD | HABITAT DESCRIPTION | LIKELIHOOD OF OCCURRENCE |
|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Petaurus australis australis* | Yellow-bellied Glider (south-eastern) | PMST | VU | vu | | | Lives in coastal and open foothill forest and woodland, and in wet eucalypt forests. In eastern Australia it lives only in tall, mature eucalypt forests in regions of high rainfall, with temperate to subtropical climates. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Phascogale tapoatafa* | Brush-tailed Phascogale | VBA | | vu | 1 | 1/05/1990 | Largely arboreal it occurs in a range of habitats which have reliable rainfall (500-2000mm), but has preference for open dry sclerophyll forest on ridges (up to 600 m alt) with little/sparse ground cover. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | PMST | VU | vu | | | Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. | **Low** - Non preferential or required habitat resources for this species across the study area |
| **REPTILES** | | | | | | | | |
| *Aprasia parapulchella* | Pink-tailed Worm-lizard | PMST | VU | en | | | In general, lizards occur in open grassland habitats that have a substantial cover of small rocks, and show a preference for sunny aspects, avoiding south facing slopes. A burrowing species, it is usually found under rocks on well-drained soil and in ant nests, occasionally with several individuals found under the same rock. | **Low** - Non preferential or required habitat resources for this species across the study area |
| *Delma impar* | Striped Legless Lizard | PMST | VU | en | | | Within their historical range across south-eastern Australia, potential habitat for the Striped Legless Lizard includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands), provided that area retains suitable tussock structure, the soil is of appropriate type and structure, and the site has not had major disturbance such as ploughing. | **Low –** not detected during targeted survey. Suboptimal habitat for this species. |
| *Lissolepis coventryi* | Swamp Skink, Eastern Mourning Skink | PMST | EN | en | | | In Victoria, species primarily occurs south of the Great Dividing Range with the population at the Grampians being the most northern extent of the species distribution. Species is limited to densely vegetated swamps, associated watercourses and wet heath environments, sedgelands and saltmarshes. Species often use fallen timber, driftwood, sedges, and tussocks to bask upon. | **Low** - No suitable habitat to support this species and no previous records within a 5km radius. |
| *Litoria raniformis* | Growling Grass Frog | VBA PMST | VU | vu | 1 | 01/01/1788 | Usually found amongst emergent vegetation such as Typha, Phragmites and Eleocharis within or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds, and farm dams. It also in occurs in irrigation channels and crops, lignum shrublands, black box and river red gum woodlands and at the periphery of rivers. | **Low –** not detected during targeted survey. Suboptimal habitat for this species. The study area is connected with known habitat ~8.6 km upstream via the Burrumbeet Creek and Slattery Creek in Creswick State Forest. It is reasonable to assume that under the right conditions (e.g. high rainfall/flooding) this species would be likely to utilise aquatic riparian habitat across the study area whilst dispersing throughout the landscape. |
| **FISH** | | | | | | | | |

| SCIENTIFIC NAME | COMMON NAME | SOURCE | CONSERVATION STATUS | | COUNT OF SIGHTINGS | LAST RECORD | HABITAT DESCRIPTION | LIKELIHOOD OF OCCURRENCE |
|---|---|---|---|---|---|---|---|---|
| | | | EPBC ACT | FFG ACT | | | | |
| *Galaxias rostratus* | Flathead Galaxias | PMST | CR | vu | | | Only known in the Southern half of the Murray-Darling Basin system. Inhabits a variety of habitats including billabongs, lakes, swamps, and rivers with a preference for still or slow flowing waters. | **Low** - No previous records within a 5km radius. |
| *Galaxiella pusilla* | Eastern Dwarf Galaxias, Dwarf Galaxias | PMST | VU | en | | | Occurs in slow flowing and still, shallow, permanent and temporary freshwater habitats such as swamps, drains and the backwaters of streams and creeks, often (but not always) containing dense aquatic macrophytes and emergent plants. | **Low** - No previous records within a 5km radius. |
| *Macquaria australasica* | Macquarie Perch | VBA | EN | en | 2 | 1/01/1970 | Small discreet populations remain in the Murray Darling Catchment in Northern Victoria with a larger translocated population occurring in the Yarra River near Warrandyte. | **Low** - Species not known to occur in the area. |
| *Nannoperca australis Murray-Darling Basin lineage* | Southern Pygmy Perch | PMST | VU | vu | | | The Southern pygmy perch prefers slow flowing or still waters, usually with dense aquatic vegetation and plenty of cover. It has been recorded from small streams, well-vegetated lakes (or wetlands within), billabongs and irrigation channels. It is still common in southern (coastal) Vic, but is patchily distributed along Vic tributaries of the Murray, where it is still known from the Broken, Ovens, Campaspe, Goulburn, Kiewa, Mitta Mitta, Loddon and Wimmera basins. | **Low** - No previous records within a 5km radius. |
| *Nannoperca obscura* | Yarra Pygmy Perch | PMST | VU | vu | | | Typically occurs in slow-flowing or still waters which possess large amounts of aquatic vegetation (particularly emergent vegetation) such as lakes, ponds and slow-flowing rivers. | **Low** - No previous records within a 5km radius. |
| *Prototroctes maraena* | Australian Grayling | PMST | VU | en | | | It is a mid-water, freshwater species that occurs most commonly in clear, gravelly streams with a moderate flow. Prefers deep, slow flowing pools. | **Low** - No previous records within a 5km radius. |
| **INSECTS** | | | | | | | | |
| *Synemon plana* | Golden Sun Moth | VBA PMST | VU | vu | 11 | 22/11/2017 | This species occurs Natural Temperate Grasslands, exotic grassland and some secondary grassland. Larvae feed on the roots of native grasses, particularly wallaby grasses Rytidosperma spp. They also feed on the introduced noxious weed Chilean Needlegrass *Nassella neesiana*. | **Low –** not observed during targeted survey. Unlikely habitat across the study area. |

**Conservation Status used in the table above:**

Conservation Status in Australia (Environment Protection and Biodiversity Conservation Act 1999)

CR = Critically Endangered, EN = Endangered, VU = Vulnerable, M = Migratory, Mr = Marine

Conservation Status in Victoria (Flora and Fauna Guarantee Act 1988)
cr = critically endangered, en= endangered, vu = vulnerable

# APPENDIX C

## MAPS

# C1. HISTORICAL RECORDS AND MODELLING

wsp

# VPA Ballarat North PSP

**Ecology**
**Figure C-1**
Desktop Assessment

**Legend**

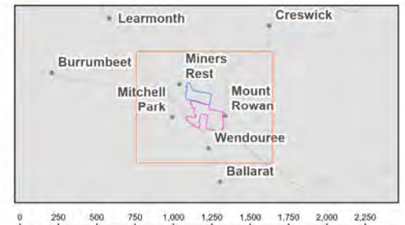
- Watercourse
- VBA Threatened Fauna Species Records
- VBA Threatened Flora Species Records
- Environmental Significance Overlay
- Parks and Reserves

**Modelled Vegetation (NV2005)**

- Heathy Dry Forest
- Plains Grassy Wetland
- Plains Grassy Woodland
- Plains Sedgy Wetland
- Victorian Wetland Inventory (Current)

**Study Areas**

- Core Area
- Expanded Area

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GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap imagery



www.wsp.com

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# C2. ECOLOGICAL VALUES

# VPA Ballarat North PSP

## Ecology
## Figure C-2
Ecological Values

**Legend**

- Canopy Tree
- Watercourse
- Areas to consider for retention
- Platypus Habitat (assumed)
- Seasonal Herbaceous Wetland (EPBC Act)

**Properties (Property Number Labelled)**

- Cadaste Parcel
- No Access (Not Assessed)

**Study Areas**

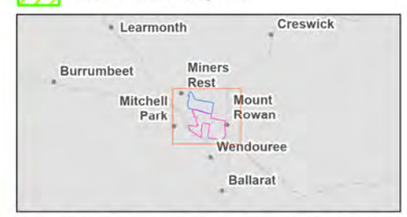
- Core Area
- Expanded Area

**Native Vegetation (EVC)**

- Current Wetland
- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63
- Tall Marsh 821

**Revegetation**

- Australian native revegetation
- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation

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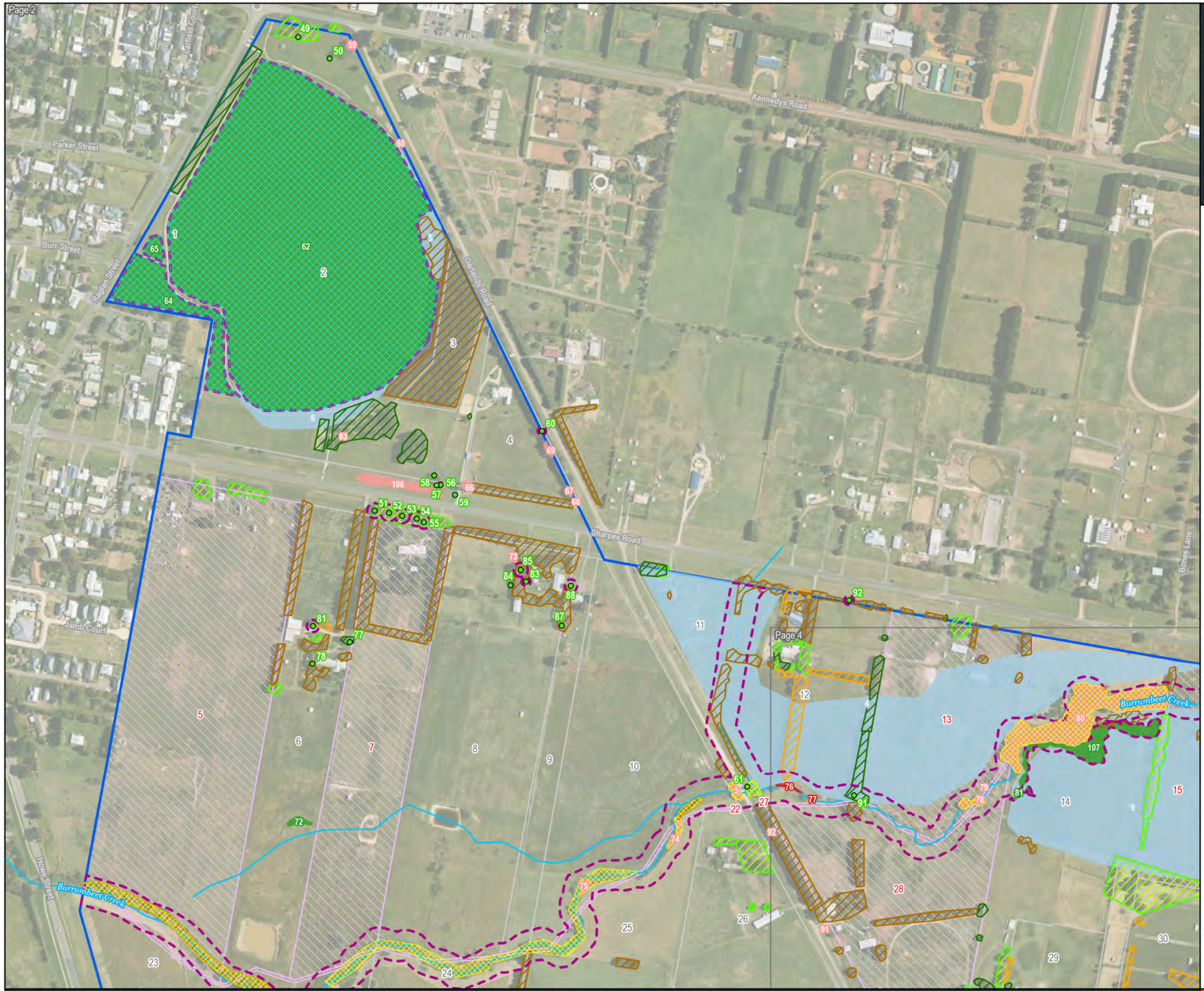
GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery




# VPA Ballarat North PSP

**Ecology**
**Figure C-2**
Ecological Values

**Legend**

- Canopy Tree
- Watercourse
- Areas to consider for retention
- Platypus Habitat (assumed)
- Seasonal Herbaceous Wetland (EPBC Act)

**Properties (Property Number Labelled)**

- Cadaste Parcel
- No Access (Not Assessed)

**Study Areas**

- Core Area
- Expanded Area

**Native Vegetation (EVC)**

- Current Wetland
- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63
- Tall Marsh 821

**Revegetation**

- Australian native revegetation
- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation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Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:5,000 Date: 27/06/2024

GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# VPA Ballarat North PSP

**Ecology**
**Figure C-2**
Ecological Values

**Legend**

- Canopy Tree
- Watercourse
- Areas to consider for retention
- Platypus Habitat (assumed)
- Seasonal Herbaceous Wetland (EPBC Act)

**Properties (Property Number Labelled)**

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**Study Areas**

- Core Area
- Expanded Area

**Native Vegetation (EVC)**

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- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63
- Tall Marsh 821

**Revegetation**

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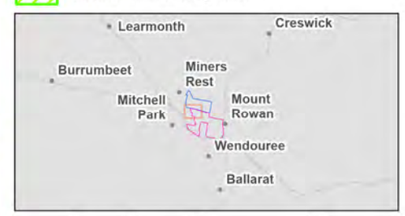
- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation

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Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery





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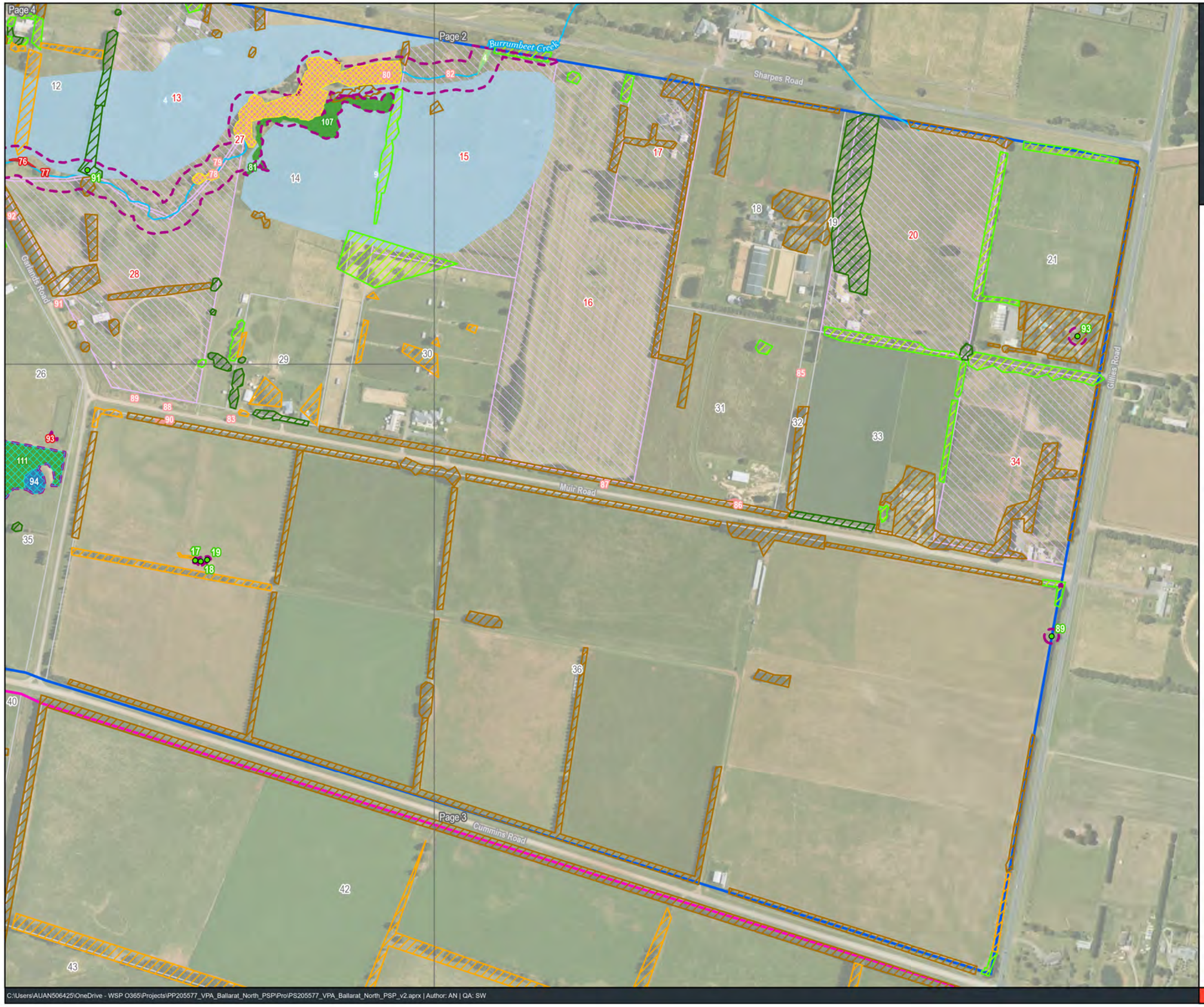


