

FEBRUARY 2023

PUBLIC

WERRIBEE JUNCTION PRECINCT

BIODIVERSITY ASSESSMENT

This report should be used for information purposes only and should not be used for any decision making.

The report was prepared to inform the Due Diligence process for Werribee Junction and Mambourin East.

When planning for these precincts progress to plan preparation, the report will need to be reviewed and updated, as required, to inform that process.



Question today *Imagine tomorrow* Create for the future

Werribee Junction Precinct Biodiversity Assessment

Victorian Planning Authority

WSP

Level 15, 28 Freshwater Place
Southbank VIC 3006

Tel: +61 3 9861 1111

Fax: +61 3 9861 1144

wsp.com

REV	DATE	DETAILS
A	8/04/2022	Draft for client comment
B	09/02/2023	Final

	NAME	DATE	SIGNATURES
Prepared by:	Justin Pegg Samantha Vertucci Danelle Scicluna Patrick Monarca	13/02/2023	
Reviewed by:	Briony Mitchell Imogen Merlot	08/04/2022 13/02/2023	
Approved by:	Nic McCaffrey	13/02/2023	

This document may contain confidential and legally privileged information, neither of which are intended to be waived, and must be used only for its intended purpose. Any unauthorised copying, dissemination or use in any form or by any means other than by the addressee, is strictly prohibited. If you have received this document in error or by any means other than as authorised addressee, please notify us immediately and we will arrange for its return to us.



TABLE OF CONTENTS

ACKNOWLEDGEMENTS	V
GLOSSARY	VI
REPORT SUMMARY	XI
1 INTRODUCTION	18
1.1 OBJECTIVES	18
1.2 PROJECT SCOPE	18
1.3 PROJECT AREA.....	19
2 METHODOLOGY	22
2.1 PERSONNEL	22
2.2 DATABASE AND LITERATURE REVIEW.....	22
2.3 SITE ASSESSMENT	23
2.4 TARGETED SURVEYS	25
2.5 LIKELIHOOD OF OCCURRENCE	30
2.6 PLANT IDENTIFICATION.....	31
2.7 LEGISLATION AND POLICY	32
2.8 LIMITATIONS.....	32
2.9 PERMITS.....	33
3 RESULTS.....	34
3.1 DATABASE AND LITERATURE REVIEW.....	34
3.2 SITE ASSESSMENT RESULTS	38
4 RECOMMENDATIONS	68
4.1 AVOIDANCE AND MINIMISATION OF IMPACTS ON NATIVE VEGETATION - PLANNING	68
4.2 MITIGATION – DESIGN	69
4.3 CONTROLS AND PROCEDURES FOR CONSTRUCTION.....	69
4.4 RECOMMENDATIONS FOR FURTHER SURVEY AND ASSESSMENT.....	71

5	LEGISLATION AND POLICY	72
5.1	COMMONWEALTH	72
5.2	STATE.....	76
5.3	FFG ACT PUBLIC AUTHORITY DUTY	80
6	CONCLUSION.....	86
6.1	SUMMARY OF FINDINGS.....	86
6.2	RECOMMENDATIONS AND IMPLICATIONS	86
7	LIMITATIONS	88
8	REFERENCES	89

LIST OF TABLES

TABLE 1.1	CADASTRE DETAILS – WERRIBEE JUNCTION PRECINCT; ECOLOGY ASSESSMENT.	20
TABLE 2.1	CONTRIBUTORS AND THEIR ROLES.....	22
TABLE 2.2	REVEGETATION CATEGORIES USED FOR MAPPING.....	24
TABLE 2.3	SUMMARY OF TARGETED SURVEYS COMPLETED	25
TABLE 2.4	FLORA SPECIES TARGETED DURING SURVEY	26
TABLE 2.5	BRAUN-BLANQUET DENSITY SCORING METHOD	27
TABLE 2.6	GOLDEN SUN MOTH SURVEY DATES AND DETAILS.....	28
TABLE 2.7	GROWLING GRASS FROG SURVEY TIMING AND WEATHER SUMMARY	30
TABLE 2.8	LIKELIHOOD OF OCCURRENCE CRITERIA FOR THREATENED FLORA AND FAUNA SPECIES.....	31
TABLE 3.1	MODELLED EXTANT ECOLOGICAL VEGETATION CLASSES ACROSS THE STUDY AREA	36
TABLE 3.2	EPBC ACT LISTED COMMUNITIES AND PRESENCE AS PER THE PMST	37
TABLE 3.3	ECOLOGICAL VEGETATION CLASSES MAPPED BY WSP WITHIN THE STUDY AREA, WITH ASSOCIATED EPBC ACT COMMUNITIES AND STATE CONSERVATION SIGNIFICANCES	39
TABLE 3.4	SUMMARY OF INDIGENOUS CANOPY TREES RECORDED WITHIN THE STUDY AREA.....	43
TABLE 3.5	SUMMARY OF HABITAT HECTARE ASSESSMENTS FOR PATCHES OF NATIVE VEGETATION WITHIN THE STUDY AREA	43

TABLE 3.6	BRAUN-BLANQUET SCORING – NTGVVP PROPERTY 52, PATCH 103.....	46
TABLE 3.7	MNES ASSESSMENT – NTGVVP – PROPERTY 52, PATCH 103.....	47
TABLE 3.8	BRAUN-BLANQUET SCORING – NTGVVP PROPERTY 19, PATCH 71.....	47
TABLE 3.9	MNES ASSESSMENT – NTGVVP – PROPERTY 19, PATCH 71.....	47
TABLE 3.10	BRAUN-BLANQUET SCORING – NTGVVP PROPERTY 40 & 17, PATCH 63 & 96.....	48
TABLE 3.11	MNES ASSESSMENT – NTGVVP – PROPERTY 40 & 17, PATCH 63 & 96.....	49
TABLE 3.12	BRAUN -BLANQUET SCORE SHW PROPERTY 52.....	49
TABLE 3.13	CALP ACT WEED SPECIES RECORDED WITHIN THE STUDY AREA.....	51
TABLE 3.14	FAUNA HABITAT DESCRIPTIONS AND AREAS.....	52
TABLE 3.15	SPECIES RECORDED DURING TARGETED STRIPED LEGLESS LIZARD SURVEYS.....	58
TABLE 3.16	SUMMARY OF FAUNA SPECIES WITH A MODERATE OR HIGHER LIKELIHOOD OF OCCURRENCE AT THE STUDY AREA.....	59
TABLE 3.17	RAMSAR CRITERIA MET BY THE PORT PHILLIP BAY (WESTERN SHORELINE) AND BELLARINE PENINSULA SITE, AND APPLICABILITY TO THE STUDY AREA.....	63
TABLE 5.1	MSA HABITAT COMPENSATION AREA FEE PRICES.....	75
TABLE 5.2	LEVY ESTIMATE FOR AREAS WITHIN THE MSA ON PROPERTIES 52, 48, 39.....	75
TABLE 5.3	INDIVIDUAL POTENTIAL ENVIRONMENTAL EFFECTS – ONE CRITERIA NEEDS TO BE MET TO TRIGGER A REFERRAL.....	76
TABLE 5.4	COMBINED POTENTIAL ENVIRONMENTAL EFFECTS – TWO OR MORE NEED TO BE MET TO TRIGGER A REFERRAL	77
TABLE 5.5	PERMIT APPLICATION PATHWAY DETERMINATION	81
TABLE 5.6	SUMMARISED VEGETATION CLEARANCE CALCULATIONS AND OFFSET REQUIREMENTS.....	82
TABLE 5.7	REQUIREMENT FOR AN NVPP – WERRIBEE JUNCTION PRECINCT STRUCTURE PLAN	84
TABLE 5.8	CALP ACT WEED SPECIES RECORDED WITHIN THE STUDY AREA.....	85

LIST OF FIGURES

FIGURE 1-1	STUDY AREA.....	21
------------	-----------------	----



LIST OF APPENDICES

APPENDIX A SURVEY DATA

APPENDIX B LIKELIHOOD OF OCCURRENCE ASSESSMENT

APPENDIX C MAPPING

APPENDIX D NATIVE VEGETATION PATCHES, HABITAT HECTARE
SCORING, AND ENSYM ATTRIBUTION

APPENDIX E ENSYM REPORT

ACKNOWLEDGEMENTS

Michael Prior, Jake Koumoundouros & Alastair Jaffray – Victorian Planning Authority.

Department of Energy, Environment and Climate Action (DEECA) for access to the Victorian Biodiversity Atlas (VBA) database and Biodiversity Interactive Maps.

Richard Bokel from DEECA for preliminary feedback at early stages of the ecological assessment.

Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for access to its Protected Matters Search Tool (PMST).

GLOSSARY

Biodiversity	The biological diversity of life is commonly regarded as being made up of the following three components: — Genetic diversity — the variety of genes (or units of heredity) in any population. — Species diversity — the variety of species. — Ecosystem diversity — the variety of communities or ecosystems.
Bioregion (region)	A bioregion defined in a national system of bioregionalisation. The majority of the Study Area falls within the Central Victorian Uplands bioregion with smaller areas covered by the Victorian Volcanic Plain bioregion.
CaLP Act	<i>State Catchment and Land Protection Act 1994</i>
Canopy tree	See ‘Native Canopy Tree’.
CMA	Catchment Management Authority (area).
Construction footprint	A construction footprint is the area of proposed impact during the construction of the project, which is located within the study area, and includes all proposed infrastructure along with temporary access and laydown areas.
DBH	Diameter at Breast Height. The diameter of the main trunk of a tree measured over bark at 1.3 m above ground level.
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The department develops and implements national policy, programs and legislation to protect and conserve Australia’s natural environment and cultural heritage and administers the EPBC Act. The Commonwealth Department of Agriculture, Water and the Environment was previously known as: — Department of Agriculture, Water and the Environment (DAWE) — Department of the Environment and Energy (DoEE) — Department of Sustainability, Environment, Water, Populations and Communities (SEWPAC). — Department of the Environment, Water, Heritage and the Arts (DEWHA). — Department of Environment and Heritage (DEH) — Department of the Environment and Water Resources (DEWR).
Department of Energy, Environment and Climate Action (DEECA)	This department was formerly known as: — Department of Environment, Land, Water and Planning (DELWP) — Department of Environment and Primary Industries (DEPI). — Department of Planning, Local Government, and Property and Land Titles (DTPLI).
Drip Line	The outermost boundary of a tree canopy (leaves and/or branches) where the water drips onto the ground.

Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristics, life form and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups in the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.
EES	Environment Effects Statement
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Exotic	Introduced from outside the area (Ensbey and Johnson, 2009) used in the context of this report to refer to species introduced from overseas.
FFG Act	State <i>Flora and Fauna Guarantee Act 1988</i> .
GPS	Global Positioning System – a navigational tool which uses radio receivers to pick up signals from four or more special satellites to provide precise determination of location.
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic components.
Habitat Hectare	A site based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type.
Habitat score	The score assigned to a habitat zone that indicates the quality of the vegetation relative to the EVC benchmark – sum of the study area condition score and landscape context score usually expressed as a percentage or as a decimal fraction of 1.
Habitat Zone	A discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar quality. This is the base spatial unit for conducting a habitat hectare assessment.
Indigenous	Native to the subject area: not exotic.
Introduced	Not native to the area: not indigenous. Refers to both exotic and non-indigenous Australian native species of plants and animals.
LGA	Local Government Authority – Benalla Rural City Council
Likely	Taken to be a real chance or possibility.
Locality	The area within a 5 km radius of the study area.
Location Category	There are three location categories that indicate the potential risk to biodiversity from removing a small amount of native vegetation. These location categories are identified by DEECA as follows: — Location 3: includes locations where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for a rare or threatened species. — Location 2: includes locations that are mapped as endangered EVCs and/or sensitive wetlands and coastal areas (section 3.2.1) and are not included in Location 3. — Location 1: includes all remaining locations in Victoria.

Mapped wetlands	Mapped wetlands, a mapping layer provided by DEECA, may or may not be visible on the ground and are treated as a patch of native vegetation for the purpose of offsets unless they are covered by a hardened, man-made surface, for example, a roadway.
Matters of National Environmental Significance (MNES)	The following Matters of National Environmental Significance are protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act): listed threatened species and communities, listed Migratory species, Ramsar wetlands of international importance, Commonwealth marine environment, World Heritage Properties, National Heritage Places, the Great Barrier Reef Marine Park and nuclear actions.
Migratory species	Species listed as Migratory under the <i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i> relating to international agreements to which Australia is a signatory. These include Japan-Australia Migratory Bird Agreement, China-Australia Migratory Bird Agreement, Republic of Korea-Australia Migratory Bird Agreement and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Capitalisation of the term ‘Migratory’ in this report refers to those species listed as Migratory under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
Native Canopy Tree	A native canopy tree is either: — a mature tree (able to flower) that is greater than three metres in height and is normally found in the upper layer of the relevant vegetation type (EVC); or — a standing dead tree (stag) if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground.
Native Vegetation	Native vegetation is defined in the Victoria Planning Provisions as ‘plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses’.
No Net Loss	An outcome where a particular gain in the contribution to Victoria’s biodiversity is equivalent to an associated loss in the contribution to Victoria’s biodiversity from permitted clearing.
Noxious weed	An introduced species listed under the <i>Catchment and Land Protection Act 1994</i> . Under the Act, noxious weeds have specific control measure and reporting requirements.
Offset (State-based)	Protection and management (including revegetation) of native vegetation at a site to generate a gain in the contribution that native vegetation makes to Victoria’s biodiversity. An Offset is used to compensate for the loss to Victoria’s biodiversity from the removal of native vegetation. Offsets are to be secured in perpetuity with an on-Title conservation covenant.
Offset target (state)	The amount of Offset required, measured in Habitat Units, to ensure permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria’s biodiversity.
P&E Act	<i>State Planning and Environment Act 1987</i>

Patch of native vegetation	A patch of native vegetation is either: — 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 layer available in Native Vegetation Information Management (NVIM) and other DEECA systems.
Project area	The areas for which planning approvals are sought as part of the project. This is also discussed as the study area in this report.
Protected species	Those species defined as protected under the <i>Flora and Fauna Guarantee Act 1988</i> , <i>Environment Protection and Biodiversity Conservation Act 1999</i> or DEECA Advisory Lists.
Ramsar	The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
Recruitment	The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc.), by facilitating such processes, or by actively revegetating (replanting, reseeding). See revegetation.
Revegetation	Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a Remnant Patch
Scattered trees	A scattered tree is a native canopy tree (see ‘Native Canopy Tree’ above) that does not form part of a patch. Scattered trees have two sizes, small and large: — a small scattered tree is less than the large tree benchmark for the species in the relevant EVC — a large tree is equal to or greater than the large tree benchmark for the species in the relevant EVC — a standing dead tree that does not form part of a patch is treated as a large scattered tree if it has a trunk diameter of 40 centimetres or more at a height of 1.3 metres above the ground.
Significant (species)	Important, weighty or more than ordinary; typically used to describe the importance of a species or community of conservation significance at local, regional, state or federal levels.
Significant impact	As defined by DCCEEW: A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity.
Species Offset	A Species Offset is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species. Species Offsets must compensate for the removal of that particular species’ habitat.

Species richness	Species richness is simply the number of species present in a sample, community, or taxonomic group. Species richness is one component of the concept of species diversity, which also incorporates evenness, that is, the relative abundance of species.
sp.	Abbreviation of <i>species</i>
spp.	Abbreviation of <i>species plural</i>
ssp. or subsp..	Abbreviation for <i>subspecies</i>
Threatened species, populations and ecological communities	Species, populations and ecological communities listed as Vulnerable, Endangered or Critically Endangered (collectively referred to as Threatened) under the FFG Act or EPBC Act. Capitalisation of the terms ‘Threatened’, ‘Vulnerable’, ‘Endangered’, ‘Extinct’ or ‘Critically Endangered’ in this report refers to listing under the relevant state and/or Commonwealth legislation.
Tree Protection Zone (TPZ)	Calculated area (based on AS 4970-2009 (Protection of trees on development sites)) of soil volume required to encompass sufficient absorbing tree root systems to ensure the long term survival of a tree. Calculated as (12 x DBH) of the tree. Trees may be considered as lost (and may require an Offset) if impacts of greater than 10% intrusion into the TPZ occur.
Weed	A plant growing out of place or where it is not wanted: often characterised by high seed production and the ability to colonise disturbed ground quickly. Weeds include both exotic and Australian native species of plant naturalised outside of their natural range.

REPORT SUMMARY

INTRODUCTION

WSP Australia Pty Limited – WSP, has been engaged by the Victorian Planning Authority – VPA, to undertake an ecological assessment to support planning and approvals for the proposed Werribee Junction Precinct Structure Plan (PSP). The project area is located in Werribee, approximately 30 kilometre (km) south-west of Melbourne, Victoria. It covers an area of approximately 1,141 hectares (ha) and is located to the south-west of Werribee town centre.

This report includes an ecological assessment to determine the project's likely impacts and the likely implications of development under pertinent legislation including the *Environmental Protection and Biodiversity Conservation Act 1999*, (EPBC Act) the *Flora and Fauna Guarantee Act 1988* (FFG Act), and the *Planning and Environment Act 1987* (P&E Act).

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 EPBC Act and FFG Act)

A site assessment was undertaken by WSP ecologists from October 2021 through to January 2022, and involved mapping native vegetation patches and scattered trees as per The *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017c) (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 and mapped.

TARGETED FLORA SURVEY

Targeted surveys were undertaken for EPBC Act, and FFG Act listed flora species listed in Table ES.1 over four passes across suitable habitat from October – November 2021. Surveys for Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* – EPBC Act Critically Endangered, FFG Act critically endangered, are to be undertaken late-winter/early-spring 2022.

Table ES.1 Flora species targeted during survey

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT
<i>Dianella amoena</i>	Matted Flax-lily	EN	cr
<i>Rutidosia leptorhynchoidea</i>	Button Wrinklewort	EN	en
<i>Senecio macrocarpus</i>	Large-headed Fireweed	VU	cr

THREATENED ECOLOGICAL COMMUNITY ASSESSMENT

Surveys were also undertaken to qualify possible EPBC Act listed Threatened Ecological Communities. Surveys were undertaken across higher quality areas within patches identified which possibly qualify as EPBC Act-listed Threatened Ecological Communities (TECs). Qualification of these communities was assessed against the most appropriate guidelines or listing advice for these communities (DSEWPac, 2011b) (TSSC, 2009, TSSC, 2012).

GOLDEN SUN MOTH TARGETED SURVEYS

Surveys for Golden Sun Moth *Synemon plana*, listed as Vulnerable under both the EPBC Act and FFG Act, were undertaken across potential habitat as per the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) survey guidelines for this species (DEWHA, 2009a).

GROWLING GRASS FROG TARGETED SURVEYS

Targeted surveys were undertaken for the Growling Grass Frog *Litoria raniformis*, listed as Vulnerable under both the EPBC Act and FFG Act. Surveys were undertaken in accordance with the methodology described in: 'Significant Impact Guidelines for the Vulnerable Growling Grass Frog *Litoria raniformis* EPBC Act Policy Statement 3.14' (DEWHA, 2009c), and 'Survey Guidelines for Australia's Threatened Frogs (DEWHA, 2010)'. Targeted surveys for Growling Grass Frog were undertaken on 6 and 14 December 2021 by two ecologists.

STRIPED LEGLESS LIZARD TARGETED SURVEYS

The Striped Legless Lizard *Delma impar* – EPBC Act vulnerable, FFG Act endangered, were across suitable habitat for habitat for this species as per the recommended Commonwealth survey guidelines for the species (DSEWPoC, 2011a). This report will be updated upon completion.

LEGISLATION AND POLICY

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

- EPBC Act
- FFG Act
- *Planning and Environment Act 1987* (P&E Act) in relation to the Casey Planning Scheme (Planning Scheme)
- Clause 52.17- *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines)
- *Melbourne Strategic Assessment (Environmental Mitigation Levy) Act 2020* (MSA Act)
- *Catchment and Land Protection Act 1994* (CaLP Act)
- *Wildlife Act 1975*
- *Environmental Effects Act 1978* (EE Act).

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

The FFG Act Amendment Act 2019 came into effect on 1 June 2020. As part of the amendments, all taxa of flora and fauna listed under the FFG Act, along with all taxa on the DEECA Advisory lists were given a new conservation status. The Amendment also supersedes the DEECA Advisory lists. Species listed under the DEECA Advisory Lists are still assessed within this report and conservation status provided for species recorded during the site assessment. However, implications of the Advisory Lists are not described further in this assessment.

RESULTS AND POTENTIAL IMPACTS

The study area is, in general, highly modified from its likely condition pre-European settlement, which was likely to have been a biodiverse grassland, and grassy woodland most attributable to Plains Grassland EVC 132_62, Plains Grassy Woodland EVC 55, and Creek line Grassy Woodland EVC 68. Relatively small patches of remnant vegetation and habitat persists across the precinct.

Approximately 134 ha of the 1,141 ha study area is part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site (refer to C1), a wetland of international importance. This area is along the western side of the

study area. Although partially overlapping with the Ramsar site, there are no wetlands of importance located within the study area, with the Werribee-Avalon Area wetland situated 3.5 km away.

DESKTOP ASSESSMENT

Searches of the Victorian Biodiversity Atlas – VBA, and Protected Matters Search Tool – PMST returned a total of 36 significant flora species recorded, or predicted to occur, within a 5 km radius of the study area. Of these, 17 species are listed under the EPBC Act and 33 are listed under the FFG Act.

Within the study area, extant vegetation modelling (DEPI, 2009) indicates the presence of scattered and fragmented Plains Grassy Woodland EVC 55 and Plains Grassland EVC 132, synonymous with The EPBC Act listed ‘*Natural Temperate Grassland of the Victorian Volcanic Plain*’ and Plains Grassy Woodland EVC 55 synonymous with the EPBC Act listed ‘*Grassy Eucalypt Woodland of the Victorian Volcanic Plain*’.

Various relevant ecological assessments have been undertaken across and around the precinct. WSPs assessment was informed by results of these assessments, and both confirms and diverges from previous vegetation mapping, and assessment results.

The Melbourne Strategic Assessment (MSA) evaluated the impacts on MNES listed under the EPBC Act and established measures to mitigate those impacts within the MSA area. The south-western region of the precinct is covered by the MSA, this corridor is reserved for the Outer Metropolitan Ring Road.

VEGETATION MAPPING

A total of 27.072 ha of native vegetation was mapped across 53 patches. The highest quality patches of remnant vegetation within the study area occur to the far south-east of the proposed project area at property 52 south of Gilded Road and west of Wests Road where patches of Plains Grassy Wetland EVC 125, Plains Grassland EVC 132_62 support a relatively diverse suite of understory species. The study area also supports riparian habitat attributable to Aquatic Herbland EVC 653 through properties 33 & 16.