# VPA Ballarat North PSP

## Ecology
## Figure C-2
Ecological Values

**Legend**

- Canopy Tree
- Watercourse
- Areas to consider for retention
- Platypus Habitat (assumed)
- Seasonal Herbaceous Wetland (EPBC Act)

**Properties (Property Number Labelled)**

- Cadaste Parcel
- No Access (Not Assessed)

**Study Areas**

- Core Area
- Expanded Area

**Native Vegetation (EVC)**

- Current Wetland
- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63
- Tall Marsh 821

**Revegetation**

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- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation


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Scale ratio correct when printed at A3

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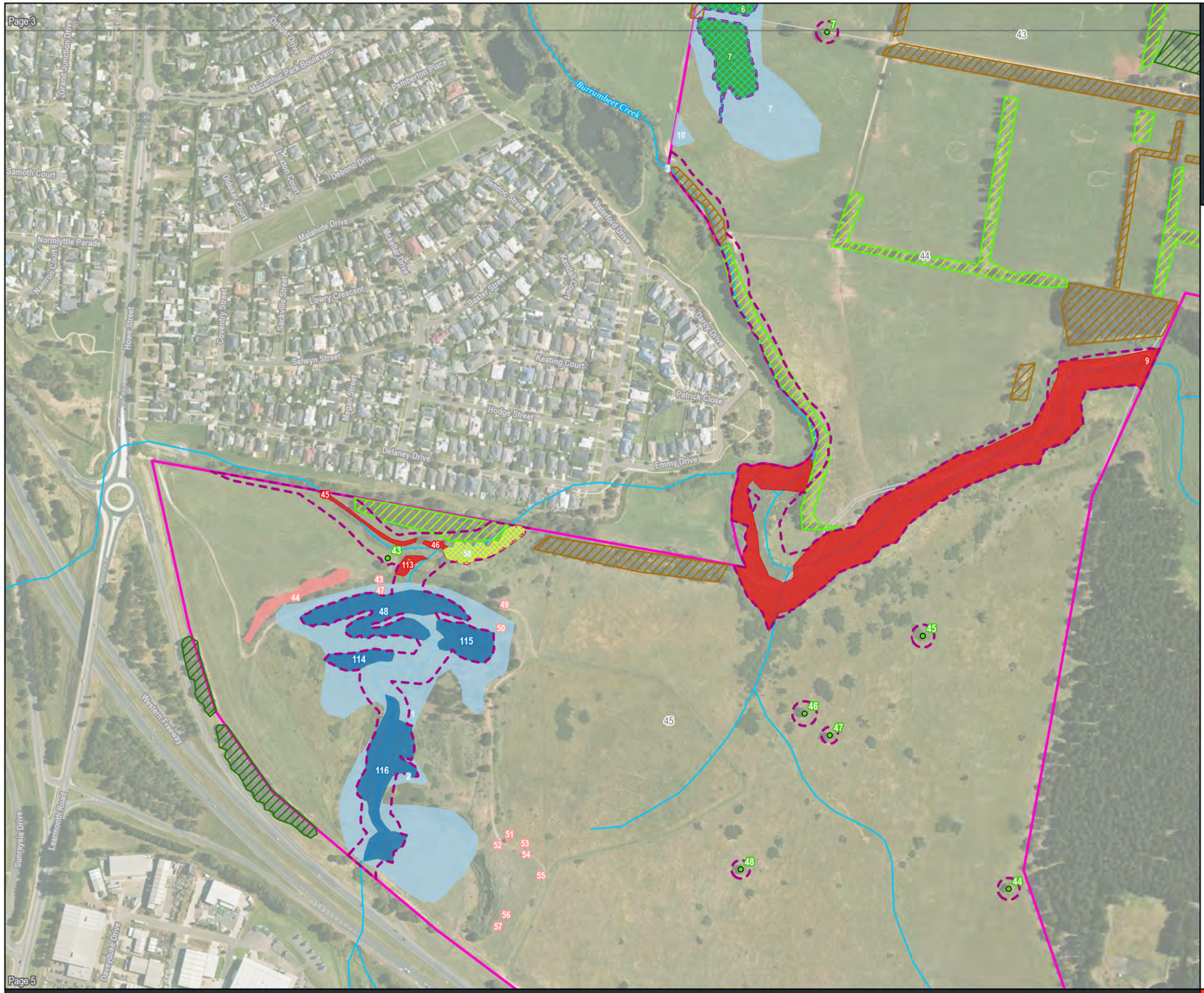
GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap imagery




# VPA Ballarat North PSP

## Ecology
## Figure C-2
Ecological Values

**Legend**

- Canopy Tree
- Watercourse
- Areas to consider for retention
- Platypus Habitat (assumed)
- Seasonal Herbaceous Wetland (EPBC Act)

**Properties (Property Number Labelled)**

- Cadaste Parcel
- No Access (Not Assessed)

**Study Areas**

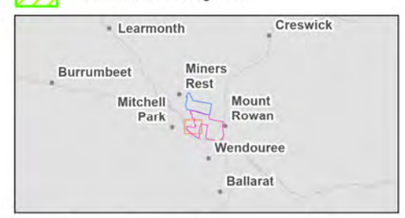
- Core Area
- Expanded Area

**Native Vegetation (EVC)**

- Current Wetland
- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63
- Tall Marsh 821

**Revegetation**

- Australian native revegetation
- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation

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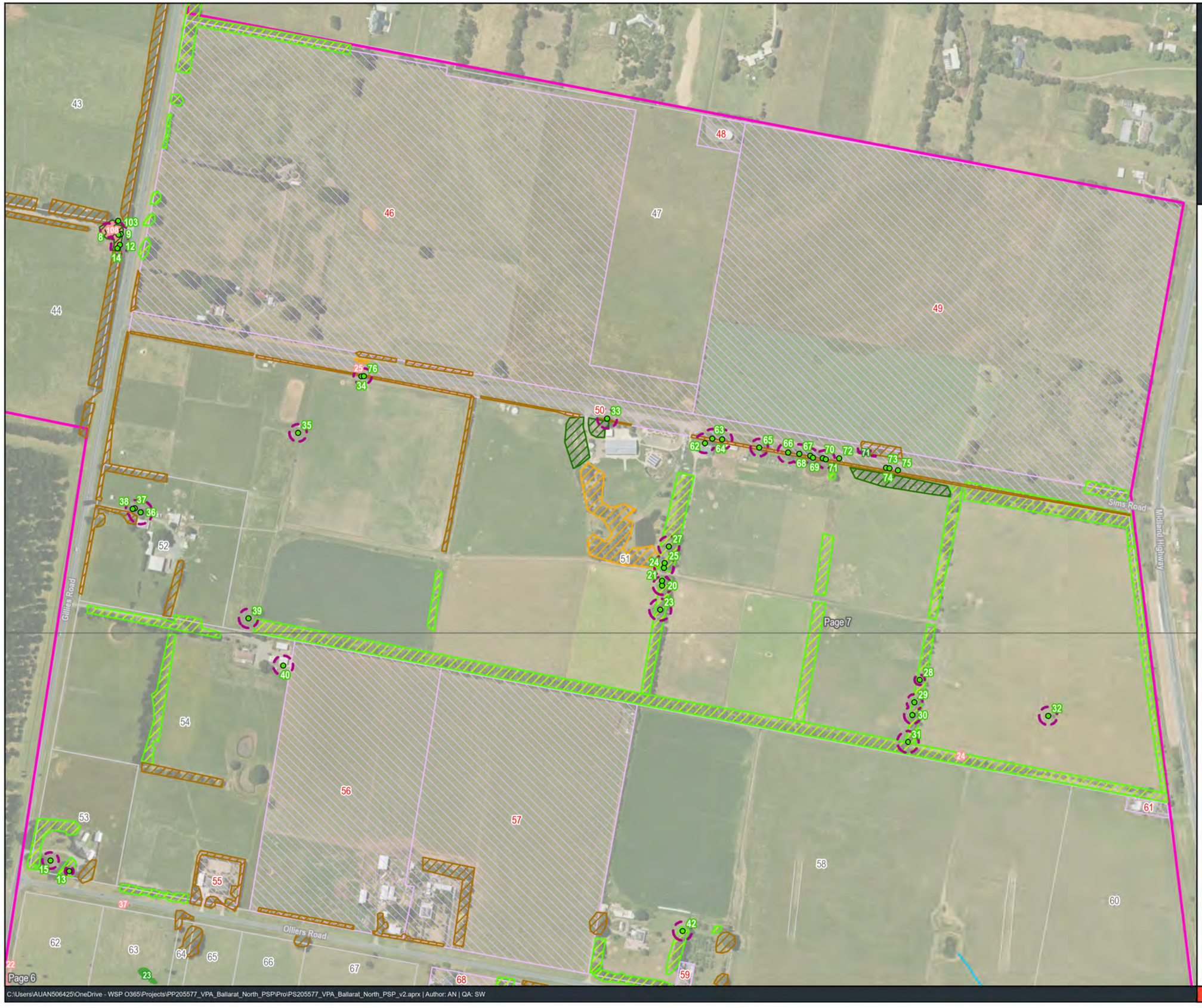



VPA Ballarat North PSP

**Ecology**
**Figure C-2**
Ecological Values

**Legend**

- Canopy Tree
- Watercourse
- Areas to consider for retention

**Properties (Property Number Labelled)**

- Cadaste Parcel
- No Access (Not Assessed)

**Study Areas**

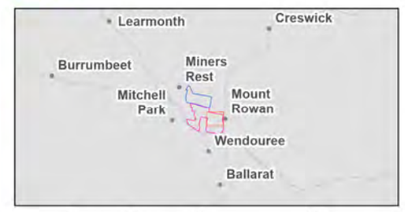
- Core Area
- Expanded Area

**Native Vegetation (EVC)**

- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63

**Revegetation**

- Australian native revegetation
- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation

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Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

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Olliers Road

Gillies Road

Millers Road

Midland Highway

Noble Court

Burrumbeet Creek

Gillies - Western In Ramp On

Western Out - Gillies Ramp Of

Western Freeway

Old Midland Highway

Giot Drive

Ealing Avenue

Ulswater Road

Langham Road

Winston Court

Langstaffe Drive

Halbert Street

Molbray Street

Cedric Street

Conniston Street

Forest Street

Sidbury Avenue

Rozel Avenue

Rowan Parade

Lincoln Street

Cornwall Street

Gillies Street N

Western In - Midland Ramp Of

Midland - Western In Ramp On

Midland - Western Out Ramp On

Creswick Road

# VPA Ballarat North PSP

**Ecology**
**Figure C-2**
Ecological Values

## Legend

- Canopy Tree
- Watercourse
- Areas to consider for retention

**Properties (Property Number Labelled)**

- Cadaste Parcel
- No Access (Not Assessed)

**Study Areas**

- Core Area
- Expanded Area

**Native Vegetation (EVC)**

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Wetland 125
- Plains Grassy Woodland 55 63
- Tall Marsh 821

**Revegetation**

- Australian native revegetation
- Exotic revegetation
- Indigenous revegetation
- Victorian native revegetation


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Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:6,000 Date: 27/06/2024

GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# C3. GOLDEN SUN MOTH SURVEY EFFORT

# VPA Ballarat North PSP

**Ecology**
**Figure C-3**
Golden Sun Moth Survey Effort

**Legend**

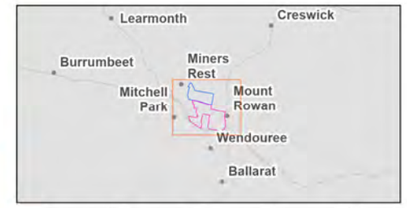
- Watercourse
- Golden Sun Moth potential habitat surveyed
- Cadaste Parcel (Property Number Labelled)

**Study Areas**

- Core Area
- Expanded Area

**Golden Sun Moth Survey Track**

- HA 06.12.2023
- JB 06.12.2023
- JG 20.12.23
- JB 11.01.2024
- JP 11.01.2024
- JB 16.01.2024
- JP 16.01.2024

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Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:20,000 Date: 27/06/2024

GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# C4. GROWLING GRASS FROG SURVEY LOCATIONS AND RESULTS

# VPA Ballarat North PSP

**Ecology**
**Figure C-4**
Growling Grass Frog Survey Effort

**Legend**

- Growling Grass Frog Survey Location

**Hydrology**

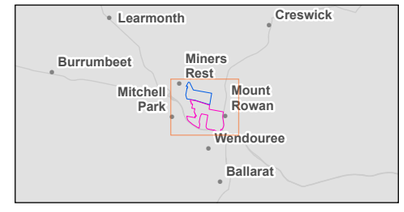
- Watercourse
- Victorian Wetland Inventory (Current)

**Study Areas**

- Core Area
- Expanded Area

**Properties**

- Cadaste Parcel (Property Number Labelled)

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Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:20,000 Date: 15/03/2024

GDA 2020

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# C5. STRIPED LEGLESS LIZARD SURVEY LOCATIONS

# VPA Ballarat North PSP

**Ecology**
**Figure C-5**
Striped Legless Lizard Survey Effort

## Legend

- Striped Legless Lizard Survey Grid Location

**Hydrology**

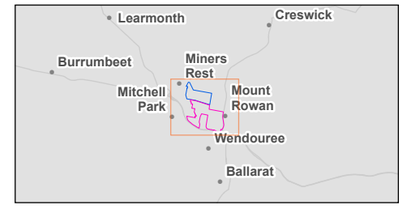
- Watercourse
- Victorian Wetland Inventory (Current)

**Study Areas**

- Core Area
- Expanded Area

**Properties**

- Cadaste Parcel (Property Number Labelled)

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Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:20,000 Date: 15/03/2024

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# C6. TARGETED FLORA SURVEY EFFORT

# VPA Ballarat North PSP

## Ecology
## Figure C-6
Targeted Flora Survey Effort

**Legend**

**Significant Flora**

- Vittadinia cuneata (Fuzzweed)
- Amphibromus fluitans (River Swamp Wallaby-grass)
- Helichrysum luteoalbum (Jersey Cudweed)
- Lemna disperma (Common Duckweed)
- Senecio behrianus (Stiff Groundsel)
- Senecio campylocarpus (Floodplain Fireweed)
- Senecio quadridentatus (Cotton Fireweed)

**Targeted Flora Survey Track**

- 24/08/2023
- 25/08/2023
- 20/09/2023
- 21/09/2023
- 3/11/2023
- 15/11/2023

**Hydrology**

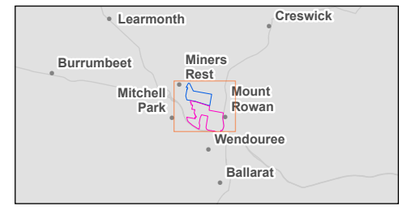
- Watercourse
- Victorian Wetland Inventory (Current)

**Study Areas**

- Core Area
- Expanded Area

**Properties**

- Cadaste Parcel (Property Number Labelled)




0 250 500 750 1,000 Meters

Coordinate system: GDA2020 MGA Zone 54

Scale ratio correct when printed at A3

1:18,049 Date: 15/03/2024

Data sources: Geoscience Australia, Victorian Government, WSP, MetroMap Imagery

# APPENDIX D

## DETAILED SURVEY DATA

# D1. FLORA SPECIES LIST

Table D.1 Flora species observed on site

| ORIGIN | SCIENTIFIC NAME | COMMON NAME | CONSERVATION STATUS | CALP ACT |
|---|---|---|---|---|
| | *Acacia dealbata* | Silver Wattle | | - |
| * | *Acacia decurrens* | Early Black-wattle | | - |
| | *Acacia melanoxylon* | Blackwood | | - |
| | *Acaena X anserovina* | Hybrid Burr | | - |
| * | *Agrostis capillaris* | Brown-top Bent | | - |
| | *Alisma plantago-aquatica* | Water Plantain | | - |
| * | *Allium vineale* | Crow Garlic | | R |
| | *Allocasuarina littoralis* | Black Sheoak | | - |
| | *Amphibromus fluitans* | River Swamp Wallaby-grass | | - |
| | *Amphibromus nervosus* | Common Swamp Wallaby-grass | | - |
| | *Amphibromus spp.* | Swamp Wallaby-grass | | - |
| * | *Anthoxanthum odoratum* | Sweet Vernal-grass | | - |
| * | *Arctotheca calendula* | Cape weed | | - |
| * | *Avena fatua* | Wild Oat | | - |
| * | *Brassica napus* | Rapeseed | | - |
| * | *Bromus catharticus* | Prairie Grass | | - |
| * | *Callitriche stagnalis* | Common Water-starwort | | - |
| | *Carex appressa* | Tall Sedge | | - |
| | *Carex inversa* | Knob Sedge | | - |
| | *Carex tereticaulis* | Poong'ort | | - |
| * | *Cirsium vulgare* | Spear Thistle | | R |
| * | *Conium maculatum* | Hemlock | | R |
| * | *Cotula coronopifolia* | Water-buttons | | - |
| | *Crassula helmsii* | Swamp Crassula | | - |
| * | *Crataegus monogyna* | Hawthorn | | R |
| | *Cycnogeton procerum s.s.* | Common Water-ribbons | | - |
| * | *Cynodon dactylon var. dactylon* | Couch | | - |
| * | *Cyperus eragrostis* | Drain Flat-sedge | | - |
| * | *Cytisus scoparius* | English Broom | | R |
| * | *Daucus carota* | Carrot | | - |
| | *Eleocharis acuta* | Common Spike-sedge | | - |

| ORIGIN | SCIENTIFIC NAME | COMMON NAME | CONSERVATION STATUS | CALP ACT |
|---|---|---|---|---|
| | *Eleocharis gracilis* | Slender Spike-sedge | | - |
| | *Eragrostis infecunda* | Southern Cane-grass | | - |
| | *Eryngium vesiculosum* | Prickfoot | | - |
| | *Eucalyptus baueriana* | Blue Box | | - |
| # | *Eucalyptus botryoides* | Southern Mahogany | | - |
| | *Eucalyptus camaldulensis* | River Red-gum | | - |
| # | *Eucalyptus globulus* | Southern Blue-gum | | - |
| # | *Eucalyptus leucoxylon* | Yellow Gum | | - |
| | *Eucalyptus melliodora* | Yellow Box | | - |
| | *Eucalyptus ovata var. ovata* | Swamp Gum | | - |
| | *Eucalyptus polyanthemos* | Red Box | | - |
| | *Eucalyptus radiata s.l.* | Narrow-leaf Peppermint | | - |
| | *Eucalyptus rubida subsp. rubida* | Candlebark | | - |
| | *Eucalyptus sideroxylon subsp. sideroxylon* | Mugga | en | - |
| | *Eucalyptus viminalis subsp. viminalis* | Manna Gum | | - |
| * | *Foeniculum vulgare* | Fennel | | R |
| * | *Genista monspessulana* | Montpellier Broom | | R |
| | *Geranium Sp.* | Geranium Sp. | | - |
| | *Haloragis heterophylla* | Varied Raspwort | | - |
| * | *Helichrysum luteoalbum* | Jersey Cudweed | | - |
| * | *Holcus lanatus* | Yorkshire Fog | | - |
| * | *Hypochoeris glabra* | Smooth Cat's-ear | | - |
| * | *Hypochoeris radicata* | Flatweed | | - |
| * | *Juncus acutus subsp. acutus* | Spiny Rush | | - |
| | *Juncus amabilis* | Hollow Rush | | - |
| * | *Juncus articulatus subsp. articulatus* | Jointed Rush | | - |
| | *Juncus australis* | Austral Rush | | - |
| | *Juncus bufonius* | Toad Rush | | - |
| | *Juncus gregiflorus* | Green Rush | | - |
| | *Juncus pallidus* | Pale Rush | | - |
| | *Juncus procerus* | Tall Rush | | - |
| | *Juncus subsecundus* | Finger Rush | | - |

| ORIGIN | SCIENTIFIC NAME | COMMON NAME | CONSERVATION STATUS | CALP ACT |
|---|---|---|---|---|
| | *Lachnagrostis filiformis s.l.* | Common Blown-grass | | - |
| | *Lemna disperma* | Common Duckweed | | - |
| | *Leptospermum lanigerum* | Woolly Tea-tree | | - |
| * | *Lolium perenne* | Perennial Rye-grass | | - |
| * | *Lycium ferocissimum* | African Box-thorn | | C |
| | *Lythrum hyssopifolia* | Small Loosestrife | | - |
| * | *Medicago sativa subsp. sativa* | Lucerne | | - |
| | *Montia australasica* | White Purslane | | - |
| | *Myriophyllum simulans* | Amphibious Water-milfoil | | - |
| | *Ottelia ovalifolia* | Swamp Lily | | - |
| * | *Paspalum distichum* | Water Couch | | - |
| | *Persicaria prostrata* | Creeping Knotweed | | - |
| * | *Phalaris aquatica* | Toowoomba Canary-grass | | - |
| * | *Phalaris minor* | Lesser Canary-grass | | - |
| | *Plantago gaudichaudii* | Narrow Plantain | | - |
| * | *Plantago lanceolata* | Ribwort | | - |
| * | *Poa annua* | Annual Meadow-grass | | - |
| | *Poa labillardierei var. labillardierei* | Common Tussock-grass | | - |
| | *Potamogeton cheesemanii* | Red Pondweed | | - |
| | *Potamogeton crispus* | Curly Pondweed | | - |
| | *Potamogeton ochreatus* | Blunt Pondweed | | - |
| | *Ranunculus inundatus* | River Buttercup | | - |
| * | *Ranunculus repens* | Creeping Buttercup | | - |
| * | *Romulea rosea* | Onion Grass | | - |
| * | *Rosa rubiginosa* | Sweet Briar | | C |
| * | *Rubus anglocandicans* | Common Blackberry | | - |
| * | *Rubus fruticosus spp. agg.* | Blackberry | | C |
| | *Rumex bidens* | Mud Dock | | - |
| * | *Rumex conglomeratus* | Clustered Dock | | - |
| * | *Rumex crispus* | Curled Dock | | - |
| | *Rumex dumosus* | Wiry Dock | | - |
| | *Rytidosperma duttonianum* | Brown-back Wallaby-grass | | - |

| ORIGIN | SCIENTIFIC NAME | COMMON NAME | CONSERVATION STATUS | CALP ACT |
|---|---|---|---|---|
| * | *Salix alba var. vitellina* | Golden Willow | | - |
| * | *Salix matsudana 'Tortuosa'* | Tortured Willow | | - |
| | *Schoenoplectus tabernaemontani* | River Club-sedge | | - |
| | *Schoenus apogon* | Common Bog-sedge | | - |
| | *Senecio campylocarpus* | Floodplain Fireweed | en P | - |
| | *Senecio quadridentatus* | Cotton Fireweed | P | - |
| * | *Silybum marianum* | Variegated Thistle | | R |
| * | Sonchus asper s.l. | Rough Sow-thistle | | - |
| * | *Trifolium repens var. repens* | White Clover | | - |
| * | *Trifolium sp.* | Clover | | - |
| | *Typha domingensis* | Narrow-leaf Cumbungi | | - |
| * | *Ulex europaeus* | Gorse | | C |
| * | *Ulmus procera* | English Elm | | - |
| | *Vittadinia cuneata* | New Holland Daisy | P | - |

**Conservation Status used in the table above:**

**Conservation Status in Australia**
Listing under the federal *Environment Protection and Biodiversity Conservation Act 1999*
CR = Critically Endangered, EN = Endangered, VU = Vulnerable.

**Conservation Status in Victoria**
Status under the *Flora and Fauna Guarantee Act 1988*
cr = Critically Endangered, en = Endangered, vu = Vulnerable, P = Protected

**Taxon Origin**
# = native but some stands may be alien, * = introduced

# D2. VEGETATION QUALITY ASSESSEMNT RESULTS

Table D.2 Vegetation Quality Assessment results,

| EVC | LARGE TREE | TREE CANOPY | WEEDS | UNDERSTORY | RECRUITMEN | ORGANIC LIT | LOGS | HH_PAI | HH_EVC | BCS | LT_CNT | HH_H_SP | HH_SI | HH_ZI | HH_VAC | IS_PAST | IS_PARTIAL | HH_H_S | HH_A | SITE_COND | LS_CONT | VQA | STANDARDIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 1 | W | P | No | No | 0.4 | 4.348482 | 40 | 2 | - | - |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 2 | W | P | No | No | 0.4 | 0.076357 | 40 | 2 | - | - |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 3 | W | P | No | No | 0.29 | 0.000119 | 29 | 2 | - | - |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 4 | P | P | No | No | 0.1 | 0.019176 | 8 | 2 | 10 | 1 |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 4 | W | P | No | No | 0.472 | 8.312079 | 47 | 2 | - | - |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 5 | W | P | No | No | 0.646 | 0.249784 | 65 | 2 | - | - |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 5 | P | P | No | No | 0.1 | 0.027605 | 8 | 2 | 10 | 1 |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 6 | W | P | No | No | 0.646 | 0.447875 | 65 | 2 | - | - |
| Plains_Grassy_Wetland_125 | | | 7 | 15 | 3 | 3 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 6 | P | P | No | No | 0.4008 | 1.568376 | 28 | 2 | 40.08 | 1.36 |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 7 | W | P | No | No | 0.3422 | 4.699916 | 34 | 2 | - | - |
| Plains_Grassy_Wetland_125 | | | 7 | 15 | 3 | 3 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 7 | P | P | No | No | 0.4008 | 0.57274 | 28 | 2 | 40.08 | 1.36 |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 8 | W | P | No | No | 0.3422 | 5.48E-05 | 34 | 2 | - | - |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 9 | W | P | No | No | 0.5314 | 7.498687 | 53 | 2 | - | - |
| Tall_Marsh_821 | | | 9 | 15 | 3 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 9 | P | P | No | No | 0.4416 | 3.728423 | 31 | 2 | 44.16 | 1.36 |
| Current Wetland | | | | | | | | Bal_Nth | WET_0000 | E | 0 | 0 | 10 | W | P | No | No | 0.3333 | 0.08819 | 33 | 2 | - | - |
| Tall_Marsh_821 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 10 | P | P | No | No | 0.156 | 0.004819 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 11 | P | P | No | No | 0.156 | 0.060519 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 12 | P | P | No | No | 0.156 | 0.020241 | 10 | 2 | 15.6 | 1.36 |
| Tall_Marsh_821 | | | 7 | 15 | 3 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 13 | P | P | No | No | 0.4144 | 0.155347 | 29 | 2 | 41.44 | 1.36 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 14 | P | P | No | No | 0.09 | 0.015692 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 15 | P | P | No | No | 0.09 | 0.058932 | 7 | 2 | 9 | 1 |
| Tall_Marsh_821 | | | 7 | 15 | 3 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 16 | P | P | No | No | 0.4144 | 0.029404 | 29 | 2 | 41.44 | 1.36 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 17 | P | P | No | No | 0.09 | 0.041114 | 7 | 2 | 9 | 1 |
| Tall_Marsh_821 | | | 7 | 15 | 3 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 18 | P | P | No | No | 0.4144 | 0.168019 | 29 | 2 | 41.44 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 19 | P | P | No | No | 0.09 | 0.002367 | 7 | 2 | 9 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 20 | P | P | No | No | 0.1 | 0.000808 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 21 | P | P | No | No | 0.156 | 0.086369 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 22 | P | P | No | No | 0.09 | 0.038046 | 7 | 2 | 9 | 1 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 23 | P | P | No | No | 0.156 | 0.024224 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 24 | P | P | No | No | 0.1 | 0.018191 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 25 | P | P | No | No | 0.1 | 0.006842 | 8 | 2 | 10 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 26 | P | P | No | No | 0.09 | 0.04771 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 27 | P | P | No | No | 0.09 | 0.128675 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 28 | P | P | No | No | 0.09 | 0.12338 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 29 | P | P | No | No | 0.09 | 0.009696 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 30 | P | P | No | No | 0.09 | 0.008153 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 31 | P | P | No | No | 0.09 | 0.364368 | 7 | 2 | 9 | 1 |

| EVC | LARGE TREE | TREE CANOPY | WEEDS | UNDERSTORY | RECRUITMEN | ORGANIC LIT | LOGS | HH_PAI | HH_EVC | BCS | LT_CNT | HH_H_SP | HH_SI | HH_ZI | HH_VAC | IS_PAST | IS_PARTIAL | HH_H_S | HH_A | SITE_COND | LS_CONT | VQA | STANDARDIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 32 | P | P | No | No | 0.1 | 0.014527 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 33 | P | P | No | No | 0.156 | 0.017244 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 34 | P | P | No | No | 0.156 | 0.02039 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 4 | 15 | 3 | 5 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 35 | P | P | No | No | 0.3872 | 0.236776 | 27 | 2 | 38.72 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 36 | P | P | No | No | 0.1 | 0.00172 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 37 | P | P | No | No | 0.1 | 0.008703 | 8 | 2 | 10 | 1 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 38 | P | P | No | No | 0.3872 | 0.055967 | 27 | 2 | 38.72 | 1.36 |
| Tall_Marsh_821 | | | 7 | 15 | 3 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 39 | P | P | No | No | 0.4144 | 0.028487 | 29 | 2 | 41.44 | 1.36 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 40 | P | P | No | No | 0.3872 | 0.066282 | 27 | 2 | 38.72 | 1.36 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 41 | P | P | No | No | 0.3872 | 0.013015 | 27 | 2 | 38.72 | 1.36 |
| Tall_Marsh_821 | | | 7 | 5 | 6 | 3 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 42 | P | P | No | No | 0.3056 | 0.010508 | 21 | 2 | 30.56 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 43 | P | P | No | No | 0.1 | 0.004261 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 44 | P | P | No | No | 0.1 | 0.236694 | 8 | 2 | 10 | 1 |
| Tall_Marsh_821 | | | 4 | 5 | 0 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 45 | P | P | No | No | 0.1968 | 0.067445 | 13 | 2 | 19.68 | 1.36 |
| Tall_Marsh_821 | | | 4 | 5 | 0 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 46 | P | P | No | No | 0.1968 | 0.021943 | 13 | 2 | 19.68 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 47 | P | P | No | No | 0.1 | 0.000312 | 8 | 2 | 10 | 1 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 4 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 48 | P | P | No | No | 0.3736 | 0.823033 | 26 | 2 | 37.36 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 49 | P | P | No | No | 0.1 | 0.005362 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 50 | P | P | No | No | 0.1 | 0.001264 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 51 | P | P | No | No | 0.1 | 0.00029 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 52 | P | P | No | No | 0.1 | 0.002474 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 53 | P | P | No | No | 0.1 | 0.000413 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 54 | P | P | No | No | 0.1 | 0.000403 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 55 | P | P | No | No | 0.1 | 0.000711 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 56 | P | P | No | No | 0.1 | 1.98E-05 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 57 | P | P | No | No | 0.1 | 0.000434 | 8 | 2 | 10 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 3 | 0 | 5 | 5 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 58 | P | P | No | No | 0.17 | 0.198398 | 15 | 2 | 17 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 59 | P | P | No | No | 0.14 | 0.013262 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 60 | P | P | No | No | 0.1 | 0.001003 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Wetland_125 | | | 7 | 15 | 6 | 5 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 62 | P | P | No | No | 0.4688 | 12.11516 | 33 | 2 | 46.88 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 63 | P | P | No | No | 0.1 | 0.003705 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Wetland_125 | | | 7 | 15 | 6 | 5 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 64 | P | P | No | No | 0.4688 | 0.705496 | 33 | 2 | 46.88 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 7 | 15 | 6 | 5 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 65 | P | P | No | No | 0.4688 | 0.067632 | 33 | 2 | 46.88 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 66 | P | P | No | No | 0.09 | 0.015622 | 7 | 2 | 9 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 5 | 0 | 5 | 5 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 67 | P | P | No | No | 0.19 | 0.005132 | 17 | 2 | 19 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 1 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 68 | P | P | No | No | 0.1 | 0.001142 | 8 | 2 | 10 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 69 | P | P | No | No | 0.14 | 0.01124 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 71 | P | P | No | No | 0.156 | 0.00798 | 10 | 2 | 15.6 | 1.36 |