Overall, 110 canopy trees occur within the study area. Eighty of these are scattered, 76 trees are large as per the most appropriate EVC benchmark. Of these large trees 28 are within patches, and 30 provide arboreal habitat in the form of hollows or nests. Thirty-four trees – out of the 110, were digitised from aerial imagery across property 33. This property was unaccusable. Three of these trees appear to have been cleared since 2001 based on historic aerial imagery.

FLORA SURVEYS

Following targeted surveys for four threatened flora species considered likely to occur, three have been observed:

- Marsh Saltbush *Atriplex paludosa* subsp. *paludosa* – FFG Act endangered
- Fragrant Saltbush *Rhagodia parabolica* – FFG Act vulnerable
- Large-headed Fireweed *Senecio macrocarpus* – EPBC Act Vulnerable, FFG Act critically endangered

THREATENED ECOLOGICAL COMMUNITY ASSESSMENT

Two EPBC Act listed Threatened Ecological Communities were identified:

- ‘*Natural Temperate Grassland & Grassy Eucalypt Woodland of the Victorian Volcanic Plain*’ – NTGVVP & GEW (6.158 ha)
- ‘*Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains*’ – SHW (0.532 ha)

Thirteen patches of grassland totalling 19.814 ha were thought to align with the description of the FFG Act-listed community ‘*Western Basalt Plains (River Red Gum) Grassy Woodland*’.

RAMSAR ASSESSMENT

A 134 ha area of the south west corner of the study area is located within the mapped extent of a wetland of international importance (Ramsar site): *Port Phillip Bay (Western Shoreline) and Bellarine Peninsula*. Ramsar sites are those listed under the Convention on Wetlands of International Importance, which was signed in 1971 in Ramsar, Iran.

The Ramsar overlap area does not meaningfully contribute to the Ramsar site as a whole with regard to these criteria. i.e. if the Ramsar overlap area was removed, it would not affect the ability of the Ramsar site to meet any of the criteria. It is also clear that the study area does not meet these criteria or support numbers of waterbirds or significant habitat which are in any way comparable to the Ramsar site.

FAUNA SURVEYS

No EPBC Act or FFG Act listed threatened or EPBC Act listed migratory species were observed during the field surveys. Due to the location of the study area near the Werribee Treatment Plant, the number and location of records in the areas, and the presence of potential habitat all indicate that threatened species may occur in the study area, and/or have the potential to do so in the future.

HABITAT ASSESSMENT

Arboreal habitat was mapped at tree points as detailed above. Understory habitat was mapped as polygon areas.

Table ES.2 Summary of understory habitats mapped across the study area.

HABITATS IDENTIFIED	AREAS (HA)
Aquatic - deep marsh	2.402
Deep water	1.430
Ephemeral shallow marsh - high quality	5.199
Ephemeral shallow marsh - lower quality	1.755
Highly modified uncultivated land	95.319
Remnant grassland inc. Wallaby Grass	24.070
Uncultivated low quality grassland	41.008
Unvegetated shallow water	0.911
<i>Total</i>	<i>172.094</i>

LEGISLATIVE IMPLICATIONS

This section addresses any permits, approvals and offset requirements that may be required for the project under Federal, State and local government environmental legislation.

Table ES.3 Legislation and policy implications summary

Legislation/Policy	Relevance
COMMONWEALTH LEGISLATION	
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	An EPBC Act significant impact criteria assessment will be required based on the Commonwealth significant impact guidelines (DoEE, 2013) should impacts on

Legislation/Policy	Relevance
	EPBC Listed flora, fauna, TECs or Ramsar area be proposed. With the recommendations in Section 4, it may be possible to avoid a significant impact. If impacts are considered likely to be significant, it is recommended that the project be referred to the Commonwealth Department of Climate Change, Energy, the Environment, and Water (DCCEEW). under the EPBC Act and Commonwealth Offsets may be required.
<i>Melbourne Strategic Assessment</i>	The south-western region of the precinct is covered by the MSA, this corridor is reserved for the Outer Metropolitan Ring Road. The MSA mapshare portal – https://mapshare.vic.gov.au/msa/map/ was queried to gain a levy liability estimate. The Precinct intersects areas requiring habitat levy's for Native Vegetation (6.325 ha), Golden Sun Moth (23.663 ha), and Growling Grass Frog (\$673 ha). The total amount payable is \$1,263,852.36 for the region reserved for the Outer Metropolitan Ring Road across properties 39, 48 & 52.
STATE LEGISLATION AND POLICY	
<i>Environment Effects Act 1978</i>	There is the potential to trigger both individual and cumulative assessment criteria as per the <i>Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978</i> (Ministerial Guidelines) (DSE, 2006). It has been recommended that most of the remnant vegetation and habitat be retained, and it is understood this is somewhat achievable. With the recommendations in Section 4, it is unlikely the project will need to be referred as a result of proposed biodiversity-related impacts. However, this assessment will need to be revised once precinct design is progressed.
<i>Flora and Fauna Guarantee Act 1988</i>	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 would be required for impacts FFG Act listed species and communities across the Melbourne Water land – properties 39, 48 & 52. The VPA should consider these conservation and mitigation recommendations, aligning with the objectives of the FFG Act, as per their Public Authority Duty. To date, no Critical Habitat Determinations have been produced in Victoria. However, it is possible that habitat for Small Large-headed Fireweed <i>Senecio macrocarpus</i> across Property 17 may be considered critical habitat for this species. Large-headed Fireweed <i>Senecio macrocarpus</i> is found in higher quality grassland, of which less than 5 % of its original extent remains (DSEWPac, 2011b), there are 88 records of this species within 20 km of property 17 (DELWP, 2021b). In this instance, it is possible, if this area is to be impacted, a HCO may be made by the State Minister for Environment. It is unlikely any other habitat across Werribee Junction Precinct would be considered critical habitat for any other FFG Act listed species. Further assessment regarding the occurrence of this species on property 17 may be undertaken by DEECA. A permit under the FFG Act will not be required for the parts of the study area which are private land. Should impacts to native vegetation on the Melbourne

Legislation/Policy	Relevance
	Water land in the western part of the study area be proposed a permit will be required for protected flora.
<i>Planning and Environment Act 1987</i>	The study area is zoned Farming Zone – FZ1 in the eastern regions, Special Use Zone FZ6 across the refuse area and quarry. And Public Use Zone PUZ1 across the WPT properties at the south-west. No zonation pertains to ecological matters. Much of the floodplain is covered by Environmental Significance Overlay ESO1. this area is somewhat consistent with flood modelling undertaken for this project (Jacobs, 2020b).
<i>Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017c)</i>	Impacts to native vegetation within the project area fall in Location 3 vegetation removal will follow a Detailed Assessment Pathway. EnSym testing has been undertaken to give an indication of maximum impacts and offset requirements. EnSym testing indicates that impacts equate to 40.157 ha. The offset target for clearance of all vegetation across the precinct would require 5 lots of Species Units ranging from 0.272 Species Units for Sunshine Diuris, <i>Diuris fragrantissima</i>, up to 20.888 Species Units for Heath Spear-grass, <i>Austrostipa exilis</i>, and 75 Large Trees. 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 avoid and minimise impacts to native vegetation, in order to reduce the likelihood of species units being triggered.
<i>Preparing a Native Vegetation Precinct Plan (DELWP, 2017d)</i>	Due to the possible clearance of high value remnant vegetation, over numerous lots, an NVPP may be considered required for the Werribee Junction Precinct.
<i>Wildlife Act 1975</i>	The study area contains potential habitat for arboreal fauna. If habitat tree clearance and fauna salvage are required for this species and will need to be done by a suitably qualified person licenced under the Wildlife Act. 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.
<i>Catchment and Land Protection Act 1994</i>	Seven regionally controlled, and five restricted CaLP Act listed weeds were recorded within the study area. Landowners have the responsibility to take all reasonable steps to prevent the growth and spread of these species.

RECOMMENDATIONS

- Recommended avoidance and minimisation measures for the precinct, including prioritisation of areas for retention. Highest priority has been assigned to retention of creeks and associated wetlands, large areas of remnant grassland, threatened ecological communities and remnant trees.

- Recommended mitigation measures for the design of the precinct, including for lighting, protection of retained habitat, and revegetation.
- Recommended measures for all construction within the precinct including vegetation and habitat protection measures, noise and lighting, water quality impacts, weed management, and fauna management.
- Recommendations for further survey and assessment which would help to determine the impacts of any proposed development, including wetland bird survey, hydrological assessment, aquatic ecological survey, and impact assessment.

Implications for the project under relevant legislation and policy have been preliminarily assessed. The following has been determined and will need to be reassessed following initial precinct design:

- Significant impact assessment will be required based on the proposed impacts. If a significant impact on any matter of national environmental significance is likely, a referral to DCCEEW under the EPBC Act will be required.
- Assessing against both individual and cumulative criteria set out in the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE, 2006), an EES referral is unlikely to be triggered based on ecological matters, provided the recommendations in Section 5 are followed.
- A permit under the FFG Act is unlikely to be required, unless impacts are proposed on public land. VPA has an obligation under the FFG Act as public authorities and ministers to consider potential biodiversity impacts when exercising their functions. It is recommended consideration be given to conservation of FFG Act listed species and communities.
- A planning permit will be required along with offsets for the native vegetation being impacted. The offset area will depend on the extent of impacts. Avoidance and minimisation of native vegetation impacts is highly recommended to reduce offset requirements and reduce the likelihood of requiring species offsets. It is recommended that effort be made to reduce impacts to native vegetation, in order to reduce the likelihood of hard to achieve species units being triggered.

1 INTRODUCTION

WSP Australia Pty Limited (WSP), was engaged by the Victorian Planning Authority (VPA), to undertake targeted surveys and prepare a Biodiversity Assessment to inform and facilitate future development of the Werribee Junction Precinct Structure Plan (PSP) area, and a Native Vegetation Precinct Plan – NVPP if required.

This Biodiversity Assessment report will be used by the VPA to inform the future development of the PSP. In particular, it will assist in decision-making around the retention, removal and/or offsetting and native vegetation and fauna habitat within the Precinct. WSP undertook this Biodiversity Assessment as per Section 1.2 of the Biodiversity Precinct Planning Kit (DSE, 2010). This Biodiversity Assessment is the first stage of the assessment, with stage two being the development of the Native Vegetation Precinct Plan – NVPP which will follow after further discussions with VPA.

1.1 OBJECTIVES

The objectives of the assessment, as per the Biodiversity Precinct Planning Kit (DSE, 2010), are to:

- 1 Identify, assess and map significant flora, fauna, and habitat in the study area.
- 2 Collect data at sufficient detail and standard that enables a PSP and Biodiversity Plan to be developed.
- 3 Ensure environmental values identified are integrated with the planning and development of the Precinct.
- 4 Ensure proposed development in the precinct is, where possible, designed to reduce the potential impact on biodiversity values and to suggest mitigation actions.
- 5 Provide advice on any works or management measures that may reduce adverse impacts of the development on species known or likely to occur in the Precinct.
- 6 Ensure that development of the precinct is able to comply with Government legislative and policy requirements on the protection of indigenous fauna and flora species and Communities.

This report includes an assessment to determine the precincts possible ecological impacts, and the likely implications of development under pertinent legislation including the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the *Flora and Fauna Guarantee Act 1988* (FFG Act) and the *Planning and Environment Act 1987* (P&E Act).

1.2 PROJECT SCOPE

The following scope of work was defined for the project:

- A desktop review of flora and fauna databases, aerial imagery, and relevant biodiversity policies and legislation.
- A preliminary habitat assessment of the project area to determine the targeted survey effort required.
- A site assessment to:
 - Identify and map native vegetation, including mapping of patches and scattered trees, defined as per the Department of Energy, Environment and Climate Actions– DEECA, *Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017c)* (the Guidelines).
 - Complete 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, 2018a).
 - Assess requirements under the RAMSAR convention and provide advice on any RAMSAR (Commonwealth of Australia, 2016) values within the Precinct.
 - 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.
- Specify management measures to protect retained vegetation, and areas to revegetate.
- Provide an offset statement and an avoid and minimise statement in the reporting phase.
- Provide maps and data of the results.
- Targeted surveys for the EPBC Act and FFG Act listed species requested by the VPA (listed below) in accordance with the most appropriate Commonwealth survey guidelines and *Planning for Biodiversity* (DELWP December 2017). Targeted surveys involved:
 - Identifying, documenting and mapping the location of any threatened species recorded, and threatened species habitat.
 - 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 *Rutidosia leptorhynchoidea* and Large-headed Fireweed *Senecio macrocarpus*.
- Golden Sun Moth *Synemon plana*.
- Growling Grass Frog *Litoria raniformis*.
- Striped Legless Lizard *Delma impar*.

1.3 PROJECT AREA

The project area for this assessment is the proposed Werribee Junction Precinct area, and is defined by the cadastral boundaries of the properties included within the Precinct. It is the area for which planning approvals for the development of the Werribee Junction PSP will be sought and is shown in Figure 1-1 and Appendix C.

The project area is located in Werribee, approximately 30 kilometres (km) south-west of Melbourne, Victoria. It covers an area of approximately 1,141 hectares (ha) and is located to the south-west of Werribee town centre.

The project area is bounded by the Princes Freeway to the south, medium density housing developments to the east and a combination of Bulban Road, Manor Road and the Werribee West Station to the north. The western boundary runs from the Princes Freeway, north to the railway line (see Figure 1-1). The project area comprises large rural properties and agricultural land utilised for both cropping and grazing, an abandoned quarry, and the Wyndham City municipal waste depot.

The project area is situated within the Wyndham City Local Government Area (LGA), the Port Phillip and Westernport Catchment Management Authority (CMA) region and the Victorian Volcanic Plain (VVP) and the Otway Plain (OtP) bioregions.

1.3.1 STUDY AREA

The study area for this assessment is a 20 metre (m) buffer of the project area (inclusive). A 20 m buffer is used to record any large trees immediately outside of the project area and allows for the assessment of tree protection zones that may be impacted by development of the precinct. The 20 m buffer also provides for the assessment of fauna habitat which may be impacted indirectly by development of the project area.

Properties assessed, and / or referenced in this report are referred to in this report by property reference, as per Table 1.1.

Table 1.1 Cadastre details – Werribee Junction Precinct; ecology assessment.

PROPERTY #	HECTARES	ADDRESS	PARCEL SPI
2	20.95	152 BROWNS ROAD WERRIBEE 3030	6\LP144800
4	12.143	132 BROWNS ROAD WERRIBEE 3030	1\PS739406
5	12.2	112 BROWNS ROAD WERRIBEE 3030	2\PS739406
7	95.965	85 BROWNS ROAD WERRIBEE 3030	B\PS835906
9	33.603		9\LP4509
10	12.077	92 BROWNS ROAD WERRIBEE 3030	3\PS739406
11	21.076		6~4\PP3047
12	11.894	10 WESTS ROAD WERRIBEE 3030	4\PS739406
13	0.438	30 WESTS ROAD WERRIBEE 3030	1\PS628166
15	44.683		1\TP855710
16	54.086	32 BROWNS ROAD WERRIBEE 3030	1\TP138483
17	33.1		10\LP4509
19	0.82	650 WESTS ROAD WERRIBEE 3030	1\TP431600
28	37.871		2\TP319902
29	56.998		2\TP855710
33	81.57	15 BROWNS ROAD WERRIBEE 3030	1\TP99686
38	2.08		4\TP319902
39	67.372		7\TP752523
40	103.041		1\TP7462
41	47.415		1\TP319902
42	16.119		1\TP138161
42	0.813		1\TP225224
43	25.907		3\TP319902
45	3.759	290 WESTS ROAD WERRIBEE 3030	1\TP196767
48	62.902		6\TP752523
49	3.668	375 WESTS ROAD LITTLE RIVER 3211	1\TP115156
50	20.261	20 MORRISONS LANE LITTLE RIVER 3211	1\LP93546
51	181.927		2\LP93546
52	62.838		3\TP330916
21 - 31	2.261		1\TP912462 2\TP912462 3\TP912462 4\TP912462 12\LP9503 11\LP9503 9\LP9503 14\LP9503 13\LP9503 10\LP9503 4\LP9503

Figure 1-1 Study area

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 Manager, field survey
Nic McCaffrey	BSc	Principal Ecologist – Ecology project director, field survey
Samantha Vertucci	BSc (hons)	Senior Ecologist – Field survey, reporting (fauna likelihood and impacts)
Danelle Scicluna	BEnvSc	Professional Ecologist – Field survey, desktop assessment and reporting
Pat Monarca	BSc, Hns Env	Graduate Ecologist – Field survey and reporting

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 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 km radial buffer of the study area.

The database searches were undertaken on 24 November 2021. 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. The following sources of information were consulted:

- Victorian Biodiversity Atlas (VBA) – 5 km buffer of the study area (DELWP, 2021c)
- Commonwealth EPBC Act Protected Matters Search Tool (PMST) – 5 km buffer of the study area (DAWE, 2021)
- DEECA NatureKit 2.0 online tool (DELWP, 2021b)
- Commonwealth Department of Climate Change, Energy, the Environment, and Waters online Species Profile and Threats Database (DAWE, 2020)
- The *Guidelines* (DELWP, 2017c)
- Biodiversity Information Tools used in Victoria's Native Vegetation Permitted Clearing Regulations and the Native Vegetation Information Management System (DELWP, 2021a)
- DEECAs Vegetation Quality Assessment Manual (DSE, 2004)
- Relevant legislation, government policy and strategies including:
 - *Preparing a Native Vegetation Precinct Plan* (DELWP, 2017d)
 - *Biodiversity Precinct Planning Kit* (DSE, 2010).
- Aerial imagery to determine habitat extents and linkages.

Previous assessments were reviewed for relevant information, and to inform determinations of threatening processes and likelihood of occurrence assessments. Previous assessments reviewed include:

- Avalon Corridor Strategy: Existing Conditions Report, Flora and Fauna (EHP, 2021a)
- Existing Ecological Conditions Report: Werribee Junction Precinct Structure Plan (EHP, 2018b)
- Werribee Junction PSP Riparian Environmental Values Assessment; re-planning for Waterways in the Werribee Junction Precinct Structure Plan Area (Jacobs, 2020b).
- Ison Road Overpass; Ecological Existing Conditions Report (Arup, 2022b)
- Ecology assessment: Spiny Rice-flower findings for the proposed Ison Road Overpass (Arup, 2021a).

2.3 SITE ASSESSMENT

Site assessments, including targeted surveys, were undertaken by WSP ecologists from 27 October 2021 through to January 2022. Results of this assessment are provided in Section 3. The following sections detail the methodology of this site assessment.

2.3.1 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, 2017c).

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 locations of scattered trees and outlines of patches were recorded with a handheld GPS of 1 – 3 m where possible. Where not possible scattered trees and patches were digitised from aerial imagery.

The Diameter at Breast Height – DBH of canopy and scattered trees were measured where possible. Where this was prevented by bees in hollows, or dense Boxthorn **Lycium ferocissimum* shrubs at the base of trees, the DBH was estimated.

2.3.2 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, and Otway 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 cases in the urban-influenced ecosystems in the Melbourne area, 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 2021: 27 October, 9 November, 16 November, 23 November and 29 November by Nic McCaffrey and Justin Pegg, who are accredited by DEECA in the Vegetation Quality Assessment (VQA) method.

2.3.3 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 categorising vegetation in the study area, the following categories are used.

Table 2.2 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. 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 # <i>Eucalyptus botryoides</i> , Giant Honey-myrtle # <i>Melaleuca armillaris</i>). 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 # <i>Eucalyptus cladocalyx</i>).	Usually do not require a permit for removal but are identified to show these have not been overlooked.
Exotic	Exotic plants evolving/originating overseas (e.g. Monterey Cypress * <i>Hesperocyparis macrocarpa</i>).	Do not require a permit for removal for ecology related matters. These are identified to show these have not been overlooked.

2.3.4 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 2021, and the refined throughout the latter half of 2021 when further site visits occurred. 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 within the state *Wildlife Act 1975*.

2.4 TARGETED SURVEYS

A summary of the targeted threatened flora and fauna surveys undertaken is provided below in Table 2.3. Information on the survey methods undertaken is provided below.

Table 2.3 Summary of targeted surveys completed

SPECIES TARGETED	DATES	METHOD	RELEVANT GUIDELINES
Threatened Ecological Communities (TECs) – state and Commonwealth	Add in from section 2.4.2		<i>Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland</i> (DSEWPac, 2011b)
Threatened flora: Matted Flax-lily Dianella amoena, Spiny Rice-flower <i>Pimelea spinescens</i> subsp.. <i>spinescens</i> , Button Wrinklewort <i>Rutidosia leptorhynchoidea</i> and Large-headed Fireweed <i>Senecio macrocarpus</i> .	27 October 2021 9 November 2021 16 November 2021 23 November 2021 29 July 2022 12 August 2022	Transects	Significant impact guidelines for the Spiny Rice-flower (DEWHA, 2009b) No guidelines available from Commonwealth or the state for the other target species surveyed.
Growling Grass Frog <i>Litoria raniformis</i>	6/12/21 14/12/21	Call playback and active searching	Significant Impact Guidelines for the Vulnerable Growling Grass Frog <i>Litoria raniformis</i> EPBC Act Policy Statement 3.14 (DEWHA, 2009c) Survey Guidelines for Australia's Threatened Frogs (DEWHA, 2010)
Golden Sun Moth <i>Synemon plana</i>	30/11/2021 17/12/2021 21/12/2021 10/1/2022	Linear Transects 25 – 50 metre spacing	Background paper to the Significant impact guidelines for the critically endangered Golden Sun Moth <i>Synemon plana</i> (DEWHA, 2009a).
Striped Legless Lizard <i>Delma impar</i>	Grids were placed in mid-winter (11 and 13 July 2022) to allow for approximately three months habitation.	Artificial shelters (roof tiles)	Commonwealth survey guidelines for the Striped Legless Lizard (DSEWPac, 2011a)

	Checks were undertaken between 26/9/2022 to 19/1/2023.		
--	--	--	--

2.4.1 FLORA

Targeted surveys for significant flora were undertaken on foot across potential habitat for the target species by two suitably qualified and experienced botanists. The locations of this ‘potential’ habitat for significant flora species, and therefore survey, was previously determined during the initial reconnaissance survey and vegetation mapping. Of this potentially suitable habitat across the study area, four significant EPBC Act and FFG Act flora species were identified for targeted survey. These are listed in Table 2.4.

Linear transects were walked where appropriate. Otherwise the survey took the form of a meander toward more suitable habitat areas, such as higher quality remnant grassland with lower overall biomass. Survey effort was recorded using GPS tracks of both botanists. Survey effort is mapped in C3.

All observations of significant flora species were recorded with a hand-held GPS 1 – 3 m.

Table 2.4 Flora species targeted during survey

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	SURVEY DATES
<i>Dianella amoena</i>	Matted Flax-lily	EN	cr	27 October 2021
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	CR	cr	9 November 2021
<i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	EN	en	16 November 2021
<i>Senecio macrocarpus</i>	Large-headed Fireweed	VU	cr	23 November 2021 30 June 2022 29 June 2022 12 August 2022

Source: (DAWE, 2021), (DELWP, 2021b)

Surveys for Spiny Rice-flower were undertaken as per the Significant impact guidelines for the this species (DEWHA, 2009b) between April – August 2022. Surveys were undertaken across appropriate grassland habitat, where walking transects will be undertaken. Survey effort is mapped in C3.

2.4.2 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 the Braun-Blanquet method (Table 2.5). Qualification of these communities was assessed against the most appropriate guidelines or listing advice for these communities (DSEWPac, 2011b) (TSSC, 2009, TSSC, 2012).

Table 2.5 Braun-Blanquet Density Scoring method

SCORE	COVER
0	Species absent from quadrat
0.1	Species represented by a solitary plant, <5% cover
0.5	Species represented by a few (<5) plants, >5% cover
1	Species represented by many (>5) plants, <5% cover
2	Species represented by many (>5) plants, 5 - 25% cover
3	Species represented by many (>5) plants, 25 - 50% cover
4	Species represented by many (>5) plants, 50 - 75% cover
5	Species represented by many (>5) plants, 75 - 100% cover

FFG ACT

Patches of remnant vegetation were also considered for alignment with descriptions in *Characteristics of Threatened Communities* (DELWP, undated). Metrics such as coverage or observed species were considered where provided in these descriptions.

2.4.3 GOLDEN SUN MOTH TARGETED SURVEYS

Golden Sun Moth *Synemon plana*, listed as Vulnerable under both the EPBC Act and FFG Act, is found in grassland and grassy woodland habitats west and north of Melbourne into NSW and the ACT. The larvae feed on the roots of native Wallaby Grasses (*Rytidosperma* spp.) and Spear Grass (*Austrostipa* spp.), as well as the introduced Chilean Needle Grass *Nassella neesiana* (DEWHA, 2009a). The species is usually recorded in tussock grassland habitats where there is an open structure with inter-tussock space for basking and displaying (DCCEEW, 2021).

DCCEEW have developed survey guidelines for the species in order to maximise detection and reduce the chances of the survey producing a false negative result (DEWHA, 2009a). Surveys for Golden Sun Moth need to be conducted during the flying season, which varies from year to year but generally occurs between late October and early January. Leading up-to and into October each year, Golden Sun Moth reference sites are checked across Melbourne to confirm when the flying season has begun.

Surveys need to be undertaken four times (if no Golden Sun Moth are observed), approximately a week apart, under the following conditions:

- warm day (above 20 degrees by 10 am)
- between 10 am and 2 pm
- clear or cloudless sky
- still or relatively low winds
- at least two days since rain.

Prior to conducting each survey, a reference site check is usually undertaken at a location where the moths have previously been recorded and a population is known to persist. The reference site for these surveys was originally planned to be property 52, due to the presence of past records in the vicinity. However, as Golden Sun Moth were not seen flying here, nearby surveys conducted on the same survey dates were used as reference site checks, as reported via the Ecological Consultants of Victoria ‘GSM flight diary mailing list’ (ECAV, 2022).

Surveys were conducted in accordance with the survey guidelines where possible, across the potential habitat observed within the study area. Due to some unseasonably cool and wet weather conditions in December, some of the surveys had

to be conducted in suboptimal conditions. However, males were recorded flying at sites in the area (reference sites) on these survey dates and the surveys are, therefore, considered to be valid. Surveys occurred on the 29 November, 17 December, 21 December 2021 and the 10 January 2022. Property 52 was unable to be surveyed on the first survey date due to access issues, so an additional late-season survey was undertaken on 31 January 2022, to include that site, and three other higher-quality sites for additional coverage. Although Golden Sun Moth was not reported to be flying at nearby reference sites on that day, the survey is still expected to be acceptable for detecting pupal cases and for flushing males from the vegetation.

Potential habitat targeted included remnant grassland dominated by Golden Sun Moth feed species, as well as areas of degraded but uncultivated grassland, where a large proportion of the groundcover comprised Golden Sun Moth feed species, either native or exotic. However, areas of dense Chilean Needlegrass with no inter-tussock space were not prioritised, as they were considered highly unlikely to support the species. Some incidental survey of these areas were still undertaken, such as when moving between targeted survey locations.

For each survey, one or two ecologists with experience in detecting Golden Sun Moth walked transects approximately 25 m apart. Some 50 m transect, and some meander survey was also undertaken, with the aim to achieve good coverage of potential habitat, where higher quality suitable habitat wasn't contiguous. Meander survey enabled higher coverage of higher quality potential habitat and was prioritised near past records. Tracks showing survey effort are provided on Figure C4.

Table 2.6 provides an overview of dates and weather conditions for the surveys.

Table 2.6 Golden Sun Moth survey dates and details

PROPERTIES	WEATHER CONDITIONS	SURVEY 1 29/11/2021	SURVEY 2 17/12/2021	SURVEY 3 21/12/2022	SURVEY 4 10/01/2022	SURVEY 5 31/01/2022
40 & 17	Temp °C	21.5	20.2	19.3	18.6	Not surveyed
	Wind Speed (km/h)	17	17	4	7	
	Cloud Cover (%)	0	5	20	5	
19	Temp °C	21.5	21.1	22.3	19.5	32.7
	Wind Speed (km/h)	17	0	7	13	0
	Cloud Cover (%)	0	0	5	0	0
5	Temp °C	22.8	21.8	21	25	Not surveyed
	Wind Speed (km/h)	17	17	20	19	
	Cloud Cover (%)	10	40	5	5	
39	Temp °C	23.3	22.2	23	21	
	Wind Speed (km/h)	17	7	22	15	
	Cloud Cover (%)	0	0	20	0	
48	Temp °C	23.3	24.9	23	21	30.4
	Wind Speed (km/h)	17	20	22	11	0

PROPERTIES	WEATHER CONDITIONS	SURVEY 1 29/11/2021	SURVEY 2 17/12/2021	SURVEY 3 21/12/2022	SURVEY 4 10/01/2022	SURVEY 5 31/01/2022
	Cloud Cover (%)	0	30	20	0	0
52	Temp °C	Not surveyed – no permission for access on day of survey	24.9	23	21	32.0
	Wind Speed (km/h)		20	22	11	0
	Cloud Cover (%)		30	20	0	0
12	Temp °C	20.3	22	18.8	25	27.7
	Wind Speed (km/h)	10	17	14	19	0
	Cloud Cover (%)	0	30	20	5	0
Reference Sites (2)	GSM flying at nearby site	Yes, numerous sites	Yes, several sites	Yes, several sites	Yes, several sites	No (not reported on GSM mailing list).

- (1) Only four surveys required as per the survey guidelines, additional surplus survey undertaken for key sites
- (2) Reference site data from various sites in Melbourne close to the study area where GSM was seen flying that day. Data from the ECA Victoria GSM mailing list.

2.4.4 GROWLING GRASS FROG TARGETED SURVEYS

Growling Grass Frog *Litoria raniformis* is listed as Vulnerable under both the EPBC Act and FFG Act. Growling Grass Frogs are often found amongst emergent vegetation and inhabit both permanent and ephemeral wetlands, lakes, swamps and ponds, and sometimes slow flowing sections of river or streams (Clemann and Gillespie, 2012). Populations of Growling Grass Frog are often found where groups of neighbouring, permanent waterbodies are present, which are usually somewhat connected via tributaries or drainage lines, creating a dispersal-matrix throughout the local area (Heard et al., 2014, Heard et al., 2004, Heard, 2012, Hamer and Organ, 2008).

There are a high numbers of records within 5 km of the project area, with the species occurring approximately 7.1 km downstream of the project area. Growling Grass Frog was determined to potentially utilise areas around Lollypop Creek and Cherry Creek for dispersal and breeding.

Surveys were conducted in accordance with the methodology described in:

- Significant Impact Guidelines for the Vulnerable Growling Grass Frog *Litoria raniformis* EPBC Act Policy Statement 3.14 (DEWHA, 2009c), and
- Survey Guidelines for Australia's Threatened Frogs (DEWHA, 2010).

Targeted surveys for Growling Grass Frog were undertaken on 6 and 14 December 2021 by two ecologists. Survey involved visiting key waterbodies within the study area where potential habitat was identified. Four key survey locations were identified based on identification of suitability and habitat connectivity – locations are shown at C4.

At each of 4 key survey locations, the following methods were undertaken:

- Initial listening period of 5-10 minutes
- Call-playback, where the advertisement call of the species was played through a speaker for one minute.
- Another two minutes of listening.

Then hand searching and spotlighting to search for frogs within and around the waterbody. Surveys were undertaken under preferential weather conditions for the species, in line with the national guidelines (DEWHA, 2009c), including:

- Daytime air temperatures greater than 15°C, with moderate to no wind.
- Night-time air temperatures greater than 12°C, with moderate to no wind.

Weather data and timing for the surveys are provided in Table 2.7.

Table 2.7 Growing Grass Frog survey timing and weather summary

SURVEY DATA	SURVEY 1	SURVEY 2
Date	6/12/21	14/12/21
Time	8:57 pm – 10:47 pm	8:23 pm – 9:55 pm
Start Temperature	23.6°C	17.2°C

2.4.5 STRIPED LEGLESS LIZARD TARGETED SURVEYS

The Striped Legless Lizard *Delma impar* is listed under the EPBC Act as Vulnerable and as Endangered under the FFG Act. The species may occur in the Werribee Junction PSP due to the presence of primary grassland which is core habitat for the species. Targeted surveys for Striped Legless Lizard were undertaken in 2022 and early 2023 to determine their presence/absence from the site.

Surveys were undertaken as per the recommended Commonwealth survey guidelines for the species (DSEWPaC, 2011a), as follows:

- Shelter sites (roof tiles) were installed on 11 and 13 July 2022.
- Tiles were placed in vegetated areas wherever possible (not on bare ground).
- Arrays consist of 50 tiles, at 5 m spacing between tiles, arranged in a grid of 10 tiles by five.
- One array per three hectares for sites up to 30 hectares, at least 10 grids for sites over 30 hectares. A total of 17 grids were installed across potential habitat - refer to C4.
- Shelter sites were checked when ambient temperatures did not exceed 28°C.
- Shelters were checked over 11 weeks during the peak survey season for the species, with checks commencing on 26 September 2022 and finishing on 19 January 2023.

The site was initially surveyed to identify areas most likely to support Striped Legless Lizard. Tile grids were installed on property numbers 4, 5, 12, 16, 17, 19, 39, 48, 51 and 52 (refer to C4), placed to target the best potential habitat, whilst also obtaining good coverage of the site.

On each check, an ecologist experienced in the identification of the target species lifted each tile to examine underneath. Capture of fauna was only undertaken when required for identification and verification purposes. Tile checks were undertaken in the morning when Striped Legless Lizards and other reptiles are most likely to be using the tiles for thermoregulation. Specific timing was dependent on weather conditions and the time of year. Tile checks were not undertaken in heavy rain as this makes visibility and catching lizards more difficult. For details regarding the time and weather conditions of each check, refer to Appendix A1.3.

2.5 LIKELIHOOD OF OCCURRENCE

The absence of a particular species cannot be definitively determined during a relative short survey timeline. For this study, the likelihood of occurrence of threatened and migratory species and populations was determined based on the criteria shown in Table 2.8 below. To determine the likelihood of a species occurring in the study area, this method uses

the habitat requirements of the species, outcomes of an on-site habitat assessment, the state of habitat connectivity, records of historical and recent presence as identified in the VBA and modelled presence from the PMST.

Table 2.8 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: — rely exclusively on specific habitat types or resources that are not present in the study area — are locally or regionally extinct.
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: — have not been recorded previously in the study area and surrounds and for which the study area is beyond the current distribution range — there is no preferred habitat in the study area but the species' habitat requirements are not well understood — are considered to have the potential to be locally extinct — are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded. — 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: — have infrequently been recorded previously in the study area and surrounds — use habitat types or resources that are present in the study area, although generally in a poor or modified condition — are unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically during variable seasons or migration — 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: — have frequently been recorded previously in the study area and surrounds — use habitat types or resources that are present in the study area, that are abundant and/or in good condition within the study area — are known or likely to maintain resident populations surrounding the study area — are known or likely to visit the study area during regular seasonal movements or migration.
Recorded	Recorded/observed during field surveys.

2.6 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 (10009535) for the collection of plant material.

2.7 LEGISLATION AND POLICY

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

- EPBC Act
- FFG Act

Planning and Environment Act 1987 (P&E Act) in relation to the Casey Planning Scheme (Planning Scheme)

- Clause 52.17- *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines)
- *Melbourne Strategic Assessment (Environmental Mitigation Levy) Act 2020* (MSA Act)
- *Catchment and Land Protection Act 1994* (CaLP Act)
- *Wildlife Act 1975*
- *Environmental Effects Act 1978* (EE Act).

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

The FFG Act Amendment Act 2019 came into effect on 1 June 2020. As part of the amendments, all taxa of flora and fauna listed under the FFG Act, along with all taxa on the DEECA Advisory lists were given new conservation status. The Amendment also supersedes the DEECA Advisory lists. Species listed under the DEECA Advisory Lists are still assessed within this report and conservation status provided for species recorded during the site assessment. However, implications of the Advisory Lists are not described further in this assessment.

2.7.1 PREPARING A NATIVE VEGETATION PRECINCT PLAN

Preparing a Native Vegetation Precinct Plan (DELWP, 2017d) 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 5.3.1.3. The NVPP will be developed following consultation with VPA on potential for native vegetation retention based on the findings of this assessment.

2.8 LIMITATIONS

A common limitation of ecological surveys is the short time period over which they are undertaken and a lack of seasonal sampling, which can lead to lack of detection of some species. Site conditions, including the presence of threatened species and extent of threatened communities, can change with time, and the results of a survey, including the presence or otherwise of species, are indicative of the environmental conditions at the time of assessment.

To overcome the above limitations, the likely presence of threatened species was determined through both habitat assessment and targeted survey. Using habitat assessment is a more conservative approach likely to include species that are difficult to detect if suitable habitat was observed in the study area, and if that species is known to occur regionally. Targeted surveys, requiring multiple passes of the study area, would have minimised the likelihood that any areas of high quality habitat were missed. However, a negative targeted survey result, particularly when the survey was undertaken across only a single year, cannot be relied upon completely to rule out the potential for a species to occur.

The study area includes the Werribee Municipal Tip (Refuse Disposal Facility), an area of approximately 240 ha. This area is fenced and was not accessed for this Biodiversity Assessment. Other properties were not assessed, over-the-fence style assessments were undertaken where possible. Properties not access were 33, 11 small parcels between property 39 and the rail reserve, the rail reserve was also not accessed.

A legal limitation statement is provided in Section 7.

2.9 PERMITS

All WSP staff and subcontractors are covered under the Standard Operating Procedures approved by the Department of Economic Development, Jobs, Transport and Resources, Wildlife and Small Institutions Animal Ethics Committee approval (6.20) and Victorian *Wildlife Act 1975* Research Permit (10009535). Additionally, all relevant WSP staff are covered under the Victorian *Flora and Fauna Guarantee Act 1988* Permit to take/keep protected flora (10009535).

3 RESULTS

3.1 DATABASE AND LITERATURE REVIEW

3.1.1 AERIAL IMAGERY

The study area is situated between Little River (2.8 km) and Werribee River (2.2 km). Approximately 134 ha of the 1,141 ha study area is part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site (refer to C1), a wetland of international importance. This area is along the western side of the study area. Although partially overlapping with the Ramsar site, there are no wetlands of importance located within the study area, with the Werribee-Avalon Area wetland (DSE, 2004) situated 3.5 km away. There are also no Biosites in the study area with the closest located 3.5 km away associated with Little River. Belfrages Swamp Wetland, a small wetland within the Ramsar site, occurs approximately 900 m southwest of the study area.

From aerial imagery it is apparent that much of the study area is used for cropping. Two creeks pass through the study area: Lollipop Creek in the east, and Cherry Creek towards the centre of the study area. Several farm dams are also present.

3.1.2 LITERATURE REVIEW

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.

3.1.2.1 WERRIBEE JUNCTION PRECINCT STRUCTURE PLAN AREA – HYDROLOGIC IMPACT ASSESSMENT (JACOBS, 2020A)

Jacobs was commissioned by Melbourne Water Corporation (MW) to undertake a hydrological impact assessment for the Werribee Junction PSP area. This assessment occurred in 2020 in the same area as the current study area for this report. This report detailed the flood mapping associated with the PSP area design. This report recommends different options for hydrologic development and mentions that Scenario 3b provides the largest developable area, requiring alteration of the current Lollipop Creek channel through the project area. It should be noted that Jacobs – section 3.1.2.4, recommends that Lollipop Creek is one of the areas considered the highest priority for protection and mitigation due to it being potential habitat for the Growling Grass Frog. WSP has since undertaken targeted surveys for this species (see Section 3.2.4 for results). Although Growling Grass Frogs were not recorded during surveys, this is still suitable habitat and a movement corridor for this species. Avoiding hydrological development of this area is advised.

3.1.2.2 AVALON CORRIDOR STRATEGY: EXISTING CONDITIONS REPORT, FLORA AND FAUNA (EHP, 2021A)

Ecology and Heritage Partners (EHP) was commissioned by Hansen Partnership Pty Ltd to produce an existing conditions report to support a Framework Plan to assist the Avalon Corridor Strategy. The study area assessed by EHP covers approximately 34,800 ha of land extending between Geelong and Werribee; 1,141 ha of this is the current study area for this assessment. EHP recommended that targeted surveys and Habitat Hectare Assessments be undertaken within the entire study area to better understand ecological values and noted that more detailed surveys were required to accurately determine the extent, type and condition of native vegetation. WSP undertook targeted surveys and Habitat Hectare Assessments within the current study area. EHP also recommended the retention of areas of native vegetation prioritising large reserves over small ones, connected reserves over separated reserves and a larger number of reserves in total. Also recommended was the introduction of buffers from industrial or commercial areas in appropriate locations to protect ecological values.

3.1.2.3 EXISTING ECOLOGICAL CONDITIONS REPORT: WERRIBEE JUNCTION PRECINCT STRUCTURE PLAN (EHP, 2018A)

In 2018, EHP was commissioned by the VPA to undertake a suite of detailed ecological investigations within the Werribee Junction PSP area that is also the topic of this report. They concluded that most of the PSP is dominated by exotic flora and modified, with scattered patches of native vegetation and regrowth. Aside from habitat zone Plains Grassland 3 (PG3) (as named in the EHP report), located in Parcel ID 46, native vegetation was highly modified and most vegetation communities lacked structure and displayed a low diversity of species. PG3 met the requirements of the nationally significant ecological community NTGVVP. WSP also concluded that the majority of the vegetation across the study area was modified, apart from scattered patches of native vegetation. WSP similarly assessed the Plains Grassland patch/patches in Parcel PFI 52 as qualifying as NTGVVP (Parcel ID 46: EHP), as well as some additional patches of the nationally significant TEC, SHW on the same property. WSP also mapped several additional patches of NTGVVP on Parcel PFI's 17, 19, 40 and in the rail reserve just above Parcel PFI 9 and one small patch of SHW on Parcel PFI 40.

3.1.2.4 WERRIBEE JUNCTION PSP RIPARIAN ENVIRONMENTAL VALUES ASSESSMENT; RE-PLANNING FOR WATERWAYS IN WERRIBEE (JACOBS, 2020B)

On a previous assessment of the current study area by Jacobs Australia Pty Limited (Jacobs) it was concluded that most of the PSP area was highly degraded due to grazing and cropping and the majority of the vegetation associated with the waterways was weedy. The report mentioned there are Commonwealth listed threatened vegetation communities (or TECs) still present and potential threatened species habitat. Jacobs were not permitted access in 2020 to certain riparian areas due to property access issues, and flora surveys were undertaken in a dry summer. They concluded that this was likely to have led to an underestimate of flora values, as well as ephemeral wetland and aquatic flora and fauna reliant on floodplain or wetland inundation. WSP have since accessed these areas (except for Property 17 at the end of Cherry Creek) and ecological values of both flora and fauna have been assessed under wetter conditions. Jacobs recommended that the highest priorities for protection and mitigation within the PSP are:

1. Lollypop Creek as habitat for Growling Grass Frogs, and
2. The section of Cherry Creek supporting large River Red Gums *Eucalyptus camaldulensis* (Reach 2).

They also recommended that riparian values are maintained during development.

3.1.2.5 ISON ROAD OVERPASS; ECOLOGICAL EXISTING CONDITIONS REPORT (ARUP, 2022A)

Arup determined that the study area associated with the Ison Road overpass is heavily modified due to development. The area south of Bulban Road is outside of the MSA as is the study area associated with this report. The report mentions that native vegetation is confined to the railway reserve with patches of EVC 132 and EVC 653 and there are no scattered trees or EPBC Act listed communities within the study area. They recorded 0.6 ha of FFG community Western (Basalt) Plains Grassland Community and recommended a permit to remove.

3.1.2.6 ECOLOGY ASSESSMENT: SPINY RICE-FLOWER FINDINGS FOR THE PROPOSED ISON ROAD OVERPASS (ARUP, 2021B)

Arup undertook surveys for Spiny Rice-flower in 2021 across the study area for the Ison Road Overpass. The species was not recorded, despite optimal flowering conditions and, based on these results, was considered unlikely to occur.

3.1.2.7 ECOLOGY ASSESSMENTS FOR THE CHERRY CREEK YOUTH JUSTICE TO THE SE – GSM & NTGVVP (EPBC ACT 2017/8049) (BIOSIS, 2018)

The Department of Justice and Regulation commissioned consultants to prepare an Offset Management Plan (OMP) for an offset site required for losses associated with the development of a Youth Justice Centre immediately to the south-

west of the study area on property 52. This OMP details results of ecological assessments of the impact area for that assessment, upon which NTGVVP was identified, and Golden Sum Moth recorded in 2017. This study prompted WSP to utilise – unsuccessfully, suitable habitat across property 52 as a reference site for GSM surveys informing this biodiversity assessment.

3.1.2.8 GROWLING GRASS FROG MONITORING SITES ACROSS WTP TO THE SOUTH – 2021 (MAP)

Melbourne Water are monitoring GGF populations at known sites across the Western Treatment Plant (WTP). A draft map of these areas (EHP, 2021b) shows the distribution of this species across the WTP from around The Spit Nature Conservation Reserve to the south-west, up to just south of the Werribee River at the north-eastern coastal reaches of the WTP. The northernmost monitoring sites are along South Road, which is approximately 1 km south of the study area. However, this is approximately 7.1 km via Lollypop Creek, or 3.6 km via the more ephemeral Cherry Creek. It is 4.3km via the Cherry Creek tributary to property 52.

3.1.3 VBA AND PMST SEARCH RESULTS

The VBA and PMST were queried on 24 November 2021 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.

3.1.3.1 FLORA SPECIES

VBA and PMST searches returned a total of 36 significant flora species recorded, or predicted to occur, within a 5 km radius of the study area. Of these, 17 species are listed under the EPBC Act and 33 are listed under the FFG Act only. 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 Sections 3.2.2.2.