| EVC | LARGE TREE | TREE CANOPY | WEEDS | UNDERSTORY | RECRUITMEN | ORGANIC LIT | LOGS | HH_PAI | HH_EVC | BCS | LT_CNT | HH_H_SP | HH_SI | HH_ZI | HH_VAC | IS_PAST | IS_PARTIAL | HH_H_S | HH_A | SITE_COND | LS_CONT | VQA | STANDARDIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plains_Grassy_Wetland_125 | | | 4 | 15 | 1 | 4 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 72 | P | P | No | No | 0.3464 | 0.025225 | 24 | 2 | 34.64 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 0 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 73 | P | P | No | No | 0.09 | 0.010592 | 7 | 2 | 9 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 74 | P | P | No | No | 0.14 | 0.029989 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 75 | P | P | No | No | 0.14 | 0.02289 | 12 | 2 | 14 | 1 |
| Tall_Marsh_821 | | | 0 | 15 | 1 | 3 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 76 | P | P | No | No | 0.2784 | 0.010511 | 19 | 2 | 27.84 | 1.36 |
| Tall_Marsh_821 | | | 0 | 5 | 1 | 3 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 77 | P | P | No | No | 0.1424 | 0.001988 | 9 | 2 | 14.24 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 78 | P | P | No | No | 0.14 | 0.038525 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 79 | P | P | No | No | 0.14 | 0.004044 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 2 | 0 | 5 | 3 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 80 | P | P | No | No | 0.14 | 0.817059 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Wetland_125 | | | 0 | 15 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 81 | P | P | No | No | 0.292 | 0.016157 | 20 | 2 | 29.2 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 82 | P | P | No | No | 0.14 | 0.004086 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 83 | P | P | No | No | 0.14 | 0.007866 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 85 | P | P | No | No | 0.14 | 0.00291 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 86 | P | P | No | No | 0.14 | 0.014792 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 87 | P | P | No | No | 0.14 | 0.002921 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 88 | P | P | No | No | 0.14 | 0.006352 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 89 | P | P | No | No | 0.14 | 0.003364 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 90 | P | P | No | No | 0.14 | 0.015733 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 91 | P | P | No | No | 0.14 | 0.004104 | 12 | 2 | 14 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 92 | P | P | No | No | 0.14 | 0.001698 | 12 | 2 | 14 | 1 |
| Tall_Marsh_821 | | | 4 | 5 | 0 | 2 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 93 | P | P | No | No | 0.1696 | 0.005348 | 11 | 2 | 16.96 | 1.36 |
| Aquatic_Herbland_653 | | | 7 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 94 | P | P | No | No | 0.428 | 0.076703 | 30 | 2 | 42.8 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 95 | P | P | No | No | 0.156 | 0.009697 | 10 | 2 | 15.6 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 96 | P | P | No | No | 0.14 | 0.007378 | 12 | 2 | 14 | 1 |
| Tall_Marsh_821 | | | 0 | 15 | 3 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 97 | P | P | No | No | 0.3192 | 0.006473 | 22 | 2 | 31.92 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 98 | P | P | No | No | 0.14 | 0.003771 | 12 | 2 | 14 | 1 |
| Tall_Marsh_821 | | | 0 | 5 | 1 | 2 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 99 | P | P | No | No | 0.1288 | 0.010156 | 8 | 2 | 12.88 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 0 | 5 | 5 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 100 | P | P | No | No | 0.14 | 0.001258 | 12 | 2 | 14 | 1 |
| Aquatic_Herbland_653 | | | 9 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 101 | P | P | No | No | 0.4552 | 0.066501 | 32 | 2 | 45.52 | 1.36 |
| Aquatic_Herbland_653 | | | 9 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 102 | P | P | No | No | 0.4552 | 0.079564 | 32 | 2 | 45.52 | 1.36 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 103 | P | P | No | No | 0.09 | 0.384439 | 7 | 2 | 9 | 1 |
| Creekline_Grassy_Woodland_68 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | Bal_Nth | VVP_0055 | E | 0 | 0 | 104 | P | P | No | No | 0.09 | 0.081576 | 7 | 2 | 9 | 1 |
| Plains_Grassy_Woodland_55_63 | 0 | 0 | 4 | 5 | 0 | 2 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 106 | P | P | No | No | 0.13 | 0.122122 | 11 | 2 | 13 | 1 |
| Plains_Grassy_Wetland_125 | | | 4 | 15 | 3 | 3 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 107 | P | P | No | No | 0.36 | 0.34304 | 25 | 2 | 36 | 1.36 |
| Plains_Grassy_Woodland_55_63 | 10 | 5 | 4 | 5 | 0 | 3 | | Bal_Nth | VVP_0055 | E | 4 | 0 | 108 | P | P | No | No | 0.29 | 0.081085 | 27 | 2 | 29 | 1 |
| Plains_Grassy_Wetland_125 | | | 0 | 5 | 3 | 2 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 109 | P | P | No | No | 0.156 | 0.062046 | 10 | 2 | 15.6 | 1.36 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 5 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 110 | P | P | No | No | 0.3872 | 0.007807 | 27 | 2 | 38.72 | 1.36 |
| Plains_Grassy_Wetland_125 | | | 7 | 15 | 3 | 3 | | Bal_Nth | VVP_0125 | E | 0 | 0 | 111 | P | P | No | No | 0.4008 | 0.767654 | 28 | 2 | 40.08 | 1.36 |

| EVC | LARGE TREE | TREE CANOPY | WEEDS | UNDERSTORY | RECRUITMEN | ORGANIC LIT | LOGS | HH_PAI | HH_EVC | BCS | LT_CNT | HH_H_SP | HH_SI | HH_ZI | HH_VAC | IS_PAST | IS_PARTIAL | HH_H_S | HH_A | SITE_COND | LS_CONT | VQA | STANDARDIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tall_Marsh_821 | | | 4 | 5 | 0 | 4 | | Bal_Nth | VVP_0821 | V | 0 | 0 | 113 | P | P | No | No | 0.1968 | 0.048525 | 13 | 2 | 19.68 | 1.36 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 4 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 114 | P | P | No | No | 0.3736 | 0.168479 | 26 | 2 | 37.36 | 1.36 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 4 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 115 | P | P | No | No | 0.3736 | 0.314942 | 26 | 2 | 37.36 | 1.36 |
| Aquatic_Herbland_653 | | | 4 | 15 | 3 | 4 | | Bal_Nth | VVP_0055 | E | 0 | 0 | 116 | P | P | No | No | 0.3736 | 0.839979 | 26 | 2 | 37.36 | 1.36 |

# D3. CANOPY TREES

Table D.3 Canopy Trees recorded across the study area

| TREE # | SPECIES | DBH | HABITAT | NOTES | INDIG | SIZE CLASS | SITU |
|---|---|---|---|---|---|---|---|
| 8 | River Red-gum *Eucalyptus camaldulensis* | 84 | | | Indigenous | Large | P |
| 9 | River Red-gum *Eucalyptus camaldulensis* | 98 | | | Indigenous | Large | P |
| 10 | River Red-gum *Eucalyptus camaldulensis* | 76 | | | Indigenous | Large | P |
| 11 | River Red-gum *Eucalyptus camaldulensis* | 97 | | | Indigenous | Large | P |
| 12 | River Red-gum *Eucalyptus camaldulensis* | 101 | | | Indigenous | Large | P |
| 14 | River Red-gum *Eucalyptus camaldulensis* | 77 | | | Indigenous | Large | P |
| 7 | Swamp Gum *Eucalyptus ovata* | 130 | Cracks | | Indigenous | Large | ST |
| 13 | Yellow Box *Eucalyptus melliodora* | 49 | | | Indigenous | Small | ST |
| 15 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 94 | | | Indigenous | Large | ST |
| 17 | Eucalypt *Eucalyptus spp.* | 32 | | Planted | Indigenous | Small | ST |
| 18 | Swamp Gum *Eucalyptus ovata* | 47 | | Planted | Indigenous | Small | ST |
| 19 | Swamp Gum *Eucalyptus ovata* | 40 | | Planted | Indigenous | Small | ST |
| 20 | River Red-gum *Eucalyptus camaldulensis* | 105 | | Multi-stemmed, 22, 13, 7, 3, 6, 105 | Indigenous | Large | ST |
| 21 | River Red-gum *Eucalyptus camaldulensis* | 27 | | Multi-stemmed: 27, 16, 8, 21, 20, 7, 14 | Indigenous | Small | ST |
| 22 | Swamp Gum *Eucalyptus ovata* | 92 | | | Indigenous | Large | ST |
| 23 | River Red-gum *Eucalyptus camaldulensis* | 149 | Hollows | | Indigenous | Large | ST |
| 24 | River Red-gum *Eucalyptus camaldulensis* | 109 | | Multi-stemmed, 13, 21, 21, 14, 20, 21, 109 | Indigenous | Large | ST |
| 25 | River Red-gum *Eucalyptus camaldulensis* | 101 | | Multi-stemmed, 12, 8, 14,101 | Indigenous | Large | ST |
| 26 | Swamp Gum *Eucalyptus ovata* | 108 | Small hollows | | Indigenous | Large | ST |
| 27 | River Red-gum *Eucalyptus camaldulensis* | 118 | | | Indigenous | Large | ST |
| 28 | River Red-gum *Eucalyptus camaldulensis* | 58 | | Multi-stemmed, 31, 25, 58 | Indigenous | Small | ST |
| 29 | River Red-gum *Eucalyptus camaldulensis* | 92 | | | Indigenous | Large | ST |

| TREE # | SPECIES | DBH | HABITAT | NOTES | INDIG | SIZE CLASS | SITU |
|---|---|---|---|---|---|---|---|
| 30 | Eucalypt *Eucalyptus spp*. | 100 | | Dead stag | Indigenous | Large | ST |
| 31 | River Red-gum *Eucalyptus camaldulensis* | 133 | | Dead stag | Indigenous | Large | ST |
| 32 | River Red-gum *Eucalyptus camaldulensis* | 104 | | | Indigenous | Large | ST |
| 33 | Yellow Gum *Eucalyptus leucoxylon* | 113 | | Planted | Indigenous | Large | ST |
| 34 | River Red-gum *Eucalyptus camaldulensis* | 89 | | | Indigenous | Large | ST |
| 35 | Eucalypt *Eucalyptus spp*. | 100 | | Dead stag | Indigenous | Large | ST |
| 36 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 135 | | | Indigenous | Large | ST |
| 37 | River Red-gum *Eucalyptus camaldulensis* | 95 | | | Indigenous | Large | ST |
| 38 | River Red-gum *Eucalyptus camaldulensis* | 80 | | | Indigenous | Large | ST |
| 39 | River Red-gum *Eucalyptus camaldulensis* | 110 | | DBH estimated | Indigenous | Large | ST |
| 40 | Eucalypt *Eucalyptus spp*. | 113 | | Dead stag | Indigenous | Large | ST |
| 42 | Narrow-leaf Peppermint *Eucalyptus radiata s.l.* | 108 | | | Indigenous | Large | ST |
| 43 | Swamp Gum *Eucalyptus ovata* | 74 | | | Indigenous | Large | ST |
| 44 | Swamp Gum *Eucalyptus ovata* | 135 | Med hollows, Cracks | | Indigenous | Large | ST |
| 45 | Eucalyptus ovata var. ovata_Swamp Gum | 130 | Med hollows | | Indigenous | Large | ST |
| 46 | Swamp Gum *Eucalyptus ovata* | 140 | | | Indigenous | Large | ST |
| 47 | Swamp Gum *Eucalyptus ovata* | 95 | | | Indigenous | Large | ST |
| 48 | Swamp Gum *Eucalyptus ovata* | 105 | Large hollows | | Indigenous | Large | ST |
| 49 | River Red-gum *Eucalyptus camaldulensis* | 15 | | | Indigenous | Small | ST |
| 50 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 15 | | | Indigenous | Small | ST |
| 51 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 85 | | | Indigenous | Large | ST |
| 52 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 95 | | | Indigenous | Large | ST |
| 53 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 85 | | | Indigenous | Large | ST |
| 54 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 85 | | | Indigenous | Large | ST |

| TREE # | SPECIES | DBH | HABITAT | NOTES | INDIG | SIZE CLASS | SITU |
|---|---|---|---|---|---|---|---|
| 55 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 75 | | | Indigenous | Large | ST |
| 56 | River Red-gum *Eucalyptus camaldulensis* | 26 | | | Indigenous | Small | ST |
| 57 | River Red-gum *Eucalyptus camaldulensis* | 12 | | | Indigenous | Small | ST |
| 58 | River Red-gum *Eucalyptus camaldulensis* | 20 | | | Indigenous | Small | ST |
| 59 | River Red-gum *Eucalyptus camaldulensis* | 9 | | | Indigenous | Small | ST |
| 60 | Candlebark *Eucalyptus rubida subsp. rubida* | 47 | | | Indigenous | Small | ST |
| 61 | Swamp Gum *Eucalyptus ovata* | 22 | | | Indigenous | Small | ST |
| 62 | River Red-gum *Eucalyptus camaldulensis* | 112 | | | Indigenous | Large | ST |
| 63 | Swamp Gum *Eucalyptus ovata* | 110 | | | Indigenous | Large | ST |
| 64 | River Red-gum *Eucalyptus camaldulensis* | 115 | | | Indigenous | Large | ST |
| 65 | River Red-gum *Eucalyptus camaldulensis* | 100 | | | Indigenous | Large | ST |
| 66 | River Red-gum *Eucalyptus camaldulensis* | 120 | Med hollows | | Indigenous | Large | ST |
| 67 | River Red-gum *Eucalyptus camaldulensis* | 109 | Med hollows | | Indigenous | Large | ST |
| 68 | River Red-gum *Eucalyptus camaldulensis* | 85 | Med hollows | Bee hive | Indigenous | Large | ST |
| 69 | River Red-gum *Eucalyptus camaldulensis* | 70 | | Dead | Indigenous | Large | ST |
| 70 | River Red-gum *Eucalyptus camaldulensis* | 85 | Med hollows | | Indigenous | Large | ST |
| 71 | River Red-gum *Eucalyptus camaldulensis* | 105 | | | Indigenous | Large | ST |
| 72 | River Red-gum *Eucalyptus camaldulensis* | 11 | | | Indigenous | Small | ST |
| 73 | River Red-gum *Eucalyptus camaldulensis* | 16 | | | Indigenous | Small | ST |
| 74 | River Red-gum *Eucalyptus camaldulensis* | 12 | | | Indigenous | Small | ST |
| 75 | River Red-gum *Eucalyptus camaldulensis* | 11 | | Multi stemmed DBH 11, 10 | Indigenous | Small | ST |
| 76 | River Red-gum *Eucalyptus camaldulensis* | 90 | Med hollows | | Indigenous | Large | ST |
| 77 | Yellow Box *Eucalyptus melliodora* | 0 | | | Indigenous | Small | ST |
| 78 | Yellow Gum *Eucalyptus leucoxylon* | 0 | | | Indigenous | Small | ST |
| 81 | Black Sheoak *Allocasuarina littoralis* | 69 | | 62 56 69 | Indigenous | Large | ST |
| 83 | River Red-gum *Eucalyptus camaldulensis* | 51 | | 53 48 | Indigenous | Small | ST |
| 84 | River Red-gum *Eucalyptus camaldulensis* | 4 | | | Indigenous | Small | ST |

| TREE # | SPECIES | DBH | HABITAT | NOTES | INDIG | SIZE CLASS | SITU |
|---|---|---|---|---|---|---|---|
| 85 | River Red-gum *Eucalyptus camaldulensis* | 81 | | | Indigenous | Large | ST |
| 87 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 0 | | | Indigenous | Small | ST |
| 88 | River Red-gum *Eucalyptus camaldulensis* | 71 | | | Indigenous | Large | ST |
| 89 | Swamp Gum *Eucalyptus ovata* | 83 | Small hollows | | Indigenous | Large | ST |
| 91 | Manna Gum *Eucalyptus viminalis subsp. viminalis* | 0 | | | Indigenous | Small | ST |
| 92 | Swamp Gum *Eucalyptus ovata* | 54 | | | Indigenous | Small | ST |
| 93 | River Red-gum *Eucalyptus camaldulensis* | 100 | | | Indigenous | Large | ST |
| 94 | River Red-gum *Eucalyptus camaldulensis* | 44 | | | Indigenous | Small | ST |
| 95 | River Red-gum *Eucalyptus camaldulensis* | 39 | | | Indigenous | Small | ST |
| 96 | Yellow Box *Eucalyptus melliodora* | 44 | | | Indigenous | Small | ST |
| 97 | Eucalypt *Eucalyptus spp*. | 107 | Large hollows, Cracks | Dead | Indigenous | Large | ST |
| 98 | Candlebark *Eucalyptus rubida subsp. rubida* | 65 | | | Indigenous | Small | ST |
| 99 | Swamp Gum *Eucalyptus ovata* | 86 | Small hollows | | Indigenous | Large | ST |
| 100 | Swamp Gum *Eucalyptus ovata* | 82 | | | Indigenous | Large | ST |
| 101 | Swamp Gum *Eucalyptus ovata* | 72 | Small hollows | | Indigenous | Large | ST |
| 102 | River Red-gum *Eucalyptus camaldulensis* | 45 | | DBH Estimated | Indigenous | Small | ST |
| 103 | River Red-gum *Eucalyptus camaldulensis* | 19 | | | Indigenous | Small | ST |