3.1.3.2 FAUNA SPECIES

VBA and PMST searches returned a total of 107 significant fauna species recorded, or predicted to occur, within 5 kms of the study area. Of these, 79 species are listed under the EPBC Act.. This includes 23 species which are also listed under the EPBC Act as migratory. An additional 30 species listed under the EPBC Act as migratory without a threatened conservation status were also recorded. Of the 107 species, 78 are also listed under the FFG Act. 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 3.2.4.4.

3.1.4 EXTANT VEGETATION MODELLING AND CURRENT WETLANDS

Within the study area, extant vegetation modelling (DEPI, 2009) indicates the presence of scattered and fragmented Plains Grassy Woodland EVC 55 and Plains Grassland EVC 132. Both EVCs are considered Endangered within the VVP and OP bioregions. A map of the modelled EVCs is provided in C1 and a summary of the extent of each EVC for each bioregion is provided in Table 3.1.

Table 3.1 Modelled Extant Ecological Vegetation Classes across the study area

EVC BY BIOREGION	CONSERVATION SIGNIFICANCE	AREA
Otway Plain		8.96 ha
Plains Grassland	Endangered	2.87 ha
Plains Grassy Woodland	Endangered	6.09 ha
Victorian Volcanic Plain		119.04 ha

EVC BY BIOREGION	CONSERVATION SIGNIFICANCE	AREA
Plains Grassland	Endangered	119.04 ha
Grand Total		128 ha

Source: Insert-source-details

Two ‘current wetlands’, identified on the DEECA current wetlands 2013 layer (Naturekit 2.0) are mapped in the western part of the study area, along the drainage line which links to Cherry Creek near the Princes Freeway. These wetlands are identified as ‘Periodically Inundated – Episodic’ freshwater wetlands. One of the wetlands occurs within the Werribee Municipal Tip, which was not assessed for this report. The southern-most wetland occurs in an area which is mostly cropped and in an area which was highly modified.

3.1.5 THREATENED ECOLOGICAL COMMUNITIES

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 3.2 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. EVC 132, also modelled to occur within the study area, is synonymous with the TEC, NTGVVP. No other EVCs are modelled within the study area that could qualify as the remaining two TECs. However the presence or absence of these EPBC Act listed communities must be based on the site assessment – refer Section 2.4.2.

Table 3.2 EPBC Act listed communities and presence as per the PMST

COMMUNITY NAME	STATUS	PRESENCE IN 5 KM OF STUDY AREA (PMST)
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

3.1.5.2 FFG ACT LISTED THREATENED 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-listed ‘Victorian temperate woodland bird community.’ EVC 55 which is modelled to occur within the study area.

The EPBC Act listed ‘Natural Temperate Grassland of the Victorian Volcanic Plain’ corresponds with the FFG Act Threatened Community ‘Western (Basalt) Plains Grassland Community’. EVC 132_62 Plains Grassland also corresponds to this FFG community and is also modelled in the study area. This can be viewed in C1.

The actual extent of FFG Act listed communities in the study area must be based on site assessment (refer Section 2.4.2, and C3).

3.2 SITE 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 includes the Werribee Municipal Tip (Refuse Disposal Facility), an area of approximately 240 ha. As this is a waste facility the majority of this area is cleared for the facility, with the exception of some revegetation acting as a windbreak and natural border surrounding the facility. This area is fenced and was not accessed for this Biodiversity Assessment. The remainder of the site is predominantly composed of modified exotic paddocks with a small percentage of native vegetation in areas associated with the eastern side of the waste facility, watercourses and surrounding farm houses (not in grazed or cropped areas).

The highest quality patches of remnant vegetation within the study area occur to the far south-east of the proposed project area at property 52, south of Gilded Road and west of Wests Road. Here, patches of Plains Grassy Wetland EVC 125 and Plains Grassland EVC 132_62 support a relatively diverse suite of understory species. Riparian habitat attributable to Aquatic Herbland EVC 653 was also mapped through properties 33 & 16.

3.2.2 FLORA

A total of 147 vascular plant species were recorded across the study area during the site assessment, of which 64 were indigenous (44%), 78 were introduced species (53%) and five were non-indigenous native species (3%). A list of the species recorded has been provided in Appendix A1.1.

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

Understorey 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. Cropped land supports only Wheat **Triticum aestivum*.

Exotic graminoids dominate highly modified uncultivated areas including Chilean Needle Grass **Nassella neesiana*, Serrated Tussock **Nassella trichotoma*, Toowoomba Canary Grass **Phalaris aquatica*, Cocksfoot **Dactylis glomeratus*, Couch **Cynodon dactylon*, Prairie Grass **Bromus Catharticus* and Paspalum **Paspalum dilatatum* and Annual Rye Grass **Lolium perenne*.

Exotic herbs across these areas are predominantly Artichoke Thistle **Cynara cardunculus*, Saffron Thistle **Carthamus lanatus*, African Thistle **Berkheya rigida*, Bathurst Burr **Xanthium spinosum*, 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 Sugar Gum # *Eucalyptus cladocalyx*, Giant Honey-myrtle # *Melaleuca armillaris*, Peppercorn * *Schinus molle*, Weeping Willows * *Salix babylonica*, Moonah *Melaleuca lanceolata* and River Red-gums *Eucalyptus camaldulensis*.

Planted woody trees provide favourable habitat for indigenous graminoids such as Wallaby Grasses *Rytidosperma* spp., and Spear Grasses *Austrostipa* spp. Beneath and surrounding these trees, hydrophobic soils created by seed rain, combined with water competition and plant oils create conditions where exotic species are outcompeted. These trees also provide a recruitment opportunity for indigenous forbes, such as Seaberry Saltbush *Rhagodia candolleana* and *Atriplex semibaccata* Berry Saltbush, both recorded, to persist.

REMNANT PATCHES

There were approximately 35 ha of patches of remnant native vegetation identified across the study area. This native vegetation is most attributable to six EVCs as detailed in Table 3.3 below. Occurrences of these patches are described in the paragraphs below and mapped in C2.

Table 3.3 Ecological Vegetation Classes mapped by WSP within the study area, with associated EPBC Act communities and state conservation significances

ECOLOGICAL VEGETATION CLASS	E**	V**	TOTAL (HA)
Aquatic Herbland EVC 653	2.746		2.746
Creekline Grassy Woodland EVC 68	3.296		3.296
Plains Grassy Woodland EVC 55	0.011		0.011
Plains Grassland Lighter Soils EVC 132 62	20.153		20.153
Plains Grassy Wetland EVC 125	0.610		0.610
Tall Marsh EVC 821		0.258	0.258
Totals	26.815	0.258	27.072

** E: endangered EVC in the Victorian Volcanic Plain Bioregion

V: vulnerable EVC in the Victorian Volcanic Plain Bioregion

PLAINS GRASSY WOODLAND

Two patches of Plains Grassy Woodland EVC 55 were mapped within the study area. River Red-gums occurring away from creek lines were also attributed to Plains Grassy Woodland EVC 55, such as those across properties 17 and 7. Plains Grassy Woodland is defined as:

'An open, eucalypt woodland to 15 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 approximately 500 – 700 mm annual rainfall.' (DELWP, 2016)

Patches of Plains Grassy Woodland within the study area were due to occurrence of a woodland understorey being Blackwoods *Acacia melanoxylon*. These patches are not archetypal representations of EVC 55, and are recruiting on reformed land.



EVC 55 Plains Grassy Woodland

PLAINS GRASSLAND

Most of the remnant vegetation supported by the study area is attributable to Low-rainfall Plains Grassland EVC 132_63.

Low-rainfall Plains Grassland is described as:

'Treeless vegetation mostly < 1 m tall dominated by largely graminoid and herb life forms. Occupies cracking basalt soils prone to seasonal waterlogging in areas receiving < 500 mm annual rainfall.' (DELWP, 2016)

Patches of Plains Grassland supported by the study area vary in quality and composition. Higher quality patches are dominated in turn by both Kangaroo Grass *Themeda triandra*, or Wallaby Grasses *Rytidosperma caespitosum*, *R. setacea* and *R. duttonianum*, and Spear Grasses *Austrostipa geniculata*, *A. mollis*, *A. scabra* var. *falcata*. Herbs more common throughout these areas include Lemon Beauty-heads *Calocephalus citreus* and Blushing Bindweed *Convolvulus angustissimus*.



EVC 132 Plains Grassland

Lower quality patches were attributed to higher modification due to weed cover, including Chilean Needle Grass Serrated Tussock Toowoomba Canary Grass. Opportunistic indigenous species were more common in lower quality Plains Grassland, such as Native Millet *Panicum decompositum*, and Windmill Grass *Chloris truncata*.

AQUATIC HERBLAND

One patch of Spike Sedge Wetland, EVC 653, was identified in the study area, to the north of the proposed project area. Spike Sedge Wetland is described 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, 2016)

Aquatic Herbland occurs along watercourses and around farm-style dams across the study area. Higher quality patches occur along an ephemeral unnamed tributary of Cherry Creek, and along the southern regions of the Lollypop Creek. Higher quality patches of Aquatic Herbland are dominated by Water Plantain *Alisma plantago-aquatica*, Common Spike-sedge *Eleocharis acuta*, Willow-herb *Epilobium hirtigerum*, 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.



EVC 653 Aquatic Herbland

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, 2016)

The single Tall Marsh occurs along a channelised drain across property 7, dominated by Narrowleaf Cumbungi *Typha domingensis*. Much of this occurrence of Tall Marsh had been recently excavated, with a windrow of Narrowleaf Cumbungi piled alongside the watercourse. Tall Marsh also occurs along Browns Road and to the south of Wests Road.



EVC 821 Tall Marsh

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, 2016)



EVC 68 Creekline Grassy Woodland

Higher quality Creekline Grassy Woodland occurs along Cherry Creek on property 40, and occasionally along Lollypop Creek where River Red-gums remain. Creekline Grassy Woodland along the Cherry Creek is large old River Red Gums around ephemeral pools fringed with 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* and then Chilean Needle Grass **Nassella neesiana* on higher ground. Occurrences of this EVC along Lollypop Creek include understory species such as Water Plantain *Alisma plantago-aquatica* and Slender Know-weed *Persicaria decipiens*. Historically, it is possible more of Lollypop Creek would have been treed similarly to Cherry Creek and, therefore, attributed to this EVC.

PLAINS GRASSY WETLAND

Plains Grassy Wetland EVC 125 was identified on property 52, and 40. 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, 2016)

EVC 125 on property 50 is generally high quality, indigenous species present in order of coverage include Common Spike-sedge *Eleocharis acuta*, Common Nardoo *Marsilea drummondii*, Mud Dock *Rumex bidens*, Southern Swamp Wallaby-grass *Amphibromus neesii*, Slender Goodenia *Goodenia gracilis* and Slender Spike-sedge *Eleocharis gracilis*. Weeds present include Artichoke Thistle **Cynara cardunculus subsp. flavescentis*, Wimmera Rye-grass **Lolium rigidum*, Buck's-horn Plantain **Plantago coronopus*, and Clustered Dock **Rumex conglomeratus*.



Goodenia gracilis amongst Plains Grassy Wetland EVC 125

3.2.2.2 CANOPY TREES

Overall, 110 canopy trees occur within the study area. Of these, 80 are Scattered trees, including 76 qualifying as large as per the most appropriate EVC benchmark. The remaining 30 canopy trees occurred within patches, including 28 large and two smaller trees. Out of these 110 trees, 34 trees were digitised from aerial imagery across properties not able to be accessed on foot. Three of these trees, on property 33, appear to have been cleared since 2001 based on historic aerial imagery (Nearmap, 2022), these trees digitised from aerial imagery were all estimated large as estimated 'over the fence'.

From the 110 canopy trees, 30 were recorded as providing arboreal habitat in the form of hollows or dreys, or bird nests.

Trees mapped are summarised in Table 3.4 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, 2017c). 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 appendix A1.4. Canopy trees are shown at C2.



One Scattered Tree – River Red Gum *Eucalyptus camaldulensis*

Table 3.4 Summary of indigenous canopy trees recorded within the study area

SPECIES	PATCH		SCATTERED TREES		TOTAL
	Large	Small	Large	Small	
<i>Eucalyptus camaldulensis</i> River Red-gum	28	2	48	31	109
<i>Eucalyptus</i> sp.				1	1
Totals	28	2	48	32	110

3.2.2.3 HABITAT HECTARE SCORES

Habitat Hectare scoring for all patches of native vegetation is provided in 132. A summary of results is provided in Table 3.5 below. The study area supports a total of 12.10 habitat hectares over 115 patches of native vegetation, covering 35.9 ha. There are 10 patches that qualify as EPBC Act listed TECs.

Table 3.5 Summary of Habitat Hectare assessments for patches of native vegetation within the study area

Row Labels	Patches mapped	Count of EPBC TEC identified	Total Area - ha	Habitat hectares
Aquatic Herbland EVC 653	13		2.746	1.24
Creekline Grassy Woodland EVC 68	23		3.326	0.89
Plains Grassland Lighter Soils EVC 132 62	70	4	28.188	9.22
Plains Grassy Wetland EVC 125	4	1	1.320	0.69
Plains Grassy Woodland EVC 55	2		0.011	0.00
Tall Marsh EVC 821	3		0.258	0.06
Totals	115	5 patches	27.072	12.10

3.2.2.4 THREATENED FLORA SPECIES

Following targeted surveys for threatened flora species, three were confirmed present within the study area being:

- Marsh Saltbush *Atriplex paludosa* subsp. *paludosa* – FFG Act Endangered
- Fragrant Saltbush *Rhagodia parabolica* – FFG Act Vulnerable
- Large-headed Fireweed *Senecio macrocarpus* – EPBC Act Vulnerable, FFG Act Critically endangered

MARSH SALTBUSSH *ATRIPLEX PALUDOSA* SUBSP. *PALUDOSA*

Marsh Saltbush *Atriplex paludosa* subsp. *paludosa* is listed as Endangered under the FFG Act. This species Decumbent or sprawling shrub, to c. 1.6 m high, Locally common on fringes of coastal and near-coastal saltmarshes west from Wilsons Promontory, around Port Phillip Ban to the Geelong area (RBGV, 2022). This species was observed on property 50.



Large-headed Fireweed *Senecio macrocarpus* observed on property 17.

LARGE-HEADED FIREWEED *SENECIO MACROCARPUS*

Large-headed Fireweed *Senecio macrocarpus* – EPBC Act Vulnerable, FFG Act Critically endangered. This plant is described as Erect or sprawling subshrub with stems to c. 70 cm high arising from a perennial rootstock, usually greyish-cobwebbed all over. In Victoria largely confined to remnant Themeda grasslands on loamy clay soils derived from basalt from near Melbourne west to Skipton area (RBGV, 2022). This species was observed on property 17.

FRAGRANT SALTBUSSH *RHAGODIA PARABOLICA*

Fragrant Saltbush *Rhagodia parabolica* is listed as vulnerable under the FFG Act. This species is described as Rounded shrub to c. 2 m high, mealy grey-green, covered with glistening hairs. In Victoria occurs on a few steep rocky slopes and broad ridges between Sunbury and Geelong (e.g. Jacksons Creek, Long Forest, Werribee

Gorge, Steiglitz, Buckleys Falls on the Barwon River) (RBGV, 2022). This species was observed in abundance beneath indigenous River Red-gums along Cherry Creek on Property 40.

SPINEY RICE FLOWER *PIMELEA SPINESCENS* SUBSP. *SPINESCENS*

Spiney Rice Flower *Pimelea spinescens* subsp. *spinescens* is listed as Critically Endangered EPBC Act and also critically endangered under the FFG Act.

Targeted surveys for Spiney Rice Flower *Pimelea spinescens* subsp. *spinescens* were undertaken late June 2022, this species was not observed, this species is thought to have a low likelihood of occurrence.

See the full likelihood of occurrence assessment at Appendix B.

Target species Matted Flax-lily *Dianella amoena* – EPBC Act Endangered, FFG Act Critically endangered and Button Wrinklewort *Rutidosia leptorhynchoides* – EPBC Act Endangered, FFG Act endangered, were not observed during targeted survey, and are subsequently thought unlikely to occur.



Spiney Rice Flower *Pimelea spinescens* subsp. *spinescens* observed at a reference site check 12/08/2022

Higher quality remnant grassland supported very high levels of biomass. It is possible that some small species occur throughout higher quality grassland such as across property 48 and property 17. Species thought possible to occur based on the desktop assessment include Cut-leaf Burr-daisy *Calotis anthemoides* – FFG Act critically endangered, Small Milkwort *Comesperma polygaloides* – FFG Act critically endangered and Small Scurf-pea *Cullen parvum* – FFG Act endangered.

3.2.2.5 FFG ACT PROTECTED FLORA

The following FFG Act Protected Flora species were recorded within the study area:

- Golden Wattle *Acacia pycnantha*
- Lemon Beauty-heads *Calocephalus citreus*
- Giant Honey-myrtle #*Melaleuca armillaris* subsp. *armillaris*
- Fragrant Saltbush *Rhagodia parabolica*
- Large-headed Fireweed *Senecio macrocarpus*
- Cotton Fireweed *Senecio quadridentatus*
- Annual New Holland Daisy *Vittadinia cervicalis*
- Fuzzy New Holland Daisy *Vittadinia cuneata*.

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 communities identified within the study area are:

- ‘Natural Temperate Grassland & Grassy Eucalypt Woodland of the Victorian Volcanic Plain’ – NTGVVP & GEW
- ‘Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains’ – SHW.

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 3.2.

GRASSY EUCALYPT WOODLAND OF THE VICTORIAN VOLCANIC PLAIN

The GEW of the VVP is a type of eucalypt woodland that is restricted to Quaternary basalt soils. It occurs on flat to gently undulating plains and associated stony knolls. The soils of the plain are heavy grey to red cracking clays, with black cracking clays common in the low-lying areas. The structure of the GEW of the VVP is an open eucalypt woodland. The tree canopy is typically dominated by River Red-gum, though other eucalypt species may become prominent at wetter or drier sites. The understorey comprises a sparse shrub layer and a species-rich ground layer of grasses and herbs (TSSC, 2009, TTSC, 2008).

Such vegetation may qualify as GEW of the VVP or NTGVVP (see below) where it meets certain condition thresholds as described in EPBC Act guidance document, including:

- The ground vegetation is layer dominated by native grasses and/or other native herbs
 - if grassland, the patch is > 0.05 ha, or
 - if woodland, the patch is > 0.5 ha

- if grassland The dominant native species represent at least 50% of the native species and the perennial tussock cover¹, or
- if woodland, 50% or more of perennial ground layer vegetation comprise native species.

Following targeted transect surveys, there was only one patch (patch number 11) of Woodland mapped in size over 0.5 ha. This patch was attributed to EVC 68 Creekline Grassy Woodland, scoring only a 5 for understory in the Habitat Hectare Assessment. The understory was well below the required condition threshold of 50% coverage of indigenous species. As such, No patches of woodland were considered likely to qualify as this TEC.

NATURAL TEMPERATE GRASSLAND OF THE VICTORIAN VOLCANIC PLAIN

The vegetation of NTGVVP is mostly limited to a ground layer of grasses and herbs. Large shrubs and trees are absent to sparse. The ground layer is dominated by native tussock-forming perennial grasses with a variety of herbs, mostly from the daisy, lily, pea and orchid families, occupying the spaces among grass tussocks. The main grass species present are Kangaroo Grasses, particularly on drier sites, Wallaby Grasses, Spear Grasses and Tussock Grasses (TSSC, 2008).

There were three patches of grassland identified as likely to qualify as this community. Transect surveys, as per section 2.4.2, were undertake to determine if these patches met the condition threshold to qualify as NTGVVP. These patches included numbers 63, 71, & 96. All were found to qualify as NTGVVP. Results are detailed below in tables Table 3.6 - Table 3.11. Two additional patches – 50 & 51, within the rail reserve to the north of property 9 were identified as NTGVVP and mapped from over-the-fence to the south due to access restrictions . No detailed assessment of these patches was undertaken. The previously identified patch of NTGVVP – patch 103 is currently overlaid by the MSA, and is therefore reduced to 0.046 ha. Disqualifying this area as NTGVVP.

The detailed results of each assessment are presented below per patch.

PROPERTY 52, PATCH 103

As mentioned above in section 3.1.2.3, this patch is within an area previously identified as NTGVVP.

Table 3.6 Braun-blauquet scoring – NTGVVP property 52, patch 103.

ORIGIN	SPECIES	COMMON NAME	SCORE
*	<i>Nassella hyalina</i>	Cane Needle-grass	0.5
*	<i>Lolium rigidum</i>	Wimmera Rye-grass	1
	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass	3
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	3
	<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass	2
	<i>Chloris truncata</i>	Windmill Grass	1
*	<i>Cynara cardunculus</i>	Artichoke Thistle	0.5
*	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	0.5
	<i>Acaena echinata</i>	Sheep's Burr	0.5

Table 3.7 MNES assessment – NTGVVP – property 52, Patch 103.

#	CRITERIA	RESULT	QUALIFICATION
1	Is the ground vegetation layer dominated by native grasses and/or other native herbs?	Braun-blauquet result in above.	Yes
2	Area	0.043 ha	No, less than 0.05 ha. The majority of this area is within the MSA.
3a	The dominant native species represent at least 50% of the native species and the perennial tussock cover	Wallaby Grasses account for over 50% of coverage	Yes
3b	non-grass weeds comprise less than 30% of ground cover	Artichoke Thistle is present although at less than 30% coverage	Yes
3c	Native forbs (wildflowers) comprise at least 50% of total vegetation cover during spring – summer.	No	3c is an alternative qualifier to 3a. This result does not disqualify this patch as MNES.

PROPERTY 19, PATCH 71

Patch 71 on property occurred within an existing conservation reserve.

Table 3.8 Braun-blauquet scoring – NTGVVP property 19, patch 71.

ORIGIN	SPECIES	COMMON NAME	SCORE
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	2
	<i>Chloris truncata</i>	Windmill Grass	2
	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass	3
*	<i>Plantago lanceolata</i>	Ribwort	1
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	2
	<i>Themeda triandra</i>	Kangaroo Grass	1
*	<i>Lolium rigidum</i>	Wimmera Rye-grass	1
*	<i>Avena barbata</i>	Bearded Oat	2
	<i>Convolvulus angustissimus subsp. omnigracilis</i>	Slender Bindweed	0.1
	<i>Oxalis perennans</i>	Grassland Wood-sorrel	0.5
	<i>Helichrysum luteoalbum</i>	Jersey Cudweed	0.1

Table 3.9 MNES assessment – NTGVVP – property 19, patch 71.

#	CRITERIA	RESULT	QUALIFICATION
1	Is the ground vegetation layer dominated by native grasses and/or other native herbs?	Braun-blauquet result in Table 3.6 above.	Yes
2	Area	0.529 ha.	Yes - over 0.05 ha

#	CRITERIA	RESULT	QUALIFICATION
3a	The dominant native species represent at least 50% of the native species and the perennial tussock cover	Wallaby Grasses account for over 50% of coverage	Yes
3b	non-grass weeds comprise less than 30% of ground cover	Ribwort present, non-grass weeds comprise less than 30% of ground cover	Yes
3c	Native forbs (wildflowers) comprise at least 50% of total vegetation cover during spring – summer.	No	3c is an alternative qualifier to 3a. This result does not disqualify this patch as MNES.

PROPERTY 40 & 17, PATCH 63 & 96

Patch 63 and 96 were mapped separately due to a vehicle track somewhat separating the two. This track is relatively impermanent, and it is considered adequate that these two patches be considered as one. No specific transect was undertaken for qualification of this patch. Scoring was undertaken from coverages at points of flora recorded throughout the patch.

Table 3.10 Braun-blauquet scoring – NTGVVP property 40 & 17, patch 63 & 96.

ORIGIN	SPECIES	COMMON NAME	SCORE
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	1
	<i>Senecio quadridentatus</i>	Cotton Fireweed	0.5
	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass	1
*	<i>Plantago lanceolata</i>	Ribwort	1
	<i>Themeda triandra</i>	Kangaroo Grass	4
*	<i>Lolium rigidum</i>	Wimmera Rye-grass	1
*	<i>Avena barbata</i>	Bearded Oat	0.5
	<i>Convolvulus angustissimus subsp. omnigracilis</i>	Slender Bindweed	0.1
	<i>Oxalis perennans</i>	Grassland Wood-sorrel	1
	<i>Helichrysum luteoalbum</i>	Jersey Cudweed	0.1
*	<i>Berkheya rigida</i>	African Thistle	2
	<i>Acaena echinata</i>	Sheeps Burr	1
	<i>Senecio macrocarpus</i>	Large-headed Fireweed	1
	<i>Chloris truncata</i>	Windmill Grass	1
	<i>Carex inversa</i>	Knob Sedge	0.5
#	<i>Rhagodia parabolica</i>	Fragrant Saltbush	0.1
	<i>Dianella admixta</i>	Black-anther Flax-lily	0.5
*	<i>Nassella neesiana</i>	Chilean Needle-grass	2
*	<i>Nassella trichotoma</i>	Serrated Tussock	2

ORIGIN	SPECIES	COMMON NAME	SCORE
*	<i>Dactylis glomerata</i>	Cocksfoot	2
	<i>Calocephalus citrius</i>	Lemon Beauty-heads	0.5

Table 3.11 MNES assessment – NTGVVP – property 40 & 17, patch 63 & 96.

#	CRITERIA	RESULT	QUALIFICATION
1	Is the ground vegetation layer dominated by native grasses and/or other native herbs?	Braun-blanquet result in Table 3.6 Braun-blanquet scoring – NTGVVP property 52Table 3.6 above.	Yes
2	Area	0.502 ha.	Yes - over 0.05 ha
3a	The dominant native species represent at least 50% of the native species and the perennial tussock cover	Kangaroo Grass accounts for over 50% of coverage across the higher quality areas	Yes
3b	non-grass weeds comprise less than 30% of ground cover	African Thistle is present however at well below 30%. Cumulatively, non-grass weeds comprise less than 30% of ground cover	Yes
3c	Native forbs (wildflowers) comprise at least 50% of total vegetation cover during spring – summer.	No	3c is an alternative qualifier to 3a. This result does not disqualify this patch as MNES.

SEASONAL HERBACEOUS WETLANDS (FRESHWATER) OF THE TEMPERATE LOWLAND PLAINS

Overall, 0.532 ha of SHW was identified along an ephemeral tributary of Cherry Tree Creek on property 52 outside of the MSA.

Seasonally wet depressions supporting native vegetation were identified on properties 4, 5, 40, 50, & 39 and assessed for SWH. However these areas were disregarded due to size qualification as per 13 of the listing advice (TSSC, 2012). High-quality aquatic vegetation along Lollypop Creek on properties 33 & 16 were considered to not qualify due to being associated with a perennial watercourse, as per page 2 – 3 of the listing advice. This does not fit the description of a seasonal wetland.

Table 3.12 Braun -blanquet score SHW Property 52

ORIGIN	SPECIES	COMMON NAME	SCORE
	<i>Amphibromus neesii</i>	Southern Swamp Wallaby-grass	1
*	<i>Berkheya rigida</i>	African Thistle	0.5
*	<i>Bromus hordeaceus subsp. hordeaceus</i>	Soft Brome	0.5
#	<i>Cassinia sifton</i>	Drooping Cassinia	0.5
	<i>Chloris truncata</i>	Windmill Grass	1
*	<i>Cynara cardunculus subsp. flavescent</i>	Artichoke Thistle	2

ORIGIN	SPECIES	COMMON NAME	SCORE
	<i>Eleocharis acuta</i>	Common Spike-sedge	2
	<i>Eleocharis gracilis</i>	Slender Spike-sedge	0.5
	<i>Haloragis heterophylla</i>	Varied Raspwort	0.5
*	<i>Hypochaeris radicata</i>	Flatweed	0.5
	<i>Juncus amabilis</i>	Hollow Rush	0.5
	<i>Juncus radula</i>	Hoary Rush	0.5
	<i>Juncus subsecundus</i>	Finger Rush	0.5
*	<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit	0.5
*	<i>Lolium rigidum</i>	Wimmera Rye-grass	0.5
	<i>Marsilea drummondii</i>	Common Nardoo	2
*	<i>Medicago polymorpha</i>	Burr Medic	0
*	<i>Paspalum dilatatum</i>	Paspalum	0.5
*	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	0.5
*	<i>Plantago coronopus</i>	Buck's-horn Plantain	1
	<i>Rumex bidens</i>	Mud Dock	1
*	<i>Rumex conglomeratus</i>	Clustered Dock	0.5
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	0.5
	<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass	1
	<i>Goodenia gracilis</i>	Slender Goodenia	0.1
*	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	0.5

3.2.3.2 FFG ACT THREATENED ECOLOGICAL COMMUNITIES

FFG Act threatened communities synonymous with native vegetation modelling and the EVCs recorded within the study area include:

- Western (Basalt) Plains Grasslands Community
- Western Basalt Plains (River Red Gum) Grassy Woodland

WESTERN (BASALT) PLAINS GRASSLANDS COMMUNITY

The Western (Basalt) Plains Grasslands Community is an open grassland community found mainly on undisturbed, poorly-drained heavy clay soils on the basalt plains of western Victoria. These soils are usually waterlogged in winter and very hard, dry and cracking in summer. The vegetation is characteristically dominated by perennial native grasses, with very few eucalypts and shrubs, and an almost complete absence of introduced grasses and weeds.

Perennial native plants predominate. On drier sites, the community is usually dominated by Kangaroo Grass *Themeda triandra*, together with composites, such as Common Everlasting *Chrysocephalum apiculatum* and Lemon Beauty-heads *Calocephalus citreus*. On moister sites tussock grasses, particularly Wallaby Grasses *Rytidosperma* spp., Spear Grasses *Austrostipa* spp. and Tussock Grasses *Poa* spp. tend to predominate. (DELWP, undated).

All patches qualifying as NTGVVP are considered to align with the description of this FFG Act listed community being patches 50, 51, 63, 71, 96 & 103. Additional areas that are considered to align with this FFG Act community are patches 4, 24, 25, 94, 102, 109, and 110. There was a total of 19.814 ha of native vegetation mapped considered to align with description of this FFG Act listed community.

3.2.3.3 WESTERN BASALT PLAINS (RIVER RED GUM) GRASSY WOODLAND

This grassy woodland community has a clearly-recognizable structure made up of an open canopy of River Red Gum *Eucalyptus camaldulensis*, a middle layer chiefly of scattered wattles such as Golden Wattle *Acacia pycnantha* and Hedge Wattle *A. paradoxa* but including a few other shrubs as well, such as Tree Violet *Melicytus dentatus*, and a ground layer dominated by grasses. In its least disturbed state, the ground layer is predominantly tussock grasses such as Common Tussock Grass *Poa labillardierei* and Wallaby Grass *Rytidosperma* spp., together with Kangaroo Grass *Themeda triandra* and various forbs in the spaces between the tussocks. More disturbed sites have a high proportion of introduced grasses and forbs in the ground layer.(DELWP, undated).

Neither of the two patches of Plains Grassy Woodland EVC 55 mapped are considered to align with the description of this community being solely made-up of recruiting patches of Blackwoods *Acacia melanoxylon*.

Patches of Creekline Grassy Woodland EVC 68 along Cherry Creek are also thought to not align with this description, as the description talks about dryer terrestrial grasses, rather than the seasonally wet species, such as Common Spike-rush that occur beneath the River Red Gums.

3.2.3.4 WEEDS AND INVASIVE ANIMALS

Thirteen weed species listed under the CaLP Act were recorded across the study area. They are listed below with their classification in Table 3.13. Regionally restricted weeds *R* are not widely distributed but are capable of spreading further. Regionally controlled weeds *C* are usually widespread in a region. To prevent further spread control measures are required. It is the landowners responsibility to prevent the growth and spread of weeds.

Invasive animals listed under the Act observed (visual or evidence (scats and tracks) observed) or likely to enter the study area include mice, cats, rabbits, foxes and hares.

Table 3.13 CaLP Act weed species recorded within the study area

SCIENTIFIC NAME	COMMON NAME	CALP ACT
<i>Carthamus lanatus</i>	Saffron Thistle	C
<i>Cirsium vulgare</i>	Spear Thistle	C
<i>Echium plantagineum</i>	Paterson's Curse	C
<i>Foeniculum vulgare</i>	Fennel	R
<i>Lepidium draba</i>	Hoary Cress	R
<i>Lycium ferocissimum</i>	African Box-thorn	C
<i>Marrubium vulgare</i>	Horehound	C
<i>Nassella neesiana</i>	Chilean Needle-grass	R
<i>Nassella trichotoma</i>	Serrated Tussock	P
<i>Opuntia stricta</i>	Common Prickly-pear	R
<i>Oxalis pes-caprae</i>	Soursob	R
<i>Rosa rubiginosa</i>	Sweet Briar	C
<i>Xanthium spinosum</i>	Bathurst Burr	C

3.2.4 FAUNA

3.2.4.1 OBSERVATIONS

During field assessments, only common (non-listed) 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 carunculata*. 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* and Pobblebonk *Limnodynastes dumerilii dumerilii* were recorded, as well as birds such as White-faced Heron *Egretta novaehollandiae* and Straw-necked Ibis *Threskiornis spinicollis*. In dense grassy areas Brown Quail *Coturnix ypsilophora australis* was observed. Stubble Quail *Coturnix pectoralis*, not seen during surveys, is also likely to occur. These secretive birds are likely to use dense native grassland but to a lesser extent, exotic and even cropped grassland. The study area provides a large area of hunting habitat for birds of prey as well as a small number of treed areas for nesting, with Black Kite, Whistling Kite, Nankeen Kestrel, Black-shouldered Kite recorded during surveys.

Most of the species recorded are common in agricultural lands in the area. A full fauna species list is provided in Appendix A2.

Although no EPBC Act or FFG Act listed threatened or EPBC Act listed migratory species were observed during the field surveys, the location of the study area near the Werribee Treatment Plant, the number and location of records in the areas, and the presence of potential habitat all indicate that threatened species may occur in the study area. The potential presence of threatened and migratory species is assessed in Section 3.2.4.5.

3.2.4.2 HABITAT

The habitat resources available for fauna within the study area are described in Table 3.14 and mapped at C4.

Table 3.14 Fauna habitat descriptions and areas.

HABITAT	DESCRIPTION	POTENTIAL VALUES	AREA (STUDY AREA)
Wetland			
Unvegetated shallow water	Areas of shallow marsh which are not dominated by vegetation, either due to disturbance (grazing, etc), or inundation. Some are open and form small areas of mudflat habitat. Others are small pools only.	In the study area, the few more open areas of unvegetated shallow water may provide foraging habitat for birds, including potentially for small numbers of migratory shorebirds when conditions are right and the water draws down to muddy foraging habitat. However, no large open mudflat areas are present, so this habitat is only likely to be suitable for low numbers of a small suite of species, as the landscape dries following significant rains.	0.911 ha
Ephemeral Shallow Marsh	An ephemeral habitat which is periodically inundated. High quality examples are dominated by Common Spike-rush <i>Eleocharis acuta</i> , Nardoo <i>Marsilea drummondii</i> , and Slender Knotweed <i>Persicaria decipiens</i> . Low quality examples are	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	High quality: 5.199 ha Low quality: 1.755 ha

HABITAT	DESCRIPTION	POTENTIAL VALUES	AREA (STUDY AREA)
	dominated by <i>Phalaris</i> and other exotic grasses, with a lower native component.	including Lewin's Rail may also utilise this habitat for foraging. This habitat (and associated areas of deep marsh and deep open water) has the potential to support the threatened Growling Grass Frog.	
Aquatic - Deep Marsh	A wetland habitat which is usually inundated. Deep Marsh species are present including Cumbungi <i>Typha domingensis</i> , Curly Pondweed <i>Potamogeton crispus</i> .	At the study area, this habitat may be utilised by wetland birds, frogs and reptiles. Some threatened duck species may utilise this habitat periodically.	2.402 ha
Deep water	Areas of deep open water, some of which supports aquatic (but not emergent) vegetation such as Eel Grass <i>Vallisneria spiralis</i> .	At the study area, this habitat may be utilised by wetland birds including threatened duck species which rely on deeper water (e.g. Blue-billed Duck). Platypus may also utilise these areas if present.	1.430 ha
Grassland			
Remnant native grassland	Supports a high percentage of Wallaby Grasses <i>Rytidosperma</i> spp and other native species.	Provides various habitat resources for smaller indigenous reptiles and birds. May provide habitat for threatened species, including Golden Sun Moth, Striped Legless Lizard and Tussock Skink. Dense areas likely to support quail species.	24.070 ha
Uncultivated low quality grassland	This habitat is modified by agricultural use and is dominated by exotic tussocky grasses although there are areas where native grasses are present (<25 % cover). The noxious weed Chilean Needle Grass <i>Nassella neesiana</i> is the dominant species in some areas.	These areas provide foraging resources for common bird species and exotic fauna, such as House Mouse. * <i>Mus musculus</i> . Eastern Grey Kangaroos and some common native reptiles are also likely to utilise this area. Chilean Needle Grass may support Golden Sun Moth, although this grass was observed to be present only in dense swathes, with none of the inter-tussock space preferred by the species. As such, the species is considered unlikely to be present in this habitat type. Being tussock dominated and uncultivated, the habitat has the potential to support Striped Legless Lizard. Any dense grassland habitat which is tussocky and occurring nearby wetland habitat or which is periodically inundated	41.008 ha

HABITAT	DESCRIPTION	POTENTIAL VALUES	AREA (STUDY AREA)
		may support sheltering Latham's Snipe when present in Australia. Dense areas likely to support quail species.	
Highly modified uncultivated land	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. Where there is tussock structure, these areas are dominated by Serrated Tussock or Chilean Needle Grass approaching 100% coverage. It is likely that these areas these have been broadacre sprayed with herbicide in the past.	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.	95.319 ha
Cultivated land	Land utilised for cropping, highly modified by agricultural use	Very low potential value for native fauna. These areas may provide foraging resources for common bird species and exotic fauna, such as House Mouse. *<i>Mus musculus</i>. Eastern Grey Kangaroos are also likely to periodically utilise this area. Likely to periodically support quail species.	Not mapped, can be seen on aerial (Figure C2)
Woodland and treed habitats			
Trees and shrubs (remnant and planted)	Indigenous, native and exotic trees are supported by the study area. Remnant and planted trees are mostly River Red Gums. Most trees are isolated, however there are some patches of trees, including a planted grove along Lollipop Creek.	Provides nesting and foraging habitat resources for a range of fauna including birds, bats, arboreal mammals, reptiles and invertebrates. Shrubs and dense areas of trees are likely to be valuable for small woodland birds for foraging, nesting and connectivity in the landscape. Trees along watercourses may provide roosting and nesting habitat for some birds of prey. Isolated trees provide stepping-stone habitat, as well as nesting habitat. Some of the older trees may provide nesting habitat in the form of hollows and/or cracks. Exotic vegetation is likely to support only common and exotic species.	30 habitat trees were identified providing habitat structures such as hollows, loose bark or fissures and cracks. Refer to native vegetation mapping at C4 for location of remnant trees and planted vegetation.

HABITAT IMAGES



Photo 3.1 Ephemeral shallow marsh habitat along Lollypop Creek



Photo 3.2 Ephemeral shallow marsh habitat along Cherry Creek on property 17



Photo 3.3 Aquatic deep marsh and ephemeral shallow marsh habitat along Lollypop Creek.



Photo 3.4 Aquatic Deep Marsh on property 40



Photo 3.5 Tress and shrubs (remnant and planted) on property 50.



Photo 3.6 Unvegetated shallow water on property 7.



Photo 3.7 Highly modified uncultivated land on property 51. Showing very-high coverage of Chilean

Needle Grass Tussock **Nassella neesiana*.



Photo 3.8 Remnant grassland inc. wallaby grass on property 40.

3.2.4.3 HABITAT CONNECTIVITY

Aside from some isolated dams and ponds, there is generally good connectivity of wetland/marsh habitat, particularly along the creeks in the study area. However some parts of the creeks are in poor condition, with 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. The exception to this is the patch of native grassland in the southwest of the study area, which is large in size and connected to other suitable habitat to the west. 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.

3.2.4.4 TARGETED SURVEY RESULTS

GROWLING GRASS FROG

No Growling Grass Frogs were recorded during targeted surveys within the study area in the 2021-22 survey season.

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 ~7.1 km downstream via the Lollypop Creek. As such, the species should be considered to have the potential to occur upstream across suitable habitat in future. It is possible that under the right conditions (e.g. high rainfall/flooding) the species may disperse into the study area and utilise the habitat present. This should be taken into consideration for the design and mitigation strategy for the precinct. See Section 4 for recommendations.

GOLDEN SUN MOTH

No Golden Sun Moth were recorded during targeted survey undertaken for the species in the 2021-22 survey season. This was unexpected prior to survey given the proximity of past records (DELWP, 2021b) to property 52, and the presence of grassland potential habitat. Prior to targeted survey, 'remnant grassland' and some of the 'uncultivated low-quality grassland' (refer Section 3.2.4.2 and mapping at C4, were both considered to have the potential to support the species. 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). This was particularly true of all habitat types identified as possibly utilised by this species being: *Remnant Grassland inc. Wallaby Grass*, *uncultivated low-quality grassland*, and *Highly modified uncultivated land*. The most dense Chilean Needlegrass-dominated areas were not prioritised for survey, although broad-scale survey passes through these areas on properties 17, 40, 48 and 51 were undertaken to verify disregarding these areas as potential habitat. It is likely there has been an alteration to land

management across property 52 that has led to increased biomass levels, and subsequently the grassland being unsuitable for his species.

Based on the results of the survey, it is unlikely that Golden Sun Moth are currently supported by the study area. If the species is still present to the west of Property 52, it may re-colonise should conditions on-site improve. There is also a small possibility that the species was not detectable in 2021-22 due to poor conditions (wet and cool season, high biomass) but that in a future season, it may be recorded. As such, Golden Sun Moth should be considered in the design and mitigation strategy for the precinct. See Section 4 for recommendations.

STRIPED LEGLESS LIZARD

No Striped Legless Lizards were recorded during targeted surveys undertaken for this species. However, 14 non-target species were recorded during surveys, including 10 reptiles, three amphibians and one mammal. These species, and the number of individuals recorded during the survey period, are outlined in Table 3.15 below. Full results including weather conditions, times of survey, and species recorded at each grid per check are provided as Appendix A1.3.

Table 3.15 Species recorded during targeted Striped Legless Lizard surveys

COMMON NAME	SCIENTIFIC NAME	NUMBER RECORDED	CONSERVATION STATUS
REPTILES			
Tussock skink	<i>Pseudemoia pagenstecheri</i>	85	Endangered
Large Striped Skink	<i>Ctenotus robustus</i>	5	
Southern Grass Skink	<i>Pseudemoia entrecasteauxii</i>	2	
Eastern Striped Skink	<i>Ctenotus orientalis</i>	5	
Pale-flecked Garden Sunskink	<i>Lampropholis guichenoti</i>	1	
Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>	8	
Little Whip Snake	<i>Parasuta flagellum</i>	9	
Eastern Brown Snake	<i>Pseudonaja textilis</i>	4	
Tiger Snake	<i>Notechis scutatus</i>	3	
Unidentified Skink	-	17	
AMPHIBIAN			
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>	39	
Striped Marsh Frog	<i>Limnodynastes peronii</i>	4	
Unidentified Frog	-	1	
MAMMAL			
*House Mouse	<i>Mus musculus</i>	1	

Given the results of the targeted surveys, Striped Legless Lizard are considered unlikely to inhabit the study area. However, Striped Legless Lizard is a cryptic species and surveys can fail to detect them when they are present at low numbers. For this reason, the determination of presence should also consider the quality of habitat present and number of local records. The majority of possible habitat for this species surveyed across Werribee Junction Precinct 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 this species is not necessarily

be excluded by 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, 2021b). Whilst it may be reasonable to consider this species effectively absent across Werribee Junction, it may be necessary to assume possible presence at low numbers across property 52, and 19 due to being higher quality habitat.

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 grid 1 on 6 occasions, recorded at grid 4,7,9,11 on two occasions, and during Check 7 tussock skink were recorded at all grids except 3,5,6 and 13.

3.2.4.5 SIGNIFICANT FAUNA SPECIES – LIKELIHOOD OF OCCURRENCE ASSESSMENT

Based on database searches, species habitat requirements and the result of habitat assessment and targeted surveys, 26 significant fauna species have been considered to have at least a moderate likelihood of occurrence in the study area either periodically or regularly – refer Table 3.16 below. These are the species that should be considered in an impact assessment, and when designing the precinct. The full likelihood of occurrence assessment for fauna is provided in Appendix B. Most of these species (23) are birds, with the majority of those being somewhat or largely reliant on wetland habitat. Three species, Growling Grass Frog, Golden Sun Moth and Striped Legless Lizard, have been included in the table even though their likelihood of occurring has been revised to low, following completion of targeted surveys. This is because these species have the potential to reoccur in the study area in future, or because there is the possibility that the species is present but was undetectable in the study area at the time of survey. As such, they should be considered in the design and mitigation strategy for the precinct.

Based on the results of the likelihood of occurrence assessment, the critical habitat for threatened fauna within the study area is the wetland habitat along creek lines. This habitat (and surrounding grassy areas) is likely to support the highest number of threatened species, although most of these species may only utilise the habitat intermittently. Native grassland habitat may also be of importance for threatened species in low numbers that were not observed during surveys. Open grassy habitat is also likely to be of some importance for listed birds of prey, as are remnant trees.

The above has been taken into consideration when providing avoidance, minimisation and mitigation recommendations for the project (Section 4).