# D4. FAUNA SPECIES LIST

Table D.4 Fauna species observed on site

| ORIGIN | SPECIES | COMMON NAME | CONSERVATION STATUS |
|---|---|---|---|
| | *Acanthiza chrysorrhoa* | Yellow-rumped Thornbill | |
| | *Acanthiza pusilla* | Brown Thornbill | |
| * | *Alauda arvensis* | European Skylark | |
| | *Anas gracilis* | Grey Teal | |
| | *Anas superciliosa* | Pacific Black Duck | |
| | *Anthochaera carunculata* | Red Wattlebird | |
| | *Ardea pacifica* | White-necked Heron | |
| | *Austrelaps superbus* | Lowland Copperhead | |
| | *Aythya australis* | Hardhead | vu |
| | *Cacatua galerita* | Sulphur-crested Cockatoo | |
| | *Cacatua sanguinea* | Little Corella | |
| | *Cacatua tenuirostris* | Long-billed Corella | |
| | *Calyptorhynchus funereus* | Yellow-tailed Black-Cockatoo | |
| | *Chenonetta jubata* | Australian Wood Duck | |
| | *Cherax destructor destructor* | Common Yabby | |
| | *Cisticola exilis* | Golden-headed Cisticola | |
| | *Colluricincla harmonica* | Grey Shrike-thrush | |
| | *Corvus mellori* | Little Raven | |
| | *Coturnix coturnix* | Common Quail | |
| | *Crinia signifera* | Common Froglet | |
| | *Cygnus atratus* | Black Swan | |
| | *Egretta novaehollandiae* | White-faced Heron | |
| | *Eolophus roseicapilla* | Galah | |
| | *Gallinula tenebrosa* | Dusky Moorhen | |
| | *Grallina cyanoleuca* | Magpie-lark | |
| | *Gymnorhina tibicen* | Australian Magpie | |
| | *Hydromys chrysogaster* | Rakali | |
| | *Lampropholis guichenoti* | Common Garden Skink | |
| | *Lichenostomus chrysops* | Yellow-faced Honeyeater | |
| | *Limnodynastes dumerili* | Eastern Banjo Frog | |
| | *Limnodynastes peronii* | Striped Marsh Frog | |
| | *Limnodynastes tasmaniensis* | Spotted Marsh Frog | |

| ORIGIN | SPECIES | COMMON NAME | CONSERVATION STATUS |
|---|---|---|---|
| | *Litoria ewingii* | Southern Brown Tree Frog | |
| | *Litoria verreauxii* | Whistling Tree Frog | |
| | *Macropus giganteus* | Eastern Grey Kangaroo | |
| | *Malurus cyaneus* | Superb Fairy-wren | |
| | *Megalurus gramineus* | Little Grassbird | |
| | *Microcarbo melanoleucos* | Little Pied Cormorant | |
| * | *Oryctolagus cuniculus* | European Rabbit | |
| | *Pardalotus punctatus* | Spotted Pardalote | |
| * | *Passer domesticus* | House Sparrow | |
| | *Petrochelidon neoxena* | Welcome Swallow | |
| | *Phylidonyris novaehollandiae* | New Holland Honeyeater | |
| | *Platycercus elegans* | Crimson Rosella | |
| | *Platycercus eximius* | Eastern Rosella | |
| | *Porphyrio porphyrio* | Purple Swamphen | |
| | *Pseudemoia pagenstecheri* | Tussock Skink | en |
| | *Rhipidura albiscarpa* | Grey Fantail | |
| | *Rhipidura leucophrys* | Willie Wagtail | |
| | *Strepera graculina* | Pied Currawong | |
| | *Strepera versicolor* | Grey Currawong | |
| * | *Sturnus vulgaris* | Common Starling | |
| | *Tachybaptus novaehollandiae* | Australasian Grebe | |
| | *Tadorna tadornoides* | Australian Shelduck | |
| | *Threskiornis molucca* | Australian White Ibis | |
| | *Trichoglossus haematodus* | Rainbow Lorikeet | |
| * | *Turdus merula* | Common Blackbird | |
| | *Vanellus miles* | Masked Lapwing | |
| * | *Vulpes vulpes* | Red Fox | |

**Conservation Status used in the table above:**

**Conservation Status in Australia**
Listing under the federal *Environment Protection and Biodiversity Conservation Act 1999*
CR = Critically Endangered, EN = Endangered, VU = Vulnerable.

**Conservation Status in Victoria**
Status under the *Flora and Fauna Guarantee Act 1988*
cr = Critically Endangered, en = Endangered, vu = Vulnerable,

**Taxon Origin**
* = introduced

# D5. GOLDEN SUN MOTH SURVEY RESULTS

Table D.5 Golden Sun Moth *Synemon plana* detailed targeted survey efforts

| SURVEY NUMBER | SURVEY TYPE | SITE | DATE | SURVEY METHOD | MAX TEMP RANGE (C) | CLOUD COVER (%) | WIND SPEED (KM/H) | WIND DIRECTION | START TIME | FINISH TIME | GSM OBSERVED | COMMENTS | PERSON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Site Survey | Ballarat North | 6/12/2023 | Broad linear transect & vehicle | 23 | 15 | 15 | SW | 10:30 | 13:58 | No | Roadside recently mowed | AH & JB |
| | Reference Check | Ballarat Aerodrome | 6/12/2023 | Broad linear transect | 23 | 15 | 15 | SW | 10:30 | 13:58 | No | | AH & JB |
| | Reference Check | Beaufort | 6/12/2023 | Golden Sun Moth Flight Diary | 29 | 50 | 12 | W | 11:55 | | Yes - 47 males | | Michael Goddard, Biosis |
| 2 | Site Survey | Ballarat North | 21/12/2023 | Broad linear transect & vehicle | 17 | 50 | 33 | SE | 10:32 | 15:06 | No | | AH & JB |
| | Reference Check | Ballarat Aerodrome | 21/12/2023 | Broad linear transect | 17 | 50 | 36 | se | 9:56 | 10:20 | No | | AH & JB |
| | Reference Check | | | Golden Sun Moth Flight Diary | | | | | | | No records | | |
| 3 | Site Survey | Ballarat North | 11/01/2024 | Broad linear transect & vehicle | 20 | 0 | 10 | S | 10:49 | 13:40 | No | | JP & JB |
| | Reference Check | Ballarat Aerodrome | 11/01/2024 | Broad linear transect | 19 | 0 | 10 | s | 10:26 | 10:40 | No | | JP & JB |
| | Reference Check | Broadmeadows | 11/01/2024 | Golden Sun Moth Flight Diary | 21 | 10 | 9 | E | 10:30 | | Yes - 2 males flying | | Liz Browne, Nature Advisory |
| 4 | Site Survey | Ballarat North | 16/01/2024 | Broad linear transect & vehicle | 25 | 0 | 39 | N | 11:30 | 11:43 | No | | JP & JB |
| | Reference Check | Ballarat Aerodrome | 16/01/2024 | Broad linear transect | 25 | 0 | 39 | N | 11:30 | 11:43 | No | | JP & JB |
| | Reference Check | Broadmeadows Valley Park | 16/01/2024 | Golden Sun Moth Flight Diary | 24 | 0 | 25 | S | 10:03 | | Yes - 1 female | | Abbey, WSP |

# D6. GROWLING GRASS FROG

Table D.6 Growling Grass Frog *Litoria raniformis* detailed targeted survey results

| SITE NAME | SURVEY NUMBER | LOCATION RECORDED | DATE CAPTURED | START TIME (DAYLIGHT SAVINGS) | SURVEY LENGTH | TEMP (C) | WIND (KM/HR) | RELATIVE HUMIDITY (%) | CLOUD COVER | RAIN IN PAST 24 HOURS | CURRENT RAIN | WATER QUALITY | HABITAT ASSESSMENT & WATERBODY TYPE | GROWLING GRASS FROG RECORDED | SPECIES RECORDED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GGF Site 1 | 1 | **Latitude**: 37.517398 **Longitude**: 143.835737 | 2023-12-05 | 23:06:00 | 10:59.85 | 15.4 | 1.3 | 59.3 | 20-40% | None | None | **Temp (C)**: 17.4 **pH**: 7.9 **Electrical Conductivity (uS)**: 548 | **Waterbody**: Creek **Water level depth**: 2m **Emergent Vegetation:** Dock, Eleocharis, River Club-rush 10% **Submergent Vegetation**: NA **Floating Vegetation**: N/A **Fringing Vegetation**: Phalaris, Dock **Shelter**: N/A | No | |
| GGF Site 1 | 2 | **Latitude** 37.517397 **Longitude**: 143.835788 | 2023-12-13 | 00:15:00 | 9:41.91 | 25.1 | 0.3 | 68.7 | 40-60% | Light | None | **Temp (C):** 19.5 **pH**: 7.1 **Electrical Conductivity (uS)**: 264 | | No | 1 x Rakali *Hydromys chrysogaster* |
| GGF Site 2 | 1 | **Latitude**: 37.512272 **Longitude**: 143.827519 | 2023-12-05 | 22:48:00 | 8:12.44 | 16 | 0 | 57.8 | | None | None | **Temp (C**): 17.6 **pH**: 7.4 **Electrical Conductivity (uS):** 575 | **Waterbody**: Creek **Water level depth**: 15cm **Emergent Vegetation:** Juncus, Typha, Elisma, Geranium 90% **Submergent Vegetation**: NA **Floating Vegetation**: N/A **Fringing Vegetation**: Blackberry, Juncus sp., Scotch thistle, Dactylis **Shelter**: Logs 1% **Other**: Pugging visible | No | |
| GGF Site 2 | 2 | **Latitude**: 37.512120 **Longitude**: 143.827556 | 2023-12-13 | 00:33:00 | 10:13.06 | 25.3 | 0.3 | 66.2 | 60-80% | Light | None | **Temp (C):** 22 **pH**: 6.3 **Electrical Conductivity (uS)**: 385 | | No | 5 x Eastern Common Froglet *Crinia signifera* (heard) |
| GGF Site 3 | 1 | **Latitude**: 37.494450 **Longitude**: 143.813305 | 2023-12-05 | 20:37:00 | 22:35.93 | 18 | 11 | 46.8 | 20-40% | None | None | **Temp (C):** 19.1 **pH:** 7.1 **Electrical Conductivity (uS)**: 357 | **Waterbody**: Dam **Water level depth**: 2m **Emergent Vegetation:** Eleocharis 15% **Submergent Vegetation**: Unknown submergence species and algae 80% **Floating Vegetation**: N/A **Fringing Vegetation**: Eleocharis, Phalaris and Juncus **Shelter**: N/A **Other**: Pugging around dam edge | No | 1 x Spotted Marsh Frog *Limnodynastes tasmaniensis* (heard) |
| GGF Site 3 | 2 | **Latitude**: 37.494312 **Longitude**: 143.813449 | 2023-12-12 | 21:37:00 | 23:11.29 | 26.7 | 0 | 72 | 20-40% | Light | None | **Temp (C):** 25.1 **pH**: 7 **Electrical Conductivity (uS):** 364 | | No | 8 x Spotted Marsh Frog *Limnodynastes tasmaniensis* (heard) 1 x Whistling Tree Frog *Litoria verreauxii* (heard) |

| SITE NAME | SURVEY NUMBER | LOCATION RECORDED | DATE CAPTURED | START TIME (DAYLIGHT SAVINGS) | SURVEY LENGTH | TEMP (C) | WIND (KM/HR) | RELATIVE HUMIDITY (%) | CLOUD COVER | RAIN IN PAST 24 HOURS | CURRENT RAIN | WATER QUALITY | HABITAT ASSESSMENT & WATERBODY TYPE | GROWLING GRASS FROG RECORDED | SPECIES RECORDED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GGF Site 4 | 1 | **Latitude**: 37.486227 **Longitude**: 143.814463 | 2023-12-05 | 21:08:00 | 12:13.24 | 18.5 | 1.1 | 41.1 | 20-40% | None | None | **Temp (C)**: 17 **pH:** 7.6 **Electrical Conductivity (uS):** 1584 | **Waterbody**: Creek **Water level depth**: 0.5m **Emergent Vegetation:** Phragmites australis 70% **Submergent Vegetation**: N/A **Floating Vegetation**: N/A **Fringing Vegetation**: Mainly couch and Phragmites, some Phalaris **Shelter**: Artificial rocks | No | |
| GGF Site 4 | 2 | **Latitude**: 37.486189 **Longitude**: 143.814396 | 2023-12-12 | 22:49:00 | 19:19.45 | 26.3 | 0 | 71.6 | 20-40% | Light | None | **Temp (C)**: 21.6 **pH**: 7.5 **Electrical Conductivity (uS):** 1506 | | No | 1 x Spotted Marsh Frog *Limnodynastes tasmaniensis* 1 x Whistling Tree Frog *Litoria verreauxii* (heard) 1 x Eastern Banjo Frog *Limnodynastes dumerili* |
| GGF Site 5 | 1 | **Latitude**: 37.484401 **Longitude**: 143.821879 | 2023-12-05 | 21:47:00 | 16:48.92 | 16.5 | 1.3 | 52.5 | 20-40% | None | None | **Temp (C):** 15.3 **pH:** 7.8 **Electrical Conductivity (uS):** 1711 | **Waterbody**: Creek **Water level depth**: 1.5m **Emergent Vegetation:** Phragmites australis 35% **Submergent Vegetation**: N/A **Floating Vegetation**: N/A **Fringing Vegetation**: Phragmites, Dactylis, Sweet vernal, Phalaris **Shelter**: Artificial rocks under bridge | No | |
| GGF Site 5 | 2 | **Latitude**: 37.484421 **Longitude**: 143.823236 | 2023-12-12 | 23:21:00 | 13:02.74 | 26.1 | 0 | 82.7 | 40-60% | Light | None | **Temp (C):** 19.3 **pH**: 7.4 **Electrical Conductivity (uS):** 1636 | | No | 1 x Spotted Marsh Frog *Limnodynastes tasmaniensis* (heard) 1 x Whistling Tree Frog *Litoria verreauxii* (heard) |
| GGF Site 6 | 1 | **Latitude**: 37.482230 **Longitude**: 143.805751 | 2023-12-05 | 21:22:00 | 14:38.04 | 15.8 | 3.6 | 41.2 | 20-40% | None | None | No surface water present, mud only - water quality not able to be sampled. | **Waterbody**: Plains Sedgy Wetland **Water level depth**: 5cm **Emergent Vegetation:** Phalaris aquatica, Dactylis 95% **Submergent Vegetation**: N/A **Floating Vegetation**: N/A **Fringing Vegetation**: N/A **Shelter**: N/A | No | |
| GGF Site 6 | 2 | **Latitude**: 37.479038 **Longitude**: 143.809134 | 2023-12-12 | 22:25:00 | 11:09.59 | 26.4 | 0 | 69 | 40-60% | Light | None | **Temp (C):** 17.8 **pH:** 6.4 **Electrical Conductivity (uS):** 1110 | | No | 1 x Spotted Marsh Frog *Limnodynastes tasmaniensis* (heard) 2 x Eastern Common Froglet *Crinia signifera* (heard) |

| SITE NAME | SURVEY NUMBER | LOCATION RECORDED | DATE CAPTURED | START TIME (DAYLIGHT SAVINGS) | SURVEY LENGTH | TEMP (C) | WIND (KM/HR) | RELATIVE HUMIDITY (%) | CLOUD COVER | RAIN IN PAST 24 HOURS | CURRENT RAIN | WATER QUALITY | HABITAT ASSESSMENT & WATERBODY TYPE | GROWLING GRASS FROG RECORDED | SPECIES RECORDED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GGF Site 7 | 1 | **Latitude**: 37.508058 **Longitude**: 143.809349 | 2023-12-05 | 22:20:00 | 14:49.57 | 15 | 2.8 | 60.3 | 20-40% | None | None | **Temp (C):** 18.6 **pH**: 10 **Electrical Conductivity (uS):** 401 | **Waterbody**: Wetland **Water level depth**: 2m **Emergent Vegetation:** Juncus and Dock 15% **Submergent Vegetation**: Algae and Dock and other unknown species 60% **Floating Vegetation**: N/A **Fringing Vegetation**: Juncus, Dock **Shelter**: Rocks present | No | 2 x Eastern Common Froglet *Crinia signifera* (heard) |
| GGF Site 7 | 2 | **Latitude**: 37.508074 **Longitude**: 143.808625 | 2023-12-12 | 23:45:00 | 14:04.86 | 27.1 | 1 | 67 | 60-80% | Light | None | **Temp (C):** 25.1 **pH**: 7.7 **Electrical Conductivity (uS):** 310 | | No | 1 x Eastern Common Froglet *Crinia signifera* (heard) 1 x Whistling Tree Frog *Litoria verreauxii* (heard) |
| Ross Creek Road Ref Site | 2 | **Latitude**: 37.611971 **Longitude**: 143.809349 | 2023-12-12 | 20:34:00 | 16:27.71 | 24.6 | 1 | 79 | 20-40% | Light | None | **Temp (C):** 20.7 **pH**: 7.4 **Electrical Conductivity (uS)**: 1122 | **Waterbody**: Creek **Water level depth**: 0.5m – 1.5m **Emergent Vegetation:** Water Ribbons 10% **Submergent Vegetation**: Water Ribbons 60% **Floating Vegetation**: Water Ribbons 30% **Fringing Vegetation**: Marsh Club-rush, Water Couch **Shelter**: N/A | No | |