Table 3.16 Summary of fauna species with a moderate or higher likelihood of occurrence at the study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	LIKELIHOOD OF OCCURRENCE
Birds				
<i>Actitis hypoleucos</i>	Common Sandpiper	M	vu	Moderate - Species may periodically forage on muddy edges of wetlands within the study area, including those associated with Lollipop Creek, as well as farm dams.
<i>Anseranas semipalmata</i>	Magpie Goose		vu	Moderate - Species may utilise wetland habitat including shallow marshy areas of Lollipop Creek, as well as nearby grassy paddocks.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	LIKELIHOOD OF OCCURRENCE
<i>Antigone rubicunda</i>	Brolga		en	Moderate - Species may periodically utilise areas around Lollypop Creek and Cherry Creek in the study area, however tends to prefer larger more open wetlands.
<i>Ardea alba modesta</i>	Eastern Great Egret		vu	High - Species may utilise areas around Lollypop Creek and Cherry Creek in the study area, as well as isolated dams.
<i>Ardea intermedia plumifera</i>	Plumed Egret		cr	Moderate - Species may utilise areas around Lollypop Creek and Cherry Creek in the study area as well as isolated dams.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	cr	Moderate - Although the species usually prefers larger shallow wetlands, parts of Lollypop Creek supporting shallow marsh may periodically support this species.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M		Moderate - Although there are no large mudflats within the study area, the species may periodically occur on muddy edges of dams and wetlands associated with Lollypop and Cherry Creeks.
<i>Calidris ruficollis</i>	Red-necked Stint	M		Moderate - The species may periodically occur at dams and wetlands associated with creeks if the conditions are right.
<i>Calidris subminuta</i>	Long-toed Stint	M		Moderate - The species may periodically occur at dams and wetlands associated with creeks if the conditions are right.
<i>Charadrius bicinctus</i>	Double-banded Plover	M		Moderate - The species may periodically occur at dams and wetlands associated with creeks in the study area.
<i>Egretta garzetta</i>	Little Egret		en	High - Species may forage in wetlands associated with Lollypop and Cherry Creeks as well as at isolated dams..
<i>Falco subniger</i>	Black Falcon		cr	Moderate - Based on the number of records in the area, the species is likely to periodically hunt over the study area and may breed in remnant or planted trees along the creeks.
<i>Gallinago hardwickii</i>	Latham's Snipe	M		High - species is likely to utilise dense vegetation along Lollypop and Cherry Creeks, particularly near shallow marshy areas. May also roost in pasture near wetlands.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	LIKELIHOOD OF OCCURRENCE
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		en	High - Species is likely to periodically hunt for prey across the study area. There is limited potential habitat for nesting.
<i>Hieraaetus morphnoides</i>	Little Eagle		vu	High - Species is likely to periodically hunt for prey across the study area. There is limited potential habitat for nesting.
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU, M	vu	Moderate - Species may occasionally fly above the study area.
<i>Lewinia pectoralis</i>	Lewin's Rail		vu	High - species may utilise dense vegetation around wetlands, particularly along Lollipop and Cherry Creeks.
<i>Oxyura australis</i>	Blue-billed Duck		vu	Moderate - Although there aren't any large and deep open water areas, the species may occur periodically in wetlands along Lollipop and Cherry Creeks.
<i>Rostratula australis</i>	Australian Painted-snipe	EN	cr	Moderate - Although there are few past records of the species in the locality, the species is somewhat cryptic and there is potential habitat along the creeks within the study area.
<i>Spatula rhynchotis</i>	Australasian Shoveler		vu	Moderate - Although there aren't any large open water areas, the species may occur along Lollipop and Cherry Creeks.
<i>Stictonetta naevosa</i>	Freckled Duck		en	Moderate - The species may occur along Lollipop and Cherry Creeks.
<i>Tringa glareola</i>	Wood Sandpiper	M	en	Moderate - There is a small amount of low quality potential habitat within the study area in wetlands along the creeks.
<i>Turnix pyrrhorthorax</i>	Red-chested Button-quail		en	Moderate - Study area supports weedy fields with dense ground cover, the species may occur.
Mammals				
<i>Ornithorhynchus anatinus</i>	Platypus		vu	Moderate - There is some potential habitat within the study area, particularly the higher quality, deeper and treed sections of Lollipop Creek. However, connectivity to other areas of potential platypus habitat is poor.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	LIKELIHOOD OF OCCURRENCE
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu	Moderate - The species may periodically fly over or visit remnant and planted eucalypts to forage, however there is minimal potential habitat within the study area.
Reptiles				
<i>Delma impar</i>	Striped Legless Lizard	VU	en	Low (previously moderate) - The study area supports patches of native grassland vegetation. However, the species was not recorded during targeted surveys undertaken in the 2022-2023 Striped Legless Lizard season. It may be necessary to assume possible presence at low numbers across property 52, and 19 due to being higher quality habitat.
<i>Pseudemoia pagenstecheri</i>	Tussock Skink		en	Recorded – A total of 85 Tussock Skink were recorded within the study area during targeted tile surveys undertaken for Striped Legless Lizard. Most records were from the grid 1 being on property 19, and also recorded on property 12, 5, 48 and 52.
Amphibians				
<i>Litoria raniformis</i>	Growling Grass Frog	VU	vu	Low (previously moderate) - Species has the potential to utilise areas of Lollypop Creek and Cherry Creek within the study area, however was not recorded during targeted surveys. There is the potential for the species to recolonise and the possibility that the species is present but was undetectable in the study area at the time of survey.
Invertebrates				
<i>Synemon plana</i>	Golden Sun Moth	VU	vu	Low (previously moderate) - The study area supports patches of native grassland vegetation as well as thick areas of Chilean Needlegrass. However, grassland and exotic grassy areas are quite dense without the inter-tussock space preferred by the species. It is likely that grassland previously suitable for this species has biomass levels that inhibit breeding of this species. The species was not recorded during targeted surveys undertaken in the 2021-22 Golden Sun Moth season.

Conservation Status used in the table above:

EPBC Act: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, M = Migratory.

FFG Act: _cr = Critically Endangered, en = Endangered, vu = Vulnerable

3.2.5 RAMSAR HABITAT ASSESSMENT

A 134 ha area of the south west corner of the study area is located within the mapped extent of a wetland of international importance (Ramsar site): *Port Phillip Bay (Western Shoreline) and Bellarine Peninsula*. Ramsar sites are those listed under the Convention on Wetlands of International Importance.

The Ramsar site covers six distinct areas and includes parts of western Port Phillip Bay extending from Altona south to Limeburners Bay, and parts of the Bellarine Peninsula extending from Point Henry to Barwon Heads. The Werribee/Avalon section of the Ramsar site, which includes the Western Treatment Plan, is the one relevant to the study area. All other parts of the Ramsar site are sufficiently distant to not be impacted directly or indirectly by the project, although many characteristic species (e.g. migratory shorebirds) are highly mobile and will move between the parts of the Ramsar site.

Within the study area, the part which overlaps the Ramsar site ('Ramsar overlap area'), as shown at C1, is mostly highly modified paddocks. There are no large wetland areas, although the very southwestern paddock supports a drainage line of seasonal herbaceous wetland in a large patch of remnant native grassland. The drainage line provides ephemeral shallow marsh habitat which may be utilised by wetland birds, including the EPBC Act listed migratory Latham's Snipe *Gallinago hardwickii*.

Although only a relatively small proportion of the study area is within the Ramsar site, significant species which are characteristic of the Ramsar site may periodically utilise habitat outside of this area within the larger study area, including wetland habitat associated with Cherry and Lollipop Creeks.

Table 3.17 provides an overview of the Ramsar assessment criteria met by the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site, as well as an assessment of each criterion in relation to the study area. I.e. how does the habitat within the study area, particularly the Ramsar overlap area, compare with the Ramsar site as a whole and would the study area meet any of the Ramsar criteria?

From this assessment, it is clear that the Ramsar overlap area does not meaningfully contribute to the Ramsar site as a whole with regard to these criteria. i.e. if the Ramsar overlap area was removed, it would not affect the ability of the Ramsar site to meet any of the criteria. It is also clear that the study area does not meet these criteria or support numbers of waterbirds or significant habitat which are in any way comparable to the Ramsar site.

Based on the above, the loss of the Ramsar overlap area or the study area as a whole would not affect the Ramsar site or contribute to its ability to meet the criteria. However, impact assessment will be required based on the proposed design. Implications of the project under the EPBC Act are discussed with in Section 5.1.1.2.

Table 3.17 Ramsar criteria met by the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula site, and applicability to the study area

RELEVANT RAMSAR CRITERIA	JUSTIFICATION (FROM (DELWP, 2020B) (DELWP, 2018B))
2. Supports vulnerable, endangered, or critically endangered species or threatened ecological communities	The site regularly supports one wetland dependent ecological community and 13 threatened fauna species listed under the EPBC Act and or IUCN Red List: • Subtropical and Temperate Coastal Saltmarsh – vulnerable ecological community (EPBC) • Australasian bittern <i>Botaurus poiciloptilus</i> – Endangered (EPBC and IUCN) • Australian fairy tern <i>Sternula nereis nereis</i> – Vulnerable (EPBC and IUCN) • Bar-tailed godwit <i>Limosa lapponica baueri</i> – Vulnerable (EPBC) • Curlew sandpiper <i>Calidris ferruginea</i> – Critically endangered (EPBC) • Eastern curlew <i>Numenius madagascariensis</i> – Critically endangered (EPBC); endangered (IUCN) • Great knot <i>Calidris tenuirostris</i> – Critically endangered (EPBC); endangered (IUCN) • Greater sand plover <i>Charadrius leschenaultia</i> – vulnerable (EPBC)

RELEVANT RAMSAR CRITERIA	JUSTIFICATION (FROM (DELWP, 2020B) (DELWP, 2018B))
	• Hooded plover <i>Thinornis rubricollis rubricollis</i> – Vulnerable (EPBC and IUCN) • Lesser sand plover <i>Charadrius mongolus</i> – Endangered (EPBC) • Red knot <i>Calidris canutus</i> – Endangered (EPBC) • Orange-bellied parrot <i>Neophema chrysogaster</i> – Critically endangered (EPBC and IUCN) • Australian grayling <i>Prototroctes maraena</i> – Vulnerable (EPBC) • Growling grass frog <i>Litoria raniformis</i> – Vulnerable (EPBC), endangered (IUCN)
Relevance to study area / project: This criteria should be applied to wetland-dependant species and communities only (REF). Of the species and communities listed in the justification, only one is considered to have a moderate potential to periodically occur in the study area: Australasian Bittern. This species may visit the wetlands associated with the creeks in the study area, although it is unlikely to be present on a regular basis due to the small area of suboptimal potential habitat present. The species is highly unlikely to occur within the part of the study area which overlaps with the Ramsar site. In addition to the above, Growling Grass Frog was not detected during targeted surveys and is unlikely to currently be supported by the study area. However, it may occur in future or disperse through the study area under suitable conditions (e.g. high rainfall). Most of the remaining wetland-dependant threatened species are coastal and are highly unlikely to utilise the study area. The Australian Grayling is considered unlikely to occur within the study area based on the available habitat and lack of nearby records. The nearest known populations of the Australian Grayling are 25 km north-east in the Maribyrnong River, and 29 km south-west in the Barwon River (DELWP, 2021b). No wetland-dependant threatened species or community listed under the EPBC Act or IUCN red list is likely to be regularly supported by any part of the study area, however Australasian Bittern may periodically occur, and Growling Grass Frog may occur again in the study area under suitable conditions.	
3. Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site supports a high diversity of waterbirds, most likely related to the diversity of habitats provided by the site (permanent shallow marine waters, marine subtidal aquatic beds, rocky marine shores, sandy shores, intertidal forested wetlands, intertidal mud, sand or salt flats, intertidal marshes, estuarine waters, seasonal and permanent saline wetlands, permanent and intermittent freshwater marshes and pools, wastewater treatment areas and former saltworks). A total of 130 species of waterbird have been recorded within the site (excluding 24 species that are outside their range or could be considered vagrant). The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site represents the most species rich Ramsar site in the South East Coast (Victoria) Drainage Division with respect to waterbirds when compared to other large marine and coastal wetland systems in the bioregion. In addition, the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site supports waterbird species across all defined functional groups (ducks, herbivores, large wading birds, piscivores, shorebirds, terns,

RELEVANT RAMSAR CRITERIA	JUSTIFICATION (FROM (DELWP, 2020B) (DELWP, 2018B))
	petrels and shearwaters); representing a higher diversity than sites that support species from only one or two functional groups.
Relevance to study area / project: The study area supports a low diversity of wetland habitat types. The wetland habitat types supported are described in Section 3.2.4.2, with a total area of 11.69 ha. In the part of the study area which overlaps with the Ramsar site 1.39 ha of wetland habitat type was recorded: — Aquatic - deep marsh - 0.009 ha — Ephemeral shallow marsh - high quality - 0.026 ha — Ephemeral shallow marsh - high quality - 1.243 ha — Ephemeral shallow marsh - lower quality - 0.114 ha This habitat occurs along two small ephemeral tributaries of Cherry Creek. The larger area running across property 52 waw mapped as EVC 123 Plains Grassy Wetland, and appears to be only ephemerally wet, inundated for shorter periods without any mud-flat type habitat areas. that and is only likely to provided habitat resources for a low diversity of waterbirds for a short time following higher rainfall events. It is insignificant in comparison to the habitat available across the larger local Ramsar site. We note that the study area, including the Ramsar overlap area, supports high quality native grassland. As this is not a wetland habitat type, it has not been considered when assessing this criterion. The study area is highly unlikely to support populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	
4. Supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions	Port Phillip Bay (Western Shoreline) and Bellarine Peninsula supports large numbers of migratory waterbirds over the summer months, supports breeding of waterbirds and frogs, provides nursery grounds and a migratory corridor for fish, and supports waterfowl during moulting of their primary flight feathers. The site also provides permanent freshwater habitat when inland systems are dry. The site thereby supports species during the critical life stages of migration, breeding, and moulting, as well as providing drought refuge.
Relevance to study area / project: The study area is unlikely to support any significant breeding habitat or otherwise support many species at critical stages in their life cycles. However, it may occasionally support a small number of migratory waterbirds when present in Australia, particularly Latham's Snipe which is not reliant on large open mudflat habitat. The wetland habitat and surrounding grassland within the Ramsar overlap area may also support this species. The study area (including the Ramsar overlap area) also provides breeding habitat for frogs although this is unlikely to be highly significant, supporting a small diversity of common species only. The study area does not provide any large areas of permanent water for refuge habitat. No permanent water is supported by the Ramsar overlap area. The study area supports some species during critical stages in their life cycles however this contribution is minor in comparison to the Ramsar site	

RELEVANT RAMSAR CRITERIA	JUSTIFICATION (FROM (DELWP, 2020B) (DELWP, 2018B))
5. Regularly supports ² 20,000 or more waterbirds	Waterbird counts across the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site are very high (mostly due to the large numbers of birds supported by the Western Treatment Plant). Waterbird counts are inconsistent and monitoring effort has increased in recent years, but a sum of maximum annual abundance (data from BirdLife Australia, Atlas of Living Australia and DEECA Annual Summer Waterfowl Counts) indicates that the site has supported > 20,000 waterbirds every year since 1981 with a maximum of over 300,000 in 1993.
Relevance to study area / project: The study area does not contain sufficient habitat to support 20,000 or more waterbirds at any one time.	
6: Regularly supports 1% of the individuals in a population of one species or subspecies of waterbird	Data provided by BirdLife Australia and from the DEECA Annual Summer Waterfowl Counts, indicate that at the time of listing 13 species met this criterion. On the basis of more recent records (2000 to 2019) the site supports > 1 % of the population of 15 species: — Australasian shoveler <i>Anas rhynchotis</i> — Australian fairy tern <i>Sternula nereis nereis</i> — Australian pied oyster catcher <i>Haematopus longirostris</i> — Australian shelduck <i>Tadorna tadornoides</i> — Blue-billed duck <i>Oxyura australis</i> — Chestnut teal <i>Anas castanea</i> — Curlew sandpiper <i>Calidris ferruginea</i> — Double-banded plover <i>Charadrius bicinctus</i> — Hoary-headed grebe <i>Poliiocephalus poliocephalus</i> — Musk duck <i>Biziura lobata</i> — Pink-eared duck <i>Malacorhynchus membranaceus</i> — Red-necked stint <i>Calidris ruficollis</i> — Red-necked avocet <i>Recurvirostra novaehollandiae</i> — Sharp-tailed sandpiper <i>Calidris acuminata</i> — Straw-necked ibis <i>Threskiornis spinicollis</i>

² Regularly (Criteria 5 and 6) - as in supports regularly - a wetland regularly supports a population of a given size if:

- i. the requisite number of birds is known to have occurred in two thirds of the seasons for which adequate data are available, the total number of seasons being not less than three; or
- ii. the mean of the maxima of those seasons in which the site is internationally important, taken over at least five years, amounts to the required level (means based on three or four years may be quoted in provisional assessments only).

Source:

RELEVANT RAMSAR CRITERIA	JUSTIFICATION (FROM (DELWP, 2020B) (DELWP, 2018B))
	In addition, there is evidence that the site supports >1% of the population of Orange-bellied Parrot. Although not a waterbird, this species is highly significant due to its low population size and critically endangered status.
Relevance to study area / project: The wetland habitat within the study area is insubstantial in comparison to the habitat available in the Ramsar site and does not contain sufficient habitat or suitable habitat types to support >1% of any one species of waterbird. Of the species in the list above, several are likely to occur within the study area periodically or regularly in low numbers. The Ramsar overlap area is only likely to support very low numbers of some of the more common species in that list, such as Straw-necked Ibis, and does not meaningfully contribute to the Ramsar site meeting this criterion. The study area does not regularly support 1% of the individuals in a population of one species or subspecies of waterbird	
8: An important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.	The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site provides important habitats, feeding areas, dispersal and migratory pathways, and spawning sites for numerous fish species of direct and indirect fisheries significance. These fish have important fisheries resource values both within and external to the site. Important habitats include seagrass beds in Swan Bay, as well as Reedy Lake, Lake Connewarre, and the Barwon River Estuary.
Relevance to study area / project: The creeks in the study area are likely to support common species such as Short-finned Eels and may be part of their migratory route, however being small and modified and somewhat ephemeral, they are unlikely to support numbers of any great significance. There is no important nursery habitat within the study area. There is no important fish habitat within the Ramsar overlap area. The study area does not support an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend	

4 RECOMMENDATIONS

The Guidelines (DELWP, 2017c) 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 below, along with recommendations for further assessment that may be required, depending on the proposed PSP design.

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 LEVEL PLANNING

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 Cherry Creek, Lollipop 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. The buffer distance should be determined based on habitat value and visibility in consultation with Melbourne water and/or the Catchment Management Authority. Ensure that retained wetlands are allowed to experience current natural cycles of wetting and drying. From an ecological perspective the buffer of watercourses and wetlands should be to the order of around at least 20 m – 50 m, and retention should be combined with reinstatement/rehabilitation of these areas.
- At minimum, retain and improve areas of high quality remnant grassland. Avoid tree planting in these areas.
- Retain as many remnant trees and other areas of native vegetation as possible.

The above should be assessed to determine what is feasible for the precinct, to ensure that no feasible opportunities for further avoidance and minimisation are available.

Prioritisation of areas to avoid and minimise impacts has been mapped on Figure C5. Areas have been ranked in terms of retention priority based on the following:

- 1 High: areas which may support or contribute to EPBC Act listed values, higher quality remnant vegetation, or provide habitat for threatened species. Impacts to these areas may trigger EPBC Act referral. It is highly recommended that all these areas are retained if possible. These include large areas of remnant grassland, remnant trees, and watercourses and associated wetlands.

- 2 Medium: areas which should be considered for retention but which do not support values of as high significance. Includes isolated wetlands and ponds, and smaller, isolated areas of grassland. While they may still support some threatened species or be listed under the EPBC Act, they are less likely to trigger referral.
- 3 Low: areas which are unlikely to support any threatened species or other listed values. Not considered of value for retention, unless they are part of a buffer area, connectivity area, or are proposed for rehabilitation and revegetation.

We note that the above areas do not consider buffer areas which should be included for any habitat retained. Similarly, additional areas may be considered for retention for connectivity or to rehabilitate.

4.2 MITIGATION – DESIGN

The following measures are recommended for consideration in the design of the precinct:

- Consider retention of high priority areas as mapped in C5. High priority areas are higher quality understory, threatened ecological communities, large canopy trees, watercourses, habitat for threatened species.
- Incorporate planting of local indigenous species into precinct design, including shrubby species to provide habitat for small birds. Consider connectivity in design of parks and in planting plans.
- Improvement / restoration of natural watercourses and wetlands, and surrounding habitat in the precinct design. Planting of trees over wetlands should be done so that the mature woodland canopy does not exceed 15% cover, in order to minimise shading of habitat, which is non-preferred for many indigenous species. The restoration of watercourses and wetlands should incorporate buffer areas to the order of around at least 20 m – 50 m.
- Consider dog access to wetlands, incorporate strategic fencing where required. Minimise walking tracks close to sensitive habitat.
- Implement cat containment for the precinct with an associated education campaign.
- Allow and encourage tree regeneration in areas where remnant trees have been retained and improve retained habitat.
- 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 Werribee Treatment Plant.
- Consider noise impacts on wetland habitat. Minimise noisy roads nearby and utilise barriers where 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. This may incorporate alteration of the current Lollypop Creek channel through the project area as per scenario 3b (Jacobs, 2020a) – section 3.1.2.1.

Further exploration of mitigation will be required once a preliminary design has been developed.

4.3 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 .

4.3.1 MINIMISING LOSS OF VEGETATION, HABITAT AND CONNECTIVITY

4.3.1.1 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.

4.3.1.2 MINIMISING HABITAT DEGRADATION

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.

4.3.1.3 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, clearing 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).

4.3.1.4 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.

4.4 RECOMMENDATIONS FOR FURTHER SURVEY AND ASSESSMENT

The following further survey and assessment is recommended, depending on early precinct design and associated impacts:

- Undertake an aquatic ecological assessment of creeks and wetlands should any impacts to Cherry Creek or Lollipop Creek be considered in the design. This should include fish surveys and invertebrate observations to characterise the existing fauna community and habitat values.
- Consider undertaking another season of Golden Sun Moth survey across property 52, should impacts to these areas be considered. This is recommended as a precaution only, it is considered unlikely this species is present due to apparent habitat degradation as discussed in 3.2.4.5. It is a low possibility that although the species was not detectable during the 2021-22 season, it may still be present and detectable in a different season with more suitable conditions (lower biomass, warmer and drier weather etc).
- Similarly, additional years of Growling Grass Frog survey – depending on project timelines, would add data to improve the confidence of the likelihood of occurrence assessment, or detect the species should it re-occur when dispersing from nearby populations. While this is not necessarily required for approvals in the near future, surveying to a lesser extent – such as 1 site along Lollypop Creek, and 1 site along Cherry Creek, would assist in verification of current results depending on project timelines.
- Consider undertaking wetland bird surveys should impacts to Cherry Creek or Lollipop Creek and associated wetlands be proposed. This will assist refining the assessment of the value of this habitat to threatened and migratory bird species. This should include diurnal surveys through wetland habitat and adjacent grassy habitat in summer to flush any Latham's Snipe.
- A surface water hydrological assessment may be required to ensure that retained wetlands are allowed to experience current natural cycles of wetting and drying, and to ensure that the project does not impact the hydrology of the Ramsar site.
- Undertake impact assessment for the precinct based on the proposed design, once developed. This should include EPBC Act significant impact criteria assessments for species and communities listed under the Act. Additional assessment and implications under legislation and policy are discussed in Section 5.

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.

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

- 1 Listed threatened species and communities
- 1 Migratory Species
- 2 Wetlands of international importance

The potential for significant impacts is assessed further below. If a significant impact on any of these MNES is likely based on the precinct design, a referral to DCCEEW under the EPBC Act may be recommended. It is expected that significant impacts can be avoided through sensitive design.

5.1.1.1 THREATENED SPECIES AND COMMUNITIES

SPECIES

The EPBC Act listed threatened fauna species currently considered to have the potential to occur within the study area are:

- Australasian Bittern *Botaurus poiciloptilus* - Endangered
- White-throated Needletail - *Hirundapus caudacutus* - Vulnerable

- Australian Painted-snipe *Rostratula australis* - Endangered
- Grey-headed Flying-fox *Pteropus poliocephalus* - Vulnerable

Targeted surveys for Striped Legless Lizard *Delmar impar* – Vulnerable, did not detect this species, however as a precaution it may be necessary to assume possible presence at low numbers across property 52, and 19 due to being higher quality habitat.

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. Once a design is proposed, a significant impact assessment should be undertaken in accordance with the relevant Commonwealth significant impact criteria for those species with the potential to be impacted.

One EPBC Act listed flora species was identified on property 17 being the Large-headed Fireweed *Senecio macrocarpus* – Vulnerable. See mapping at C2.

Spiny Rice-flower *Pimelea spinescens subsp. spinescens* – EPBC Act Critically Endangered, was not observed during targeted surveys and is considered to have a low likelihood of occurrence.

COMMUNITIES

Two EPBC Act listed ecological communities occur within the study area:

- Natural Temperate Grassland of the Victorian Volcanic Plain – 6.158 ha – Critically Endangered.
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains – 1.242 ha – Critically Endangered.

An EPBC Act significant impact criteria assessment will be required based on the Commonwealth significant impact guidelines (DoEE, 2013) should impacts on either community be proposed. With the recommendations in Section 4, it may be possible to avoid a significant impact to one or both communities.

If impacts are likely to be significant, WSP would recommend the project be referred to the DCCEEW under the EPBC Act and Commonwealth Offsets may be required

MIGRATORY SPECIES

The EPBC Act listed migratory wetland-dependant species considered to have the potential to periodically utilise the study area are:

- Common Sandpiper
- Sharp-tailed Sandpiper
- Red-necked Stint
- Long-toed Stint
- Double-banded Plover
- Latham's Snipe
- Wood Sandpiper.

These species may visit wetlands associated with Cherry and Lollipop Creeks when conditions are right, and when they are present in Australia over the summer months. If present, these species would utilise the study area in low numbers only, due to the small extent and poor quality of the potential habitat in comparison to the high quality extensive habitat at the Werribee Treatment Plant nearby.

The only species which may be present in numbers warranting a significant impact criteria assessment is 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.

One other migratory bird may periodically occur at the study area: White-throated Needletail. This species is predominantly aerial and is likely to occasionally fly high above the study area, but is highly unlikely to be reliant on any habitat within the study area itself. A significant impact assessment for this species is not warranted.

5.1.1.2 WETLANDS OF INTERNATIONAL IMPORTANCE

The study area partly overlaps with one wetland of international importance (Ramsar site), *Port Phillip Bay (Western Shoreline) and Bellarine Peninsula*, as described in Section 3.2.5.

Based on a habitat assessment and examination of the Ramsar criteria which the site meets, the loss of the Ramsar overlap area or the study area as a whole would not affect the Ramsar site or contribute to its ability to meet the criteria. It is also unlikely to cause the study area to exceed the limits of acceptable change (LAC) for the Ramsar site, which are listed in the ecological character description for the Ramsar site (DELWP, 2020b). However, an assessment against the LAC should be undertaken based on an initial precinct design and should include consideration of noise, light, hydrology and other potential impacts aside from habitat loss. A significant impact criteria assessment should also be undertaken at this stage, based on the Commonwealth significant impact guidelines (DoEE, 2013). It is preliminarily considered unlikely that the project would significantly impact the Ramsar site, provided the recommendations in Section 4 are followed.

Even if significant impacts are unlikely, due to the way in which the study area overlaps a Ramsar site, referral to DCCEEW may be required. Once a preliminary design has been developed, it is preliminary recommended liaison with DCCEEW should occur for clarity.

5.1.2 MELBOURNE STRATEGIC ASSESSMENT

The Melbourne Strategic Assessment (MSA) evaluated the impacts on MNES listed under the EPBC Act and established measures to mitigate those impacts within the MSA area. The south-western region of the precinct is covered by the MSA, this corridor is reserved for the Outer Metropolitan Ring Road.

The MSA established an agreement between State and Federal governments to streamline environmental assessments and requirements under the EPBC Act and Victoria's Native Vegetation Management Framework (DEPI 2013a) (recently superseded by the Biodiversity Assessment Guidelines (DEPI 2013b), and the latest policy update to the Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines) (DELWP 2017d). The Biodiversity Conservation Strategy (BCS) was prepared in response to obligations arising from the MSA and is the overarching strategy for the protection of biodiversity in Melbourne's growth corridors. It sets out all the conservation measures required for MNES and to meet state requirements. In particular, the BCS sets out the requirements to provide fees and offsets for removal of native vegetation and threatened species habitat on land suitable for urban development within the BCS area (DEPI 2013a). The *Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020*, established a new Victorian legislative framework for the existing Melbourne Strategic Assessment program. It imposes a levy to fund mitigation measures for impacts on biodiversity caused by the development of Melbourne's growth corridors.

All actions located inside the MSA area are subject to a Part 10 (Section 146B) EPBC Act approval. These actions do not require an additional EPBC Act referral and/or assessment by the Commonwealth Government as they have already been assessed under the MSA's Strategic Impact Assessment Report which evaluated the impacts of the Victorian Government's urban development program on MNES.

To satisfy MSA requirements a habitat levy is payable to DEECAs MSA team in accordance with published rates as provided in below, prior to undertaking actions associated with urban development in the growth corridors.

All areas of the project that are outside this mapped MSA extent will still be subject to the normal legislative requirements with regards to the EPBC Act as per Section 5.1.1 above.

Native vegetation offsets as per the Guidelines are not considered to be required within MSA areas. Vegetation clearance within the MSA is considered accounted for by the habitat levy for areas triggering a levy event for 'Native Vegetation'. A Habitat levy paid for native vegetation within MSA areas are intended to satisfy 52.17 requirements for Timestamped areas of native vegetation.

DEECA reserves the right to determine the required habitat levy. The Werribee Junction Precinct, or development projects project will need to be registered for through DEECA's Native Vegetation Information Management (NVIM) system. A shapefile of impact area, the project footprint, is then uploaded accompanied by supporting documentation, being this technical report, and then the required Habitat Levy amount is returned by DEECA.

Table 5.1 MSA habitat compensation area fee prices

FEE TYPE	UNIT	NEW RATE AS OF 1 JULY 2020
Native Vegetation	Per hectare of native vegetation considered lost or removed	\$18,999
Scattered Tree	Per tree considered lost or removed	\$8,257
Growling Grass Frog	Per hectare of category 2 habitat considered lost or removed	\$8,257
Golden Sun Moth	Per hectare of habitat considered lost or removed	\$11,625
Matted Flax-lily	Per hectare habitat considered lost or removed	\$18,999

Source: <https://www.msa.vic.gov.au/regulatory-requirements/habitat-compensation>

The MSA mapshare portal – <https://mapshare.vic.gov.au/msa/map/> was queried to gain a levy liability estimate. The total amount payable is \$1,263,852.36 for the region reserved for the Outer Metropolitan Ring Road.

Table 5.2 levy estimate for areas within the MSA on properties 52, 48, 39.

HABITAT TYPE	AREA / LOCATIONS	APPLICABLE RATE	ESTIMATED SUBTOTAL
Native vegetation	6.325 ha	\$136,688	\$864,551.60
Scattered trees	0 trees	\$18,999	\$0
Golden Sun Moth	23.663 ha	\$12,773	\$302,247.50
Growling Grass Frog	4.673 ha	\$8,257	\$38,584.96
Matted Flax-lily	0 ha	\$11,625	\$0
Southern Brown Bandicoot	0 ha	\$4,309	\$0
Total			\$1,263,852.36

Source: <https://mapshare.vic.gov.au/msa/map/>

5.2 STATE

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) (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.

The assessments are provided in Table 5.3 (individual criteria – one triggers referral of the project) and Table 5.4 (combined criteria – two or more triggers referral of the project).

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

Table 5.3 Individual potential environmental effects – one criteria needs to be met to trigger a referral

INDIVIDUAL CRITERIA	RATIONALE
Potential clearing of 10 ha or more of native vegetation from an area that: is of an Ecological Vegetation Class (EVC) identified as endangered; or is, or is likely to be, of very high conservation significance; and is not authorised under an approved Forest Management Plan or Fire Protection Plan.	Potential for criteria to be met 35.591 ha of EVC identified as endangered is present within the study area. Impacts will depend on the proposed design.

INDIVIDUAL CRITERIA	RATIONALE
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 for criteria to be met It is possible that the occurrences of Large-headed fireweed <i>Senecio macrocarpus</i> listed as critically endangered in Victoria may be considered 2 – 5% of the extant population of this species. The study area is unlikely that the study area supports 2-5 % of any other known remaining habitat or population of a threatened species in Victoria.
Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in ‘A Directory of Important Wetlands in Australia’.	Unlikely for criteria to be met Refer to section 3.2.5 and 5.1.1.2. It is unlikely that the project will result in long-term change to the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site. No other important wetlands are present within or nearby the study area.
Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.	Unlikely for criteria to be met With the recommendations in Section 4 the project is unlikely to have major effects on aquatic ecosystems. Further assessment may be warranted if impacts to aquatic and wetland habitat are not avoided.
Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences.	Not assessed
Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.	Not assessed

Table 5.4 Combined potential environmental effects – two or more need to be met to trigger a referral

COMBINED CRITERIA	RATIONALE
Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan.	Potential for criteria to be met 27.072 ha of native vegetation was recorded within the study area. Impacts will depend on the design.
Matters listed under the <i>Flora and Fauna Guarantee Act 1988</i> (FFG Act): — Potential loss of a significant area of a listed ecological community; or — Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or — Potential loss of critical habitat; or	Potential for criteria to be met 19.814 ha of FFG Act listed communities was recorded within the study area. Impacts will depend on the design. To date, no Critical Habitat Determinations have been produced in Victoria. However, it is possible that habitat for Small Large-headed Fireweed <i>Senecio macrocarpus</i> across Property 17 may be considered critical habitat for this species. Although there are other several listed fauna species likely to regularly or periodically occur in the study area it is unlikely that the project would result in loss of a genetically important

COMBINED CRITERIA	RATIONALE
— Potential significant effects on habitat values of a wetland supporting migratory bird species.	population of a threatened species, or the loss of critical habitat. Nevertheless, impacts on key habitat for these species should be avoided. Impacts on habitat values of a wetland supporting migratory bird species may occur, depending on the design. Waterbird surveys could be undertaken to further inform this.
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.	Not assessed
Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term.	Not assessed
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.	Not assessed
Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities.	Not assessed
Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development.	Not assessed
Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.	Not assessed
Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.	Not assessed
Potential extensive or major effects on Aboriginal cultural heritage.	Not assessed
Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.	Not assessed

5.2.2 FLORA AND FAUNA GUARANTEE ACT 1988 (FFG ACT)

The Victorian 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

and communities which occur or are likely to occur in the study area are detailed in Sections 3.2.3.2 (communities), 3.2.2.4 & 3.2.2.5 (flora) and 3.2.4.5 (fauna).

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.

The FFG Amendment Act 2019 came into effect on 1 June 2020. As part of the amendments, all taxa of flora and fauna listed under the FFG Act, along with all taxa on the DEECA Advisory lists (except those that are ‘poorly known’ or ‘near threatened’) and any taxa nominated by public submissions, were assessed in accordance with the common assessment method by a Scientific Advisory Committee overseen by DEECA. This process was completed with the gazetting of a new list in May 2021, which was published by DEECA in June 2021, with listings subsequently within the VBA in July 2021.

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 would be required for impacts FFG Act listed species and communities across the Melbourne Water land – properties 39.42 & 52.

Should impacts to native vegetation on the Melbourne Water land in the western part of the study area be proposed a permit is likely to be required for protected flora.

It should be noted that higher quality remnant grassland was very high with regards to biomass levels. It is possible that some small species occur throughout higher quality grassland such as across property 48 and property 17. Species thought possible to occur based on the desktop assessment include Cut-leaf Burr-daisy *Calotis anthemoides* – FFG Act critically endangered, Small Milkwort *Comesperma polygaloides* – FFG Act critically endangered and Small Scurf-pea *Cullen parvum* – FFG Act endangered. Similarly, it is possible that targeted surveys did not detect species possibly present in low numbers across property 48 Striped Legless Lizard *Delma impar* – FFG Act endangered, and Spiny Rice Flower *Pimelea spinescens subsp. spinescens* – FFG Act critically endangered.

5.2.2.1 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, 2020a).

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. However, it is possible that habitat for Small Large-headed Fireweed *Senecio macrocarpus* across Property 17 may be considered critical habitat for this species. Large-headed Fireweed *Senecio macrocarpus* is found in higher quality grassland, of which less than 5 % of its original extent remains (DSEWPaC, 2011b), there are 88 records of this species within 20 km of property 17 (DELWP, 2021b). In this instance, it is possible, if this area is to be impacted, a HCO may be made by the State Minister for Environment. It is unlikely any other habitat across Werribee Junction Precinct would be considered critical habitat for any other FFG Act listed species. Further assessment regarding the occurrence of this species on property 17 may be undertaken by DEECA.

It is unlikely any other habitat across Werribee Junction Precinct would be considered critical habitat for any other FFG Act listed species.

5.3 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).

FFG Act Action Statements are available at <https://www.environment.vic.gov.au/conserving-threatened-species/action-statements>, and will be considered if impacts to FFG Act listed species and communities cannot be avoided.

The conservation of FFG Act listed species and communities is considered above in section 4.3.1.3. The VPA would consider these conservation and mitigation recommendations, aligning with the objectives of the FFG Act, as per their Public Authority Duty.

5.3.1 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 Wyndham Planning Scheme of relevance to ecological matters are discussed below.

5.3.1.1 PLANNING ZONES AND OVERLAYS

ZONES

The study area is zoned Farming Zone – FZ1 in the eastern regions, Special Use Zone FZ6 across the refuse area and quarry. And Public Use Zone PUZ1 across the WPT properties at the south-west. No zonation pertains to ecological matters.

OVERLAYS

Much of the floodplain is covered by Environmental Significance Overlay ESO1. this area is somewhat consistent with flood modelling undertaken for this project (Jacobs, 2020b).

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

The Guidelines (DELWP, 2017c) 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*.

5.3.1.1 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, 2017c). 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 5.5.

Table 5.5 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, 2017c)*

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 statewide 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 Appendix C
 - 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.

5.3.1.2 NATIVE VEGETATION REMOVAL REPORT

EnSym testing has been undertaken to give an indication of maximum impacts and offset requirements. EnSym testing indicates that impacts equate to a 40.157 ha extent, as per EnSym data standards (DELWP, 2017b). Offsets requirements for this is detailed in Table 5.6 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 impacts, a NVR report will need to be sourced from DEECA to officiate clearance and offset requirements.

Table 5.6 Summarised vegetation clearance calculations and offset requirements

VEGETATION CLEARANCE	
Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	40.157 ha
Extent of past removal	0
Extent of proposed removal	40.157 ha
No. Large trees proposed to be removed	75
Location category	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species. The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map); and a wetland designated under the Convention on Wetlands of International Importance (the Ramsar Convention).

VEGETATION CLEARANCE	
OFFSET REQUIREMENTS (IF PERMIT WAS GRANTED)	
General offset amount ¹	0.942 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Wyndham City Council
Minimum strategic biodiversity value score ²	0.361
Large trees*	7 large trees
Species offset amount ³	19.630 species units of habitat for Prickly Arrowgrass, <i>Triglochin mucronata</i> 9.813 species units of habitat for Red-chested Button-quail, <i>Turnix pyrrhorostrax</i> 19.930 species units of habitat for Small Golden Moths, <i>Diuris basaltica</i> 20.088 species units of habitat for Heath Spear-grass, <i>Austrostipa exilis</i> 0.272 species units of habitat for Sunshine Diuris, <i>Diuris fragrantissima</i>
Large trees*	59 Trees
* The total number of large trees that the offset must protect	75 large trees to be protected in either the general, species or combination across all habitat units protected

Source: EnSym report dated 29/03/2022 - Appendix E

- 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.

5.3.1.3 OFFSETTING REQUIREMENTS

The offset target for clearance of all vegetation across the precinct would require a small amount of General Habitat Units, although this is in addition to 5 lots of Species Units requirements ranging from 0.272 Species Units for Sunshine Diuris, *Diuris fragrantissima*, up to 20.888 Species Units for Heath Spear-grass *Austrostipa exilis*, and 75 Large Trees. 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.

5.3.1.4 PREPARING AN NVPP

Sections 2.3 and 2.4 of *Preparing a Native Vegetation Precinct Plan* (DELWP, 2017d) detail the rationale 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 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 5.7 below. Due to the possible clearance of high value remnant vegetation, over numerous lots, an NVPP may be considered required for the Werribee Junction PSP.

Table 5.7 Requirement for an NVPP – Werribee Junction Precinct Structure Plan

NVPP PURPOSE	WERRIBEE JUNCTION NVPP REQUIREMENT
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 supported by the study area. Recommend design considered corridors and links where possible.
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 vegetation loss is considered to be 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. The appropriateness of 1 st party offsets, and 3 rd party offsets is also yet to be determined.
A precinct contains a number of properties and land managers and an NVPP is needed to coordinate development and native vegetation management.	Numerous properties involved. It may be appropriate to undertake an NVPP for Werribee Junction.

5.3.1.5 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, 2017c).

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.

5.3.2 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*.

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 must have a current management authorisation under this Act.

5.3.3 CATCHMENT AND LAND PROTECTION ACT 1994 (CALP ACT)

5.3.3.1 DECLARED NOXIOUS WEEDS

The project area supports a number of 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).

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.

Regionally prohibited weeds are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land.

The field survey identified that study area supports seven regionally controlled (C) and five restricted weeds (R) and one prohibited weed (P). These weeds are listed in Table 5.8 below. Measures to control both noxious weeds and pest animals during construction must be contained within the CEMP.

Table 5.8 CaLP Act weed species recorded within the study area

SCIENTIFIC NAME	COMMON NAME	CALP ACT
<i>Carthamus lanatus</i>	Saffron Thistle	C
<i>Cirsium vulgare</i>	Spear Thistle	C
<i>Echium plantagineum</i>	Paterson's Curse	C
<i>Lycium ferocissimum</i>	African Box-thorn	C
<i>Marrubium vulgare</i>	Horehound	C
<i>Rosa rubiginosa</i>	Sweet Briar	C
<i>Xanthium spinosum</i>	Bathurst Burr	C
<i>Nassella trichotoma</i>	Serrated Tussock	P
<i>Foeniculum vulgare</i>	Fennel	R
<i>Lepidium draba</i>	Hoary Cress	R
<i>Nassella neesiana</i>	Chilean Needle-grass	R
<i>Opuntia stricta</i>	Common Prickly-pear	R
<i>Oxalis pes-caprae</i>	Soursob	R

6 CONCLUSION

6.1 SUMMARY OF FINDINGS

A desktop assessment and series of field surveys were undertaken within the study area for the proposed project. These informed recommendations for the proposed precinct and an assessment of likely regulatory and legislative implications of the project.

The study area is, in general, highly modified from its likely condition pre-European settlement, which would have been a biodiverse grassland with some swampy and grassy woodland and areas of wetland. Currently within the study area the remnant understory has been highly modified by weeds and agricultural utilisation. However, areas of remnant grassland remain in several areas, and a number of large remnant trees also persist. The study area supports wetland habitat along creeks and drainage lines and in dams, including some small areas of moderate quality which may support a number of wetland bird species and other fauna including some species listed under the EPBC Act and/or FFG Act. No threatened flora species are likely to occur in the study area.

Overall, 27.072 ha of native vegetation occur across 115 patches mapped within the study area, the majority of these are endangered EVCs. Most of the vegetation mapped is attributed to Plains Grassland Lighter Soils – EVC 132 62. There were 110 canopy trees mapped with the study area, 76 trees are large as per the most appropriate EVC benchmark, with 28 occurring within patches.

Two TECs listed under the EPBC Act occur across 5 patches within the study area:

- ‘*Natural Temperate Grassland of the Victorian Volcanic Plain*’ – 6.158 ha – Critically Endangered.
- ‘*Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains*’ – 0.532 ha – Critically Endangered.

There are seven EPBC Act listed threatened fauna species, and one, potentially two EPBC Act listed threatened flora species supported by the study area. If impacts to these species or communities cannot be avoided a referral under the EPBC Act may be recommended.

An area in the south-west of the study area is covered by Ramsar, albeit of low habitat value, if impacts to this area is proposed it is likely a referral under the EPBC Act may be recommended.

There are numerous flora and fauna species Listed under the FFG Act observed or considered likely to occur. In total, 19.814 ha of FFG Act listed communities was recorded within the study area.

The maximum offset target, to satisfy clause 52.17 of the Planning Scheme, for the precinct is for a small amount of General Habitat Units in addition to 5 lots of Species Units requirements ranging from 0.27 2 Species Units for Sunshine Diuris, *Diuris fragrantissima*, up to 20.888 Species Units for Heath Spear-grass *Austrostipa exilis*, and 75 Large Trees.

Due to the possible clearance of high value remnant vegetation, over numerous lots, a NVPP may be considered required for the Werribee Junction PSP by the responsible authority.

There would be a total habitat levy payable of \$1,263,852.36 for impacts within the MSA, this would be to the region reserved for the Outer Metropolitan Ring Road.

6.2 RECOMMENDATIONS AND IMPLICATIONS

Recommendations are provided in Section 5 which detail:

- Recommended avoidance and minimisation measures for the precinct, including prioritisation of areas for retention. Highest priority has been assigned to retention of creeks and associated wetlands, large areas of remnant grassland, threatened ecological communities and remnant trees.