# D7. STRIPED LEGLESS LIZARD DETAILED SURVEY RESULTS

Table D.7 Striped Legless Lizard *Delma impar* detailed targeted survey results

| SURVEY NUMBER | GRID NUMBER | DATE | TIME | TEMP C | CLOUD COVER | WIND | RAIN (PAST 24 HOURS) | RELATIVE HUMIDITY % | SLL RECORDED | SPECIES RECORDED | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2023-09-06 | 11:07:00 | 11.2 | 20-40% | Strong | None | 68 | 0 | | |
| | 2 | 2023-09-06 | 10:43:00 | 10 | 60-80% | Strong | None | 71 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 3 | 2023-09-06 | 11:37:00 | 12 | <20% | Strong | None | 91 | 0 | | |
| | 4 | 2023-09-06 | 11:26:00 | 11.4 | <20% | Light | None | 67 | 0 | | |
| | 5 | 2023-09-06 | 13:15:00 | 14 | 40-60% | Strong | None | 57 | 0 | 1 x Southern Brown Tree Frog *Litoria ewingii*<br>1 x Unidentified Skink | |
| | 6 | 2023-09-06 | 12:54:00 | 14 | 20-40% | Strong | None | 58 | 0 | 9 x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| | 7 | 2023-09-06 | 13:56:00 | 14.7 | 20-40% | Light | None | 52 | 0 | | |
| | 8 | 2023-09-06 | 14:11:00 | 15 | 20-40% | Strong | None | 56 | 0 | | |
| | 9 | 2023-09-06 | 12:30:00 | 13.3 | <20% | Strong | None | 63 | 0 | | |
| | 10 | 2023-09-06 | 13:37:00 | 14 | 40-60% | Strong | None | 56 | 0 | 1 x Unidentified Skink<br>1 x Southern Brown Tree Frog *Litoria ewingii* | |
| 2 | 1 | 2023-09-13 | 14:41:00 | 21.4 | <20% | Light | None | 39 | 0 | 2 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 2 | 2023-09-13 | 14:31:00 | 21.6 | <20% | Slight | None | 40 | 0 | 6 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 3 | 2023-09-13 | 15:01:00 | 21.4 | <20% | Slight | None | 39 | 0 | | |
| | 4 | 2023-09-13 | 15:08:00 | 21.6 | <20% | Slight | None | 36 | 0 | 2 x Unidentified Skinks (likely Tussock Skinks) | |
| | 5 | 2023-09-13 | 11:08:00 | 17 | <20% | Slight | None | 61 | 0 | 1 x Southern Brown Tree Frog *Litoria ewingii* | |
| | 6 | 2023-09-13 | 13:48:00 | 21.4 | <20% | Slight | None | 38 | 0 | 5 x Spotted Marsh Frog *Limnodynastes tasmaniensis*<br>1 x Southern Brown Tree Frog *Litoria ewingii* | |
| | 7 | 2023-09-13 | 12:15:00 | 18.6 | 40-60% | Slight | None | 53 | 0 | | Grid dismantled so tiles were reset with 1-3 tiles missing. Partial check of six tiles that were still in place. No species recorded. |
| | 8 | 2023-09-13 | 12:20:00 | 18.6 | <20% | Slight | None | 53 | 0 | | |
| | 9 | 2023-09-13 | 13:15:00 | 20.2 | 20-40% | Slight | None | 41 | 0 | | |
| | 10 | 2023-09-13 | 11:30:00 | 17.3 | 20-40% | Slight | None | 59 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri* | |
| 3 | 1 | 2023-09-22 | 12:27:00 | 14 | 20-40% | Slight | Light | 54 | | 1 x Unidentified Skink | |
| | 2 | 2023-09-22 | 12:34:00 | 13 | 20-40% | Slight | Light | 53 | | 4 x Unidentified Skinks | |
| | 3 | 2023-09-22 | 12:09:00 | 13 | <20% | Light | Moderate | 54 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Unidentified Frog | |
| | 4 | 2023-09-22 | 12:18:00 | 13 | <20% | Light | Moderate | 54 | 0 | 4 x Unidentified Skinks | |
| | 5 | 2023-09-22 | 11:17:00 | 12 | 20-40% | Slight | Light | 57 | | 2 x Southern Brown Tree Frog *Litoria ewingii* | |

| SURVEY NUMBER | GRID NUMBER | DATE | TIME | TEMP C | CLOUD COVER | WIND | RAIN (PAST 24 HOURS) | RELATIVE HUMIDITY % | SLL RECORDED | SPECIES RECORDED | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | 2023-09-22 | 10:30:00 | 11 | 20-40% | Slight | Light | 61 | 0 | 1 x Unidentified Skink<br>1 x Common Froglet *Crinia signifera*<br>3 x Striped Marsh Frog *Limnodynastes peronii*<br>26 x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-09-22 | 11:47:00 | 13 | 20-40% | Slight | Light | 55 | | 1 x Unidentified Skink | |
| | 9 | 2023-09-22 | 10:59:00 | 11.3 | 40-60% | Light | Moderate | 65 | 0 | 4 x Unidentified Skinks | Lots of frog spawn |
| | 10 | 2023-09-22 | 11:30:00 | 12 | 20-40% | Slight | Light | 57 | | 1 x Spotted Marsh Frog *Limnodynastes tasmaniensis*<br>1 x Striped Marsh Frog *Limnodynastes peronii*<br>1 x Southern Brown Tree Frog *Litoria ewingii*<br>1 x Unidentified Frog | |
| 4 | 1 | 2023-09-27 | 11:25:00 | 12.5 | 40-60% | Light | None | 66 | 0 | 1x Tussock Skink *Pseudemoia pagenstecheri*<br>1x Unidentified Skink<br>1x Whistling Tree Frog *Litoria verreauxii*<br>1x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| | 2 | 2023-09-27 | 11:34:00 | 12.5 | 40-60% | Slight | None | 66 | 0 | 6 x Tussock Skink *Pseudemoia pagenstecheri*<br>4 x Unidentified Skink<br>1 x Lowland Copperhead *Austrelaps superbus* | |
| | 3 | 2023-09-27 | 11:04:00 | 11.9 | 60-80% | Light | None | 68 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri*<br>2 x Unidentified Skinks | |
| | 4 | 2023-09-27 | 11:14:00 | 12.3 | 60-80% | Light | None | 67 | 0 | 6 x Tussock Skinks *Pseudemoia pagenstecheri*<br>1 x Unidentified Skinks | |
| | 5 | 2023-09-27 | 12:11:00 | 13.5 | 40-60% | Slight | None | 63 | | 1 x Tussock Skink *Pseudemoia pagenstecheri*<br>2 x Unidentified Skink (likely Tussock Skinks)<br>1 x Southern Brown Tree Frog *Litoria ewingii* | |
| | 6 | 2023-09-27 | 13:02:00 | 14.2 | 40-60% | Light | None | 61 | 0 | 12 x Spotted Marsh Frog *Limnodynastes tasmaniensis*<br>2 x Common Froglet *Crinia signifera* | |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-09-27 | 12:01:00 | 13.1 | 40-60% | Light | None | 60 | 0 | | |
| | 9 | 2023-09-27 | 12:42:00 | 14.3 | 20-40% | Light | None | 59 | 0 | 4 x Unidentified Skinks<br>1 x Southern Brown Tree Frog *Litoria ewingii* | |
| | 10 | 2023-09-27 | 12:24:00 | 14.2 | 40-60% | Light | None | 61 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri*<br>2 x Unidentified Skink<br>1 x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| 5 | 1 | 2023-10-10 | 12:09:00 | 13.8 | <20% | Light | None | 66 | 0 | 1 x Unidentified Skink | |
| | 2 | 2023-10-10 | 11:57:00 | 15 | <20% | Slight | None | 63 | 0 | 1 x Lowland Copperhead *Austrelaps superbus* | |
| | 3 | 2023-10-10 | 11:37:00 | 13 | <20% | Slight | None | 65 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 4 | 2023-10-10 | 11:48:00 | 13.1 | <20% | Light | None | 65 | 0 | | |

| SURVEY NUMBER | GRID NUMBER | DATE | TIME | TEMP C | CLOUD COVER | WIND | RAIN (PAST 24 HOURS) | RELATIVE HUMIDITY % | SLL RECORDED | SPECIES RECORDED | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 2023-10-10 | 09:58:00 | 11 | <20% | Slight | None | | 0 | | |
| | 6 | 2023-10-10 | 09:19:00 | 9.7 | <20% | Light | None | 77 | 0 | 14 x Spotted Marsh Frog *Limnodynastes tasmaniensis*<br>1 x Unidentified Frog | |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-10-10 | 10:37:00 | 12 | <20% | Slight | None | 72 | 0 | 1 x Unidentified Skink | |
| | 9 | 2023-10-10 | 09:37:00 | 10.3 | <20% | Slight | None | 75 | 0 | | |
| | 10 | 2023-10-10 | 10:19:00 | 11.1 | <20% | Light | None | 73 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| 6 | 1 | 2023-10-18 | 11:18:00 | 16 | <20% | Light | None | 58 | 0 | 1 x Unidentified Skink | |
| | 2 | 2023-10-18 | 11:10:00 | 16 | <20% | Slight | None | 58 | 0 | 1 x Unidentified Snake | |
| | 3 | 2023-10-18 | 10:49:00 | 15 | <20% | Light | None | 70 | 0 | 1 x Unidentified Skink | |
| | 4 | 2023-10-18 | 10:58:00 | 15 | <20% | Light | None | 65 | 0 | 1 x Unidentified Skink | |
| | 5 | 2023-10-18 | 12:10:00 | 16.6 | <20% | Light | None | 62 | 0 | 1 x Unidentified Skink | |
| | 6 | 2023-10-18 | 11:55:00 | 16 | <20% | Light | None | 65 | 0 | 15 x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-10-18 | 12:35:00 | 17 | <20% | Light | None | 57 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 9 | 2023-10-18 | 11:39:00 | 15.8 | <20% | Light | None | 65 | 0 | 1 x Unidentified Skink | |
| | 10 | 2023-10-18 | 12:19:00 | 17 | <20% | Light | None | 61 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri* | |
| 7 | 1 | 2023-10-23 | 12:32:00 | 10.5 | >80% | Slight | Light | 82 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Unidentified Skink | |
| | 2 | 2023-10-23 | 12:31:00 | 14 | >80% | Slight | Light | 68 | 0 | 1 x Lowland Copperhead *Austrelaps superbus*<br>4 x Tussock Skink *Pseudemoia pagenstecheri*<br>3 x Tussock Skink Pseudemoia pagenstecheri | |
| | 3 | 2023-10-23 | 11:52:00 | 9.7 | >80% | Light | Light | 81 | 0 | 5 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 4 | 2023-10-23 | 11:59:00 | 10.2 | >80% | Slight | Light | 81 | 0 | 6 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Unidentified Skink | |
| | 5 | 2023-10-23 | 12:56:00 | 14 | >80% | Slight | Light | 68 | 0 | 2 x Unidentified Skinks<br>1 x Southern Brown Tree Frog *Litoria ewingii* | |
| | 6 | 2023-10-23 | 10:20:00 | 8.2 | >80% | Slight | None | 86 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri*<br>22 x Spotted Marsh Frog *Limnodynastes tasmaniensis* | |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-10-23 | 13:33:00 | 15 | >80% | Slight | Light | 68 | 0 | 1 x Unidentified Skink | |
| | 9 | 2023-10-23 | 10:34:00 | 8.7 | >80% | Slight | Light | 86 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Common Garden Skink *Lampropholis guichenoti* | 2 of the Tussock Skinks were likely gravid |

| SURVEY NUMBER | GRID NUMBER | DATE | TIME | TEMP C | CLOUD COVER | WIND | RAIN (PAST 24 HOURS) | RELATIVE HUMIDITY % | SLL RECORDED | SPECIES RECORDED | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 2023-10-23 | 13:12:00 | 14 | >80% | Slight | Light | 63 | 0 | 9 x Tussock Skink *Pseudemoia pagenstecheri*<br>5 x Unidentified Skink | |
| 8 | 1 | 2023-10-31 | 10:56:00 | 9.7 | >80% | Light | Light | 63 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 2 | 2023-10-31 | 11:05:00 | 10 | 60-80% | Light | Light | 62 | 0 | 1 x Lowland Copperhead *Austrelaps superbus*<br>1 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 3 | 2023-10-31 | 10:40:00 | 10 | >80% | Light | Light | 63 | 0 | 6 x Tussock Skink *Pseudemoia pagenstecheri*<br>2 x Unidentified Skink | |
| | 4 | 2023-10-31 | 10:49:00 | 9.7 | >80% | Light | Light | 63 | 0 | 4 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Unidentified Skink | |
| | 5 | 2023-10-31 | 12:08:00 | 11 | >80% | Light | Light | 57 | 0 | 3 x Tussock Skink *Pseudemoia pagenstecheri* | |
| | 6 | 2023-10-31 | 11:47:00 | 11 | >80% | Light | Light | 51 | 0 | NA | Tiles have all been removed |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-10-31 | 12:18:00 | 11.3 | >80% | Light | Light | 51 | 0 | 3 x Tussock Skink Pseudemoia pagenstecheri | |
| | 9 | 2023-10-31 | 11:18:00 | 10.3 | 60-80% | Light | Light | 60 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri*<br>1 x Unidentified skink | |
| | 10 | 2023-10-31 | 11:55:00 | 11.2 | >80% | Light | Light | 51 | 0 | 6 x Tussock Skink *Pseudemoia pagenstecheri*<br>9 x Unidentified Skinks (8 were on top of tiles) | |
| 9 | 1 | 2023-11-06 | 11:18:00 | 20 | 40-60% | Light | None | 54 | 0 | | |
| | 2 | 2023-11-06 | 11:11:00 | 20 | 40-60% | Light | None | 55 | 0 | | |
| | 3 | 2023-11-06 | 10:51:00 | 20 | 20-40% | Light | None | 55 | 0 | | |
| | 4 | 2023-11-06 | 11:01:00 | 20 | 20-40% | Slight | None | 56 | 0 | | |
| | 5 | 2023-11-06 | 11:58:00 | 22 | 40-60% | Light | None | 50 | 0 | | |
| | 6 | | | | | | | | | NA | Tiles have all been removed |
| | 7 | | | | | | | | | NA | Tiles have all been removed |
| | 8 | 2023-11-06 | 12:10:00 | 21 | 40-60% | Light | None | 54 | 0 | | |
| | 9 | 2023-11-06 | 11:35:00 | 21 | 40-60% | Light | None | 51 | 0 | | |
| | 10 | 2023-11-06 | 11:50:00 | 20.6 | 40-60% | Light | None | 53 | 0 | 1 x Tussock Skink *Pseudemoia pagenstecheri* | |
| 10 | 1 | 2023-11-13 | 12:23:00 | 16 | <20% | Slight | None | 53 | 0 | | |
| | 2 | 2023-11-13 | 12:17:00 | 16 | <20% | Slight | None | 53 | 0 | | |
| | 3 | 2023-11-13 | 12:01:00 | 16 | <20% | Slight | None | 54 | 0 | | |
| | 4 | 2023-11-13 | 12:09:00 | 16 | <20% | Slight | None | 54 | 0 | | |
| | 5 | 2023-11-13 | 12:56:00 | 18 | <20% | Slight | None | 49 | 0 | | |
| | 6 | | | | | | | | | NA | Tiles have all been removed |
| | 7 | | | | | | | | | NA | Tiles have all been removed |

| SURVEY NUMBER | GRID NUMBER | DATE | TIME | TEMP C | CLOUD COVER | WIND | RAIN (PAST 24 HOURS) | RELATIVE HUMIDITY % | SLL RECORDED | SPECIES RECORDED | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | 2023-11-13 | 13:15:00 | 18 | <20% | Slight | None | 47 | 0 | | |
| | 9 | 2023-11-13 | 12:40:00 | 18 | <20% | Slight | None | 50 | 0 | | |
| | 10 | 2023-11-13 | 13:01:00 | 18 | <20% | Slight | None | 49 | 0 | | |

# APPENDIX E

## ENSYM REPORT

# Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

**Date of issue:** **12/03/2024**
**Time of issue:** **1:23 pm**

**Report ID: Scenario Testing**

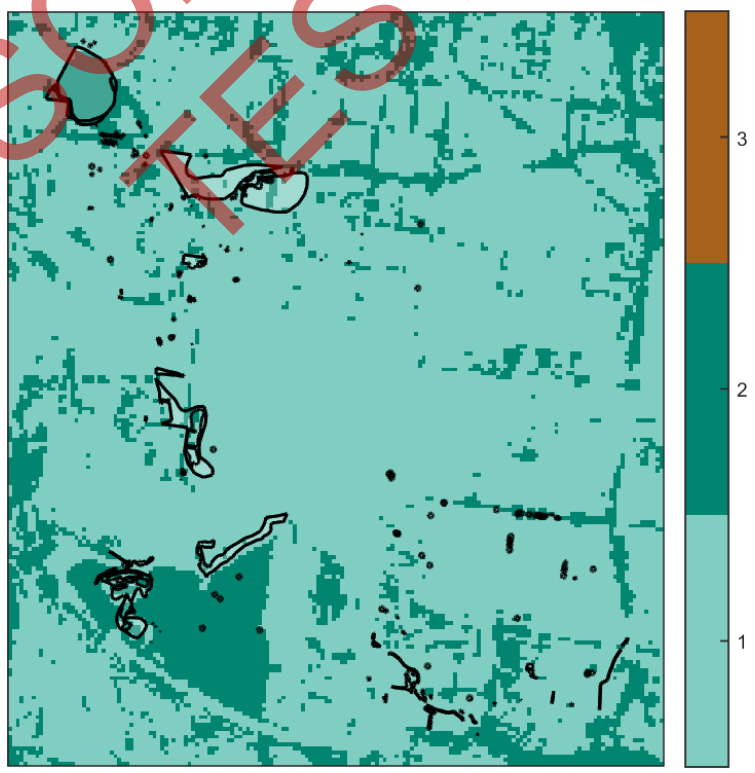
| **Project ID** | 20240307_WSP_Bal_Nth_EnSym |
|---|---|

## Assessment pathway

| **Assessment pathway** | **Detailed Assessment Pathway** |
|---|---|
| Extent including past and proposed | 56.291 ha |
| Extent of past removal | 0.000 ha |
| Extent of proposed removal | 56.291 ha |
| No. Large trees proposed to be removed | 59 |
| Location category of proposed removal | Location 2<br>The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species. |



**1. Location map**



# Scenario test – native vegetation removal

## 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] | 3.024 general habitat units |
| Vicinity | Glenelg Hopkins Catchment Management Authority (CMA) or Ballarat City Council |
| Minimum strategic biodiversity value score[2] | 0.313 |
| Large trees* | 44 large trees |
| **Species offset amount**[3] | 30.357 species units of habitat for Fragrant Leek-orchid, *Prasophyllum suaveolens*<br>17.493 species units of habitat for White Sunray, *Leucochrysum albicans subsp. tricolor* |
| Large trees* | 15 trees |
| *** The total number of large trees that the offset must protect** | 59 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.

# Scenario test – native vegetation removal

## 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.

**This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.**

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

# Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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



## Native vegetation to be removed

| Information provided by or on behalf of the applicant in a GIS file | | | | | | | Information calculated by EnSym | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zone** | **Type** | **BioEVC** | **BioEVC conservation status** | **Large tree(s)** | **Partial removal** | **Condition score** | **Polygon Extent** | **Extent without overlap** | **SBV score** | **HI score** | **Habitat units** | **Offset type** |
| 4-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.019 | 0.019 | 0.409 | | 0.002 | General |
| 5-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.028 | 0.028 | 0.410 | 0.570 | 0.004 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 6-P | Patch | vvp_0125 | Endangered | 0 | no | 0.401 | 1.568 | 1.568 | 0.368 | 0.284 | 0.807 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 7-P | Patch | vvp_0125 | Endangered | 0 | no | 0.401 | 0.573 | 0.573 | 0.324 | 0.251 | 0.287 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 9-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.442 | 3.728 | 3.728 | 0.387 | | 1.712 | General |
| 10-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.156 | 0.005 | 0.005 | 0.550 | | 0.001 | General |
| 11-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.061 | 0.061 | 0.448 | | 0.010 | General |
| 12-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.020 | 0.020 | 0.380 | | 0.003 | General |
| 13-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.414 | 0.155 | 0.155 | 0.366 | | 0.066 | General |
| 14-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.016 | 0.016 | 0.330 | | 0.001 | General |

| 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 |
| 15-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.059 | 0.059 | 0.330 | | 0.005 | General |
| 16-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.414 | 0.029 | 0.029 | 0.330 | | 0.012 | General |
| 17-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.041 | 0.041 | 0.330 | | 0.004 | General |
| 18-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.414 | 0.168 | 0.168 | 0.359 | | 0.071 | General |
| 19-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.002 | 0.002 | 0.330 | | 0.000 | General |
| 20-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.001 | 0.001 | 0.330 | | 0.000 | General |
| 21-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.086 | 0.086 | 0.410 | | 0.014 | General |
| 22-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.038 | 0.038 | 0.410 | | 0.004 | General |
| 23-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.024 | 0.024 | 0.401 | | 0.004 | General |
| 24-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.018 | 0.018 | 0.340 | | 0.002 | General |
| 25-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.007 | 0.007 | 0.340 | | 0.001 | General |
| 26-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.048 | 0.048 | 0.445 | | 0.005 | General |
| 27-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.129 | 0.129 | 0.330 | | 0.012 | General |
| 28-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.123 | 0.123 | 0.330 | | 0.011 | General |
| 29-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.010 | 0.010 | 0.330 | | 0.001 | General |
| 30-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.008 | 0.008 | 0.330 | | 0.001 | General |
| 31-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.364 | 0.364 | 0.334 | | 0.033 | General |
| 32-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.015 | 0.015 | 0.500 | | 0.002 | General |
| 33-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.017 | 0.017 | 0.360 | | 0.003 | General |
| 34-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.020 | 0.020 | 0.355 | | 0.003 | General |
| 35-P | Patch | vvp_0125 | Endangered | 0 | no | 0.387 | 0.237 | 0.237 | 0.540 | | 0.106 | General |
| 36-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.002 | 0.002 | 0.390 | | 0.000 | General |

| 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 |
| 37-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.009 | 0.009 | 0.370 | | 0.001 | General |
| 38-P | Patch | vvp_0055 | Endangered | 0 | no | 0.387 | 0.056 | 0.056 | 0.387 | | 0.023 | General |
| 39-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.414 | 0.028 | 0.028 | 0.390 | | 0.012 | General |
| 40-P | Patch | vvp_0055 | Endangered | 0 | no | 0.387 | 0.066 | 0.066 | 0.366 | | 0.026 | General |
| 41-P | Patch | vvp_0055 | Endangered | 0 | no | 0.387 | 0.013 | 0.013 | 0.360 | | 0.005 | General |
| 42-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.306 | 0.011 | 0.011 | 0.360 | | 0.003 | General |
| 43-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.004 | 0.004 | 0.410 | 0.320 | 0.001 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 44-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.237 | 0.237 | 0.710 | 0.623 | 0.038 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 45-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.197 | 0.067 | 0.067 | 0.516 | 0.600 | 0.021 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 46-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.197 | 0.022 | 0.022 | 0.410 | | 0.005 | General |
| 47-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.000 | 0.000 | 0.410 | 0.320 | 0.000 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 48-P | Patch | vvp_0055 | Endangered | 0 | no | 0.374 | 0.823 | 0.823 | 0.516 | 0.369 | 0.421 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 49-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.005 | 0.005 | 0.410 | | 0.001 | General |
| 50-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.001 | 0.001 | 0.410 | | 0.000 | General |
| 51-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.000 | 0.000 | 0.610 | | 0.000 | General |
| 52-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.002 | 0.002 | 0.610 | | 0.000 | General |
| 53-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.000 | 0.000 | 0.700 | | 0.000 | General |
| 54-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.000 | 0.000 | 0.700 | | 0.000 | General |
| 55-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.001 | 0.001 | 0.700 | | 0.000 | General |
| 56-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.000 | 0.000 | 0.700 | | 0.000 | General |

| 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 |
| 57-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.000 | 0.000 | 0.700 | | 0.000 | General |
| 58-P | Patch | vvp_0055 | Endangered | 0 | no | 0.170 | 0.198 | 0.198 | 0.410 | | 0.036 | General |
| 59-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.013 | 0.013 | 0.380 | | 0.002 | General |
| 60-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.001 | 0.001 | 0.474 | 0.637 | 0.000 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.481 | 0.000 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 62-P | Patch | vvp_0125 | Endangered | 0 | no | 0.469 | 12.115 | 12.115 | 0.669 | 0.638 | 9.302 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.580 | 9.288 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 63-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.004 | 0.004 | 0.660 | 0.660 | 0.001 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.660 | 0.001 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 64-P | Patch | vvp_0125 | Endangered | 0 | no | 0.469 | 0.705 | 0.705 | 0.576 | 0.507 | 0.498 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.507 | 0.498 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 65-P | Patch | vvp_0125 | Endangered | 0 | no | 0.469 | 0.068 | 0.068 | 0.690 | 0.632 | 0.052 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.632 | 0.052 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 66-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.016 | 0.016 | 0.380 | 0.640 | 0.002 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.640 | 0.002 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 67-P | Patch | vvp_0055 | Endangered | 0 | no | 0.190 | 0.005 | 0.005 | 0.380 | 0.363 | 0.001 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |

| 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 |
| | | | | | | | | | | 0.363 | 0.001 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 68-P | Patch | vvp_0055 | Endangered | 0 | no | 0.100 | 0.001 | 0.001 | 0.380 | 0.360 | 0.000 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.360 | 0.000 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 69-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.011 | 0.011 | 0.630 | 0.630 | 0.003 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.630 | 0.003 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 71-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.008 | 0.008 | 0.320 | | 0.001 | General |
| 72-P | Patch | vvp_0125 | Endangered | 0 | no | 0.346 | 0.025 | 0.025 | 0.310 | | 0.009 | General |
| 73-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.011 | 0.011 | 0.380 | 0.320 | 0.001 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.320 | 0.001 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 74-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.030 | 0.030 | 0.650 | | 0.005 | General |
| 75-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.023 | 0.023 | 0.360 | 0.450 | 0.005 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 76-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.278 | 0.011 | 0.011 | 0.430 | 0.560 | 0.005 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 77-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.142 | 0.002 | 0.002 | 0.430 | 0.560 | 0.000 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 78-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.039 | 0.039 | 0.380 | 0.400 | 0.008 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 79-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.004 | 0.004 | 0.380 | 0.400 | 0.001 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 80-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.817 | 0.817 | 0.388 | 0.512 | 0.173 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 81-P | Patch | vvp_0125 | Endangered | 0 | no | 0.292 | 0.016 | 0.016 | 0.380 | | 0.005 | General |

| 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 |
| 82-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.004 | 0.004 | 0.410 | | 0.001 | General |
| 83-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.008 | 0.008 | 0.300 | | 0.001 | General |
| 85-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.003 | 0.003 | 0.590 | | 0.000 | General |
| 86-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.015 | 0.015 | 0.360 | | 0.002 | General |
| 87-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.003 | 0.003 | 0.350 | 0.200 | 0.000 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 88-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.006 | 0.006 | 0.300 | | 0.001 | General |
| 89-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.003 | 0.003 | 0.330 | | 0.000 | General |
| 90-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.016 | 0.016 | 0.312 | | 0.002 | General |
| 91-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.004 | 0.004 | 0.370 | 0.360 | 0.001 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 92-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.002 | 0.002 | 0.634 | 0.391 | 0.000 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 93-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.170 | 0.005 | 0.005 | 0.330 | 0.450 | 0.001 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 94-P | Patch | vvp_0055 | Endangered | 0 | no | 0.428 | 0.077 | 0.077 | 0.330 | 0.450 | 0.048 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 95-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.010 | 0.010 | 0.350 | | 0.002 | General |
| 96-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.007 | 0.007 | 0.360 | | 0.001 | General |
| 97-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.319 | 0.006 | 0.006 | 0.373 | 0.380 | 0.003 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 98-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.004 | 0.004 | 0.410 | 0.380 | 0.001 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 99-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.129 | 0.010 | 0.010 | 0.394 | | 0.001 | General |
| 100-P | Patch | vvp_0055 | Endangered | 0 | no | 0.140 | 0.001 | 0.001 | 0.354 | 0.230 | 0.000 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |

| 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 |
| | | | | | | | | | | 0.245 | 0.000 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 101-P | Patch | vvp_0055 | Endangered | 0 | no | 0.455 | 0.067 | 0.067 | 0.330 | | 0.030 | General |
| 102-P | Patch | vvp_0055 | Endangered | 0 | no | 0.455 | 0.080 | 0.080 | 0.339 | | 0.036 | General |
| 103-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.384 | 0.384 | 0.420 | 0.484 | 0.051 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.009 | 0.053 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 104-P | Patch | vvp_0055 | Endangered | 0 | no | 0.090 | 0.082 | 0.082 | 0.390 | 0.583 | 0.012 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 106-P | Patch | vvp_0055 | Endangered | 0 | no | 0.130 | 0.122 | 0.122 | 0.400 | 0.651 | 0.026 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.651 | 0.026 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 107-P | Patch | vvp_0125 | Endangered | 0 | no | 0.360 | 0.343 | 0.343 | 0.390 | 0.530 | 0.189 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 108-P | Patch | vvp_0055 | Endangered | 4 | no | 0.290 | 0.081 | 0.081 | 0.380 | | 0.024 | General |
| 109-P | Patch | vvp_0125 | Endangered | 0 | no | 0.156 | 0.062 | 0.062 | 0.514 | 0.410 | 0.014 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.050 | 0.014 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 110-P | Patch | vvp_0055 | Endangered | 0 | no | 0.387 | 0.008 | 0.008 | 0.360 | | 0.003 | General |
| 111-P | Patch | vvp_0125 | Endangered | 0 | no | 0.401 | 0.768 | 0.768 | 0.484 | 0.640 | 0.505 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.417 | 0.481 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |

| 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 |
| 113-P | Patch | vvp_0821 | Vulnerable | 0 | no | 0.197 | 0.049 | 0.049 | 0.410 | 0.320 | 0.013 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 114-P | Patch | vvp_0055 | Endangered | 0 | no | 0.374 | 0.168 | 0.168 | 0.609 | 0.247 | 0.078 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 115-P | Patch | vvp_0055 | Endangered | 0 | no | 0.374 | 0.315 | 0.315 | 0.410 | | 0.124 | General |
| 116-P | Patch | vvp_0055 | Endangered | 0 | no | 0.374 | 0.840 | 0.840 | 0.623 | 0.347 | 0.423 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 1-W | Patch | wet_0000 | Endangered | 0 | no | 0.400 | 4.348 | 4.348 | 0.584 | 0.358 | 2.362 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 2-W | Patch | wet_0000 | Endangered | 0 | no | 0.400 | 0.076 | 0.076 | 0.610 | 0.330 | 0.041 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 3-W | Patch | wet_0000 | Endangered | 0 | no | 0.290 | 0.000 | 0.000 | 0.340 | | 0.000 | General |
| 4-W | Patch | wet_0000 | Endangered | 0 | no | 0.472 | 8.312 | 8.312 | 0.412 | 0.444 | 5.664 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.181 | 5.903 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 5-W | Patch | wet_0000 | Endangered | 0 | no | 0.646 | 0.250 | 0.250 | 0.780 | 0.655 | 0.267 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.621 | 0.267 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 6-W | Patch | wet_0000 | Endangered | 0 | no | 0.646 | 0.448 | 0.448 | 0.653 | 0.596 | 0.462 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.596 | 0.462 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 7-W | Patch | wet_0000 | Endangered | 0 | no | 0.342 | 4.700 | 4.700 | 0.358 | 0.394 | 2.242 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 8-W | Patch | wet_0000 | Endangered | 0 | no | 0.342 | 0.000 | 0.000 | 0.370 | 0.240 | 0.000 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 9-W | Patch | wet_0000 | Endangered | 0 | no | 0.531 | 7.499 | 7.499 | 0.390 | 0.532 | 6.105 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 10-W | Patch | wet_0000 | Endangered | 0 | no | 0.333 | 0.088 | 0.088 | 0.380 | | 0.030 | General |
| 7-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.342 | | 0.014 | General |
| 9-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.040 | 0.380 | | 0.008 | General |
| 13-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.370 | | 0.006 | General |
| 14-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.048 | 0.380 | | 0.010 | General |
| 15-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.370 | | 0.015 | General |
| 17-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.023 | 0.290 | | 0.004 | General |
| 18-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.016 | 0.290 | | 0.003 | General |
| 19-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.024 | 0.290 | | 0.005 | General |
| 20-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.067 | 0.479 | | 0.015 | General |
| 21-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.000 | 0.480 | | 0.000 | General |
| 22-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.380 | | 0.015 | General |
| 23-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.477 | | 0.016 | General |
| 24-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.042 | 0.480 | | 0.009 | General |
| 25-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.041 | 0.480 | | 0.009 | General |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 26-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.330 | | 0.014 | General |
| 27-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.066 | 0.480 | | 0.015 | General |
| 28-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.340 | | 0.006 | General |
| 29-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.060 | 0.340 | 0.260 | 0.015 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 30-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.060 | 0.340 | 0.260 | 0.015 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 31-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.340 | 0.260 | 0.018 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 32-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.310 | | 0.014 | General |
| 33-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.310 | | 0.014 | General |
| 34-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.035 | 0.340 | | 0.007 | General |
| 35-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.360 | | 0.014 | General |
| 36-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.049 | 0.410 | | 0.010 | General |
| 37-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.022 | 0.410 | | 0.005 | General |
| 38-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.037 | 0.410 | | 0.008 | General |
| 39-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.350 | 0.360 | 0.019 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 40-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.350 | | 0.014 | General |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 42-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.300 | 0.310 | 0.018 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 43-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.410 | 0.320 | 0.019 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| 44-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.639 | | 0.017 | General |
| 45-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.560 | | 0.017 | General |
| 46-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.570 | | 0.017 | General |
| 47-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.570 | | 0.017 | General |
| 48-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.700 | | 0.018 | General |
| 49-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.380 | 0.580 | 0.010 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.580 | 0.010 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 50-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.380 | | 0.006 | General |
| 51-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.063 | 0.400 | 0.660 | 0.021 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.660 | 0.021 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 52-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.053 | 0.400 | 0.660 | 0.018 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.660 | 0.018 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 53-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.054 | 0.400 | 0.647 | 0.018 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| | | | | | | | | | | 0.647 | 0.018 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 54-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.044 | 0.400 | 0.638 | 0.014 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.638 | 0.014 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 55-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.051 | 0.400 | 0.603 | 0.016 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.603 | 0.016 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 56-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.019 | 0.400 | 0.640 | 0.006 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.640 | 0.006 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 57-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.014 | 0.400 | 0.640 | 0.005 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.640 | 0.005 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 58-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.028 | 0.533 | 0.655 | 0.009 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.655 | 0.009 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 59-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.393 | 0.640 | 0.010 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.640 | 0.010 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 60-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.630 | 0.630 | 0.010 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.630 | 0.010 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |

| 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 |
| 61-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.410 | 0.570 | 0.010 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 62-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.053 | 0.330 | | 0.010 | General |
| 63-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.037 | 0.330 | | 0.007 | General |
| 64-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.055 | 0.330 | | 0.011 | General |
| 65-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.330 | | 0.014 | General |
| 66-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.057 | 0.330 | | 0.011 | General |
| 67-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.044 | 0.330 | | 0.009 | General |
| 68-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.029 | 0.330 | | 0.006 | General |
| 69-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.026 | 0.330 | | 0.005 | General |
| 70-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.026 | 0.327 | | 0.005 | General |
| 71-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.042 | 0.320 | | 0.008 | General |
| 72-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.024 | 0.320 | | 0.005 | General |
| 73-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.020 | 0.320 | | 0.004 | General |
| 74-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.016 | 0.320 | | 0.003 | General |
| 75-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.027 | 0.320 | | 0.005 | General |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 76-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.039 | 0.340 | | 0.008 | General |
| 77-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.391 | | 0.007 | General |
| 78-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.390 | | 0.007 | General |
| 81-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.400 | | 0.015 | General |
| 83-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.022 | 0.380 | 0.320 | 0.006 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.320 | 0.006 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 84-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.380 | 0.345 | 0.008 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.324 | 0.008 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 85-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.070 | 0.380 | 0.320 | 0.019 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.320 | 0.019 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 87-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.380 | 0.345 | 0.008 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.345 | 0.008 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 88-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.380 | 0.335 | 0.019 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.100 | 0.019 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 89-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.310 | | 0.014 | General |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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** |
| 92-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.400 | 0.576 | 0.010 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 93-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.360 | 0.330 | 0.019 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.330 | 0.019 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 94-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.029 | 0.540 | 0.580 | 0.009 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.614 | 0.009 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 95-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.018 | 0.624 | 0.611 | 0.006 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.610 | 0.006 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 96-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.021 | 0.700 | 0.640 | 0.007 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.614 | 0.007 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 97-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.071 | 0.380 | 0.480 | 0.021 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.341 | 0.021 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 98-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.330 | 0.370 | 0.009 | 504567 Fragrant Leek-orchid *Prasophyllum suaveolens* |
| | | | | | | | | | | 0.367 | 0.009 | 504581 White Sunray *Leucochrysum albicans subsp. tricolor* |
| 99-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.070 | 0.390 | | 0.015 | General |
| 100-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.046 | 0.390 | | 0.010 | General |

| 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 |
| 101-ST | Scattered Tree | vvp_0055 | Endangered | 1 | no | 0.200 | 0.071 | 0.046 | 0.390 | | 0.009 | General |
| 102-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.031 | 0.380 | | 0.006 | General |
| 103-ST | Scattered Tree | vvp_0055 | Endangered | 0 | no | 0.200 | 0.031 | 0.022 | 0.380 | | 0.005 | 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 |
|---|---|---|---|---|---|---|
| Fragrant Leek-orchid | *Prasophyllum suaveolens* | 504567 | Endangered | Dispersed | Habitat importance map | 0.0084 |
| White Sunray | *Leucochrysum albicans subsp. tricolor* | 504581 | Endangered | Dispersed | Habitat importance map | 0.0068 |
| Plump Swamp Wallaby-grass | *Amphibromus pithogastrus* | 503624 | Endangered | Dispersed | Habitat importance map | 0.0045 |
| Large-headed Fireweed | *Senecio macrocarpus* | 503116 | Endangered | Dispersed | Habitat importance map | 0.0038 |
| Clumping Golden Moths | *Diuris gregaria* | 504887 | Endangered | Dispersed | Habitat importance map | 0.0037 |
| Flat Bluebell | *Wahlenbergia planiflora subsp. planiflora* | 504064 | Vulnerable | Dispersed | Habitat importance map | 0.0033 |
| Yellow Watercrown Grass | *Paspalidium flavidum* | 507820 | Endangered | Dispersed | Habitat importance map | 0.0033 |
| Brackish Plains Buttercup | *Ranunculus diminutus* | 504314 | Rare | Dispersed | Habitat importance map | 0.0031 |
| Button Wrinklewort | *Rutidosis leptorhynchoides* | 502982 | Endangered | Dispersed | Habitat importance map | 0.0029 |
| Wavy Swamp Wallaby-grass | *Amphibromus sinuatus* | 503625 | Vulnerable | Dispersed | Habitat importance map | 0.0027 |
| Swamp Everlasting | *Xerochrysum palustre* | 503763 | Vulnerable | Dispersed | Habitat importance map | 0.0025 |
| Matted Flax-lily | *Dianella amoena* | 505084 | Endangered | Dispersed | Habitat importance map | 0.0025 |
| Pale-flower Crane's-bill | *Geranium sp. 3* | 505344 | Rare | Dispersed | Habitat importance map | 0.0025 |
| Plains Yam-daisy | *Microseris scapigera s.s.* | 504657 | Vulnerable | Dispersed | Habitat importance map | 0.0022 |
| Golden Cowslips | *Diuris behrii* | 501061 | Vulnerable | Dispersed | Habitat importance map | 0.0021 |
| Trailing Hop-bush | *Dodonaea procumbens* | 501090 | Vulnerable | Dispersed | Habitat importance map | 0.0020 |
| Purple Blown-grass | *Lachnagrostis punicea subsp. punicea* | 504206 | Rare | Dispersed | Habitat importance map | 0.0020 |
| Yarra Gum | *Eucalyptus yarraensis* | 501326 | Rare | Dispersed | Habitat importance map | 0.0020 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Arching Flax-lily | *Dianella sp. aff. longifolia (Benambra)* | 505560 | Vulnerable | Dispersed | Habitat importance map | 0.0020 |
| Purple Diuris | *Diuris punctata* | 501084 | Vulnerable | Dispersed | Habitat importance map | 0.0019 |
| Pale Swamp Everlasting | *Coronidium gunnianum* | 504655 | Vulnerable | Dispersed | Habitat importance map | 0.0017 |
| Grey Billy-buttons | *Craspedia canens* | 504643 | Endangered | Dispersed | Habitat importance map | 0.0017 |
| Purple Blown-grass | *Lachnagrostis punicea subsp. filifolia* | 504222 | Rare | Dispersed | Habitat importance map | 0.0016 |
| Growling Grass Frog | *Litoria raniformis* | 13207 | Endangered | Dispersed | Habitat importance map | 0.0015 |
| Golden Sun Moth | *Synemon plana* | 15021 | Critically endangered | Dispersed | Habitat importance map | 0.0014 |
| Salt Blown-grass | *Lachnagrostis robusta* | 504223 | Rare | Dispersed | Habitat importance map | 0.0013 |
| Small Milkwort | *Comesperma polygaloides* | 500798 | Vulnerable | Dispersed | Habitat importance map | 0.0008 |
| Clover Glycine | *Glycine latrobeana* | 501456 | Vulnerable | Dispersed | Habitat importance map | 0.0008 |
| Common Pipewort | *Eriocaulon scariosum* | 501218 | Rare | Dispersed | Habitat importance map | 0.0006 |
| Curly Sedge | *Carex tasmanica* | 500650 | Vulnerable | Dispersed | Habitat importance map | 0.0006 |
| Hairy Tails | *Ptilotus erubescens* | 502825 | Vulnerable | Dispersed | Habitat importance map | 0.0005 |
| Swamp Flax-lily | *Dianella callicarpa* | 505086 | Rare | Dispersed | Habitat importance map | 0.0005 |
| Hardhead | *Aythya australis* | 10215 | Vulnerable | Dispersed | Habitat importance map | 0.0005 |
| Lewin's Rail | *Lewinia pectoralis pectoralis* | 10045 | Vulnerable | Dispersed | Habitat importance map | 0.0004 |
| Australasian Shoveler | *Anas rhynchotis* | 10212 | Vulnerable | Dispersed | Habitat importance map ; special site | 0.0004 |
| Small-flower Mat-rush | *Lomandra micrantha subsp. tuberculata* | 504711 | Rare | Dispersed | Habitat importance map | 0.0004 |
| Black Falcon | *Falco subniger* | 10238 | Vulnerable | Dispersed | Habitat importance map | 0.0003 |
| Tough Scurf-pea | *Cullen tenax* | 502776 | Endangered | Dispersed | Habitat importance map | 0.0003 |
| Musk Duck | *Biziura lobata* | 10217 | Vulnerable | Dispersed | Habitat importance map ; special site | 0.0003 |
| Painted Honeyeater | *Grantiella picta* | 10598 | Vulnerable | Dispersed | Habitat importance map | 0.0002 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Australian Little Bittern | *Ixobrychus dubius* | 10195 | Endangered | Dispersed | Habitat importance map | 0.0002 |
| Snowy Mint-bush | *Prostanthera nivea var. nivea* | 502746 | Rare | Dispersed | Habitat importance map | 0.0002 |
| Baillon's Crake | *Porzana pusilla palustris* | 10050 | Vulnerable | Dispersed | Habitat importance map | 0.0002 |
| Blue-billed Duck | *Oxyura australis* | 10216 | Endangered | Dispersed | Habitat importance map | 0.0002 |
| Branching Groundsel | *Senecio cunninghamii var. cunninghamii* | 503104 | Rare | Dispersed | Habitat importance map | 0.0002 |
| Brown Toadlet | *Pseudophryne bibronii* | 13117 | Endangered | Dispersed | Habitat importance map | 0.0002 |
| Spiny Rice-flower | *Pimelea spinescens subsp. spinescens* | 504823 | Endangered | Dispersed | Habitat importance map | 0.0001 |
| Tussock Skink | *Pseudemoia pagenstecheri* | 12993 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Enfield Grevillea | *Grevillea bedggoodiana* | 503743 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Scented Bush-pea | *Pultenaea graveolens* | 502849 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Eastern Great Egret | *Ardea modesta* | 10187 | Vulnerable | Dispersed | Habitat importance map | 0.0001 |
| Freckled Duck | *Stictonetta naevosa* | 10214 | Endangered | Dispersed | Habitat importance map | 0.0001 |
| Small Scurf-pea | *Cullen parvum* | 502773 | Endangered | Dispersed | Habitat importance map | 0.0001 |
| Intermediate Egret | *Ardea intermedia* | 10186 | Endangered | Dispersed | Habitat importance map | 0.0001 |
| Grey Goshawk | *Accipiter novaehollandiae novaehollandiae* | 10220 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Dwarf Boronia | *Boronia nana var. pubescens* | 504278 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Brolga | *Grus rubicunda* | 10177 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Lace Monitor | *Varanus varius* | 12283 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Western Peppermint | *Eucalyptus falciformis* | 505358 | Rare | Dispersed | Habitat importance map | 0.0000 |
| White-throated Needletail | *Hirundapus caudacutus* | 10334 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Chestnut-rumped Heathwren | *Calamanthus pyrrhopygius* | 10498 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Ben Major Grevillea | *Grevillea floripendula* | 501535 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Striped Legless Lizard | *Delma impar* | 12159 | Endangered | Dispersed | Habitat importance map | 0.0000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Barking Owl | *Ninox connivens connivens* | 10246 | Endangered | Dispersed | Habitat importance map | 0.0000 |
| Fine-hairy Spear-grass | *Austrostipa puberula* | 503988 | Rare | Dispersed | Habitat importance map | 0.0000 |
| Bearded Dragon | *Pogona barbata* | 12177 | Vulnerable | Dispersed | Habitat importance map | 0.0000 |
| Australian Anchor Plant | *Discaria pubescens* | 501072 | Rare | Dispersed | Habitat importance map | 0.0000 |

**Habitat group**

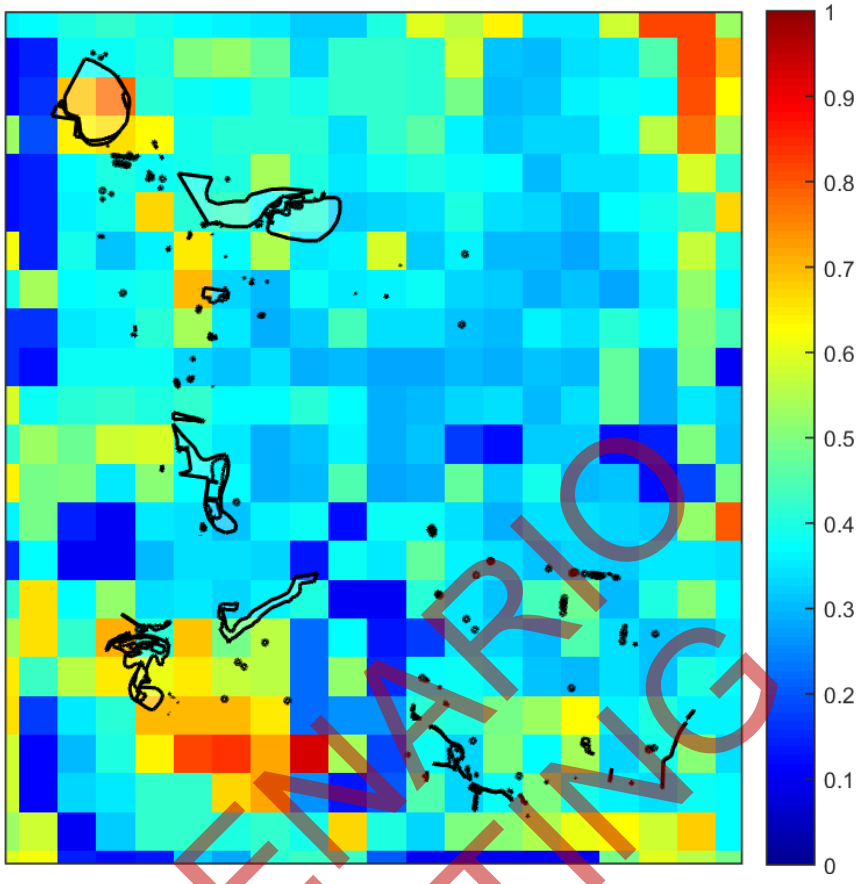
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

**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.

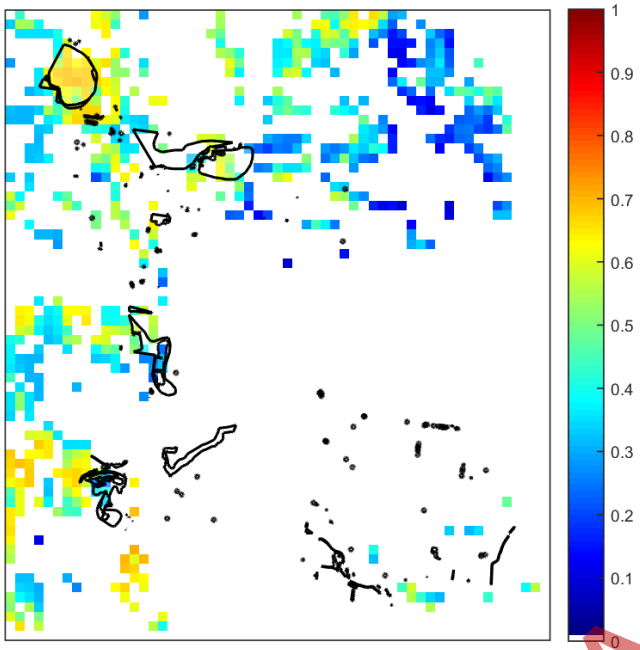
# Appendix 3 – Images of mapped native vegetation

**2. Strategic biodiversity values map**



### 3. Habitat importance maps

Fragrant Leek-orchid
*Prasophyllum suaveolens*
504567




White Sunray
*Leucochrysum albicans subsp. tricolor*
504581