- Recommended mitigation measures for the design of the precinct, including for lighting, protection of retained habitat, and revegetation
- Recommended measures for all construction within the precinct including vegetation and habitat protection measures, noise and lighting, water quality impacts, weed management, and fauna management
- Recommendations for further survey and assessment which would help to determine the impacts of any proposed development, including wetland bird survey, hydrological assessment, aquatic ecological survey, and impact assessment

Implications for the project under relevant legislation and policy have been preliminarily assessed. The following has been determined and will need to be reassessed following initial precinct design:

- Significant impact assessment will be required based on the proposed impacts. If a significant impact on any matter of national environmental significance is likely, a referral to DCCEEW under the EPBC Act will be required.
- Assessing against both individual and cumulative criteria set out in the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE, 2006), an EES referral is unlikely to be triggered based on ecological matters, provided the recommendations in Section 5 are followed.
- A permit under the FFG Act is unlikely to be required, unless impacts are proposed on public land. VPA have an obligation under the FFG Act as public authorities and ministers to consider potential biodiversity impacts when exercising their functions. It is recommended consideration be given to conservation of FFG Act listed species and communities.
- A planning permit will be required along with offsets for the native vegetation being impacted. The offset area will depend on the extent of impacts. Avoidance and minimisation of native vegetation impacts is highly recommended to reduce offset requirements and reduce the likelihood of requiring species offsets.

The offset target for this project is for a small amount of General Habitat Units in addition to 5 lots of Species Units requirements ranging from 0.27 2 Species Units for Sunshine Diuris, *Diuris fragrantissima*, up to 20.888 Species Units for Heath Spear-grass, *Austrostipa exilis*, and 75 Large Trees. Large trees and 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.

7 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (*WSP*) to Victorian Planning Authority (*Client*) in response to specific instructions from the Client and in accordance with WSP's proposal under the Consultancy Agreement between WSP and the Client signed 28 September 2021.

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.

WSP has prepared the Report without regard to any special interest of any person other than the Client when undertaking the services described in the Agreement or in preparing the Report.

USE AND RELIANCE

This Report should be read in its entirety and must not be copied, distributed or referred to in part only. The Report must not be reproduced without the written approval of WSP. WSP will not be responsible for interpretations or conclusions drawn by the reader. This Report (or sections of the Report) should not be used as part of a specification for a project or for incorporation into any other document without the prior agreement of WSP.

WSP is not (and will not be) obliged to provide an update of this Report to include any event, circumstance, revised Information or any matter coming to WSP's attention after the date of this Report. Data reported, and Conclusions drawn are based solely on information made available to WSP at the time of preparing the Report. The passage of time; unexpected variations in ground conditions; manifestations of latent conditions; or the impact of future events (including (without limitation) changes in policy, legislation, guidelines, scientific knowledge; and changes in interpretation of policy by statutory authorities); may require further investigation or subsequent re-evaluation of the Conclusions.

The Report does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise. It is the responsibility of the Client to accept (if the Client so chooses) any Conclusions contained within the Report and implement them in an appropriate, suitable and timely manner.

In the absence of express written consent of WSP, no responsibility is accepted by WSP for the use of the Report in whole or in part by any party other than the Client for any purpose whatsoever. Without the express written consent of WSP, any use which a third party makes of this Report or any reliance on (or decisions to be made) based on this Report is at the sole risk of those third parties without recourse to WSP. Third parties should make their own enquiries and obtain independent advice in relation to any matter dealt with or Conclusions expressed in the Report.

DISCLAIMER

No warranty, undertaking or guarantee whether expressed or implied, is made with respect to the data reported or the Conclusions drawn. To the fullest extent permitted at law, WSP, its related bodies corporate and its officers, employees and agents assumes no responsibility and will not be liable to any third party for, or in relation to any losses, damages or 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.

8 REFERENCES

- ARUP 2021a. Ecology assessment: Spiny Rice-flower findings for the proposed Ison Road Overpass
- ARUP 2021b. Ecology assessment: Spiny Rice-flower findings for the proposed Ison Road Overpass
- ARUP 2022a. Ison Road Overpass Ecological Existing Conditions Report
- ARUP 2022b. Ison Road Overpass; Ecological Existing Conditions Report
- BIOSIS 2018. Youth Justice Centre, Cherry Creek: EPBC Act (2017/8049) Natural Temperate Grassland of the Victorian Volcanic Plain and Golden Sun Moth Offset Management Plan: 346 Carngham Streatham Road Chepstowe
- CLEMAN, N. & GILLESPIE, G. R. 2012. National Recovery Plan for the Southern Bell Frog *Litoria raniformis*. In: DEPARTMENT OF SUSTAINABILITY AND ENVIRONMENT (ed.). Melbourne.
- COMMONWEALTH OF AUSTRALIA 2016. Ramsar Wetlands of Australia. Department of the Environment and Energy with data compiled through cooperative efforts of the States/Territories Government wetland agencies
- DAWE 2020. Species Profile and Threats Database (SPRAT). In: COMMONWEALTH DEPARTMENT OF AGRICULTURE, W. A. T. E. (ed.). Online.
- DAWE. 2021. *Protected Matters Seach Tool* [Online]. Department of Agriculture, Water and the Environment. [Accessed].
- DCCEEW 2021. Conservation Advice for *Synemon plana* (Golden Sun Moth). Australian Government Department of Agriculture, Water and the Environment.
- DELWP 2016. EVC Benchmarks for Vegetation Quality Assessment. Department of Environment Land Water and Planning.
- 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. Guidelines for the removal, destruction or lopping of native vegetation. Department of Environment Land Water and Planning.
- DELWP 2017d. Preparing a Native Vegetation Precinct Plan. In: PLANNING, D. O. E. L. W. A. (ed.).
- DELWP 2018a. Assessor's handbook: Applications to remove, destroy or lop native vegetation. Department of Environment Land Water and Planning.
- DELWP 2018b. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Management Plan Summary. Department of Environment, Land, Water and Planning, East Melbourne.
- DELWP 2020a. Flora and Fauna Guarantee Act 1988; Critical habitat and habitat conservation orders. In: DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).
- DELWP 2020b. Port Phillip Bay (Western Shoreline) & Bellarine Peninsula Ramsar Site Ecological Character Description. State of Victoria Department of Environment, Land, Water and Planning.
- DELWP 2021a. Flora and Fauna Guarantee Act 1988; Public authority duty. In: DEPARTMENT OF ENVIRONMENT, L., WATER AND PLANNING (ed.).
- DELWP. 2021b. *Victorian Biodiversity Atlas (VBA)* [Online]. East Melbourne: Department of Environment, Land, Water and Planning. Available: <https://vba.dse.vic.gov.au/vba/> [Accessed].
- 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 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.
- DSE 2010. Biodiversity Precinct Planning Kit East Melbourne: 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 Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland. In: DEPARTMENT OF SUSTAINABILITY , E., WATER, POPULATIONS AND COMMUNITIES (ed.). Commonwealth of Australia.
- EHP 2018a. 3.1.2.3 EXISTING ECOLOGICAL CONDITIONS REPORT: WERRIBEE JUNCTION PRECINCT STRUCTURE PLAN
- EHP 2018b. Existing Ecological Conditions Report: Werribee Junction Precinct Structure Plan.
- EHP 2021a. Avalon Corridor Strategy: Existing Conditions Report, Flora and Fauna.
- EHP. 2021b. *Growling Grass Frog monitoring sites 2020/21 Western Treatment Plant - draft*. Ecology and Heritage Partners.
- ENSBEY, R. & JOHNSON, A. 2009. *Noxious and Environmental Weed Control Handbook, A Guide to Weed Control in Non-crop, Aquatic and Bushland Situations. 4th Edition*, NSW Department of Primary Industries.
- HAMER, A. J. & ORGAN, A. 2008. Aspects of the ecology and conservation of the growling grass frog *Litoria raniformis* in an urban-fringe environment, southern Victoria. Proceedings of the Biology and Conservation of Bell Frogs Conferenc. . *Australian Zoologist* 34, 393-407.
- HEARD, G., MCCARTHY, M. 2012. Metapopulation viability of the Growling Grass Frog in Melbourne's urban growth areas. In: PREPARED FOR BIODIVERSITY AND ECOSYSTEMS SERVICES DIVISION, D. O. S. A. E. (ed.). Melbourne.
- HEARD, G., ROBERTSON, P. & SCROGGIE, M. 2004. The ecology and conservation status of the growling grass frog (*Litoria raniformis*) within the Merri Creek Corridor. *Second report: additional field surveys and site monitoring*.
- HEARD, G., SCROGGIE, M., CLEMANN, N. & RAMSEY, D. S. L. 2014. Wetland characteristics influence disease risk for a threatened Amphibian. In *Ecological Applications*, 24 650-662.
- JACOBS 2020a. Werribee Junction Precinct Structure Plan Area – Hydrologic Impact Assessment.
- JACOBS 2020b. Werribee Junction PSP Riparian Environmental Values Assessment; re-planning for Waterways in the Werribee Junction Precinct Structure Plan Area
- NEARMAP 2022. Nearmap. In: NEARMAP (ed.).

- 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.
- RBGV. 2022. *VicFlora - Flora of Victoria {online}* [Online]. Royal Botanic Gardens Victoria Available: <https://vicflora.rbg.vic.gov.au/> [Accessed 29/10/2022 2022].
- 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].
- ROYAL BOTANIC GARDENS OF VICTORIA 2021. Vicflora: Flora of Victoria.
- TSSC 2008. Commonwealth Listing Advice on Natural Temperate Grassland of the Victorian Volcanic Plain,. *In*: DEPARTMENT OF THE ENVIRONMENT, W., HERITAGE AND THE ARTS., (ed.).
- 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.
- TTSC 2008. Commonwealth Conservation Advice on Grassy Eucalypt Woodland of the Victorian Volcanic Plain. Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/46-conservation-advice.pdf>. In effect under the EPBC Act from 25-Jun-2009. .

APPENDIX A

SURVEY DATA

A1.1 FLORA SPECIES LIST

Table A.1 Flora species observed on site

ORIGIN	SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	CALP ACT
	<i>Acacia dealbata</i>	Silver Wattle		-
	<i>Acacia melanoxylon</i>	Blackwood		-
	<i>Acacia pycnantha</i>	Golden Wattle	P	-
	<i>Acaena echinata</i>	Sheep's Burr		-
	<i>Alisma plantago-aquatica</i>	Water Plantain		-
	<i>Alternanthera denticulata s.l.</i>	Lesser Joyweed		-
	<i>Amphibromus neesii</i>	Southern Swamp Wallaby-grass		-
*	<i>Arctotheca calendula</i>	Cape weed		-
*	<i>Artemisia verlotiorum</i>	Chinese Wormwood		-
	<i>Asperula conferta</i>	Common Woodruff		-
	<i>Atriplex paludosa subsp. paludosa</i>	Marsh Saltbush	en	-
*	<i>Atriplex prostrata</i>	Hastate Orache		-
	<i>Atriplex semibaccata</i>	Berry Saltbush		-
	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass		-
*	<i>Avena barbata</i>	Bearded Oat		-
*	<i>Avena fatua</i>	Wild Oat		-
	<i>Azolla filiculoides</i>	Azolla		-
*	<i>Berkheya rigida</i>	African Thistle		-
	<i>Bolboschoenus caldwellii</i>	Salt Club-sedge		-
	<i>Bolboschoenus medianus</i>	Marsh Club-sedge		-
*	<i>Briza minor</i>	Lesser Quaking-grass		-
*	<i>Bromus catharticus var. catharticus</i>	Prairie Grass		-
*	<i>Bromus hordeaceus</i>	Soft Brome		-
*	<i>Bromus rubens</i>	Red Brome		-
	<i>Calocephalus citreus</i>	Lemon Beauty-heads	P	-
*	<i>Carduus pycnocephalus</i>	Slender Thistle		-
	<i>Carex inversa</i>	Knob Sedge		-
*	<i>Carthamus lanatus</i>	Saffron Thistle		C
*	<i>Cassinia sifton</i>	Drooping Cassinia		-
*	<i>Casuarina cunninghamiana subsp. cunninghamiana</i>	River Oak		-
	<i>Chloris truncata</i>	Windmill Grass		-
*	<i>Cirsium vulgare</i>	Spear Thistle		C
	<i>Convolvulus angustissimus</i>	Blushing Bindweed		-
	<i>Convolvulus angustissimus subsp. omnigracilis</i>	Slender Bindweed		-
*	<i>Cotula coronopifolia</i>	Water Buttons		-
	<i>Crassula helmsii</i>	Swamp Crassula		-

ORIGIN	SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	CALP ACT
*	<i>Cynara cardunculus subsp. flavescent</i>	Artichoke Thistle		-
*	<i>Cynodon dactylon var. dactylon</i>	Couch		-
*	<i>Cyperus eragrostis</i>	Drain Flat-sedge		-
*	<i>Dactylis glomerata</i>	Cocksfoot		-
	<i>Dianella revoluta s.l.</i>	Black-anther Flax-lily		-
*	<i>Echium plantagineum</i>	Paterson's Curse		C
*	<i>Ehrharta erecta</i>	Panic Veldt-grass		-
*	<i>Ehrharta longiflora</i>	Annual Veldt-grass		-
	<i>Einadia nutans</i>	Nodding Saltbush		-
	<i>Eleocharis acuta</i>	Common Spike-sedge		-
	<i>Eleocharis gracilis</i>	Slender Spike-sedge		-
	<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush		-
	<i>Epilobium hirtigerum</i>	Willow Herb		
	<i>Epilobium billardierianum</i>	Variable Willow-herb		-
	<i>Epilobium gunnianum</i>	Gunn's Willow-herb		-
#	<i>Eucalyptus botryoides</i>	Southern Mahogany		-
	<i>Eucalyptus camaldulensis</i>	River Red-gum		-
#	<i>Eucalyptus leucoxylon</i>	Yellow Gum		-
	<i>Eucalyptus polyanthemus</i>	Red Box		-
#	<i>Euphorbia drummondii s.l.</i>	Flat Spurge		-
*	<i>Foeniculum vulgare</i>	Fennel		R
*	<i>Fraxinus angustifolia</i>	Desert Ash		-
*	<i>Galenia pubescens var. pubescens</i>	Galenia		-
*	<i>Galium aparine</i>	Cleavers		-
	<i>Goodenia gracilis</i>	Slender Goodenia		
	<i>Haloragis heterophylla</i>	Varied Raspwort		-
*	<i>Helminthotheca echioides</i>	Ox-tongue		-
*	<i>Hesperocyparis macrocarpa</i>	Monterey Cypress		-
*	<i>Hypochaeris radicata</i>	Flatweed		-
	<i>Juncus amabilis</i>	Hollow Rush		-
	<i>Juncus radula</i>	Hoary Rush		-
	<i>Juncus sarophorus</i>	Broom Rush		-
	<i>Juncus subsecundus</i>	Finger Rush		-
*	<i>Kickxia elatine</i>	Hairy Toadflax		-
	<i>Lachnagrostis filiformis s.l.</i>	Common Blown-grass		-
*	<i>Lactuca serriola</i>	Prickly Lettuce		-
	<i>Laphangium luteoalbum</i>	Jersey Cudweed	P	-
	<i>Lemna disperma</i>	Common Duckweed		-
*	<i>Leontodon saxatilis subsp. saxatilis</i>	Hairy Hawkbit		-
*	<i>Lepidium africanum</i>	Common Peppergrass		-
*	<i>Lepidium draba</i>	Hoary Cress		R
*	<i>Lolium rigidum</i>	Wimmera Rye-grass		-
*	<i>Lycium ferocissimum</i>	African Box-thorn		C

ORIGIN	SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	CALP ACT
	<i>Lythrum hyssopifolia</i>	Small Loosestrife		-
*	<i>Lythrum junceum</i>	Mediterranean Loosestrife		-
*	<i>Malus pumila</i>	Apple		-
*	<i>Marrubium vulgare</i>	Horehound		C
	<i>Marsilea drummondii</i>	Common Nardoo		-
*	<i>Medicago polymorpha</i>	Burr Medic		-
#	<i>Melaleuca armillaris subsp. armillaris</i>	Giant Honey-myrtle	En - planted	-
	<i>Melaleuca lanceolata</i>	Moonah		-
	<i>Melicytus dentatus s.l.</i>	Tree Violet		-
*	<i>Modiola caroliniana</i>	Red-flower Mallow		-
*	<i>Nassella hyalina</i>	Cane Needle-grass		-
*	<i>Nassella neesiana</i>	Chilean Needle-grass		R
*	<i>Nassella trichotoma</i>	Serrated Tussock		P
*	<i>Opuntia stricta</i>	Common Prickly-pear		R
	<i>Oxalis exilis</i>	Shade Wood-sorrel		-
	<i>Oxalis perennans</i>	Grassland Wood-sorrel		-
*	<i>Oxalis pes-caprae</i>	Soursob		R
	<i>Panicum decompositum</i>	Native Millet		
*	<i>Paspalum dilatatum</i>	Paspalum		-
*	<i>Paspalum distichum</i>	Water Couch		-
	<i>Persicaria decipiens</i>	Slender Knotweed		-
*	<i>Phalaris aquatica</i>	Toowoomba Canary-grass		-
*	<i>Phalaris minor</i>	Lesser Canary-grass		-
*	<i>Plantago coronopus</i>	Buck's-horn Plantain		-
*	<i>Plantago lanceolata</i>	Ribwort		-
	<i>Poa labillardierei var. labillardierei</i>	Common Tussock-grass		-
*	<i>Polygonum aviculare s.l.</i>	Prostrate Knotweed		-
*	<i>Polypogon monspeliensis</i>	Annual Beard-grass		-
*	<i>Populus alba</i>	White Poplar		-
	<i>Potamogeton crispus</i>	Curly Pondweed		-
*	<i>Ranunculus sceleratus subsp. sceleratus</i>	Celery Buttercup		-
*	<i>Raphanus raphanistrum</i>	Wild Radish		-
	<i>Rhagodia candolleana subsp. candolleana</i>	Seaberry Saltbush		-
#	<i>Rhagodia parabolica</i>	Fragrant Saltbush	vu	-
*	<i>Romulea rosea</i>	Onion Grass		-
*	<i>Rosa rubiginosa</i>	Sweet Briar		C
	<i>Rumex bidens</i>	Mud Dock		-
	<i>Rumex brownii</i>	Slender Dock		-
*	<i>Rumex conglomeratus</i>	Clustered Dock		-
*	<i>Rumex crispus</i>	Curled Dock		-
	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass		-

ORIGIN	SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	CALP ACT
	<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass		-
	<i>Rytidosperma erianthum</i>	Hill Wallaby-grass		-
	<i>Rytidosperma racemosum</i> var. <i>racemosum</i>	Slender Wallaby-grass		-
	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass		-
*	<i>Salix babylonica</i> s.l.	Weeping Willow		-
*	<i>Salvia verbenaca</i>	Wild Sage		-
	<i>Schoenoplectus tabernaemontani</i>	River Club-sedge		-
	<i>Senecio macrocarpus</i>	Large-headed Fireweed	VU cr P	-
	<i>Senecio quadridentatus</i>	Cotton Fireweed	P	-
*	<i>Sisymbrium officinale</i>	Hedge Mustard		-
*	<i>Sonchus oleraceus</i>	Common Sow-thistle		-
*	<i>Symphyotrichum subulatum</i>	Aster-weed		-
	<i>Tetragonia tetragonioides</i>	New Zealand Spinach		-
	<i>Themeda triandra</i>	Kangaroo Grass		-
*	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover		-
*	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover		-
*	<i>Trifolium fragiferum</i> var. <i>fragiferum</i>	Strawberry Clover		-
*	<i>Triglochin scilloides</i>	Lilaea		-
	<i>Typha domingensis</i>	Cumbungi		
*	<i>Ulmus glabra</i>	Wych Elm		-
*	<i>Urtica urens</i>	Small Nettle		-
*	<i>Verbascum thapsus</i> subsp. <i>thapsus</i>	Great Mullein		-
*	<i>Vicia sativa</i>	Common Vetch		-
	<i>Vittadinia cervicalis</i>	Annual New Holland Daisy	P	-
	<i>Vittadinia cuneata</i>	Fuzzy New Holland Daisy	P	-
*	<i>Vulpia bromoides</i>	Squirrel-tail Fescue		-
*	<i>Vulpia myuros</i>	Rat's-tail Fescue		-
	<i>Walwhalleya proluta</i>	Rigid Panic		-
*	<i>Xanthium spinosum</i>	Bathurst Burr		C

Conservation Status used in the table above:

Conservation Status in Australia

Listing under the federal *Environment Protection and Biodiversity Conservation Act 1999*

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

A1.2 FAUNA SPECIES LIST

The following table provides the list of vertebrate fauna species recorded incidentally during surveys. No threatened or migratory species were recorded.

Table A.2 Fauna species observed on site

ORIGIN	COMMON NAME	SCIENTIFIC NAME
	Australasian Pipit	<i>Anthus novaeseelandiae</i>
	Australian Magpie	<i>Gymnorhina tibicen</i>
	Australian White Ibis	<i>Threskiornis molucca</i>
	Black Kite	<i>Milvus migrans</i>
	Black-shouldered Kite	<i>Elanus axillaris</i>
	Brown Quail	<i>Coturnix ypsilophora australis</i>
	Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>
	Common Froglet	<i>Crinia signifera</i>
*	Common Starling	<i>Sturnus vulgaris</i>
*	Eastern Gambusia	<i>Gambusia holbrooki</i>
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>
	European Skylark	<i>Alauda arvensis</i>
	Golden-headed Cisticola	<i>Cisticola exilis</i>
	Grey Fantail	<i>Rhipidura albiscarpa</i>
	House Sparrow	<i>Passer domesticus</i>
	Little Raven	<i>Corvus mellori</i>
	Nankeen Kestrel	<i>Falco cenchroides</i>
	Pobblebonk	<i>Limnodynastes dumerilii dumerilii</i>
*	Red Fox	<i>Vulpes vulpes</i>
	Red Wattlebird	<i>Anthochaera carunculata</i>
	Spotted Marsh Frog (race unknown)	<i>Limnodynastes tasmaniensis</i>
	Straw-necked Ibis	<i>Threskiornis spinicollis</i>
	Superb Fairy-wren	<i>Malurus cyaneus</i>
	Welcome Swallow	<i>Petrochelidon neoxena</i>
	Whistling Kite	<i>Haliastur sphenurus</i>
	White-faced Heron	<i>Egretta novaehollandiae</i>
	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>
	Willie Wagtail	<i>Rhipidura leucophrys</i>
	Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>

Taxon Origin* = introduced

A1.3 STRIPED LEGLESS LIZARD SURVEY RESULTS

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
1	1	2022-09-26	14	>80%	Light	Light	None	75	10:47:00	10:58:00			3 x Tussock Skink <i>Pseudemoia pagenstecheri</i> 1 x Spotted Marsh Frog <i>Limnodynastes tasmaniensis</i> 1 x Large Striped Skink <i>Ctenotus robustus</i>
1	2	2022-09-26	14	>80%	Light	Light	None	76	11:13:00	11:20:00			
1	4	2022-09-26	16	>80%	Slight	Light	None	67	12:52:00	13:03:00			1 x Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i> 1 x Unidentified Skink
1	5	2022-09-26	16	>80%	Slight	Light	None	67	13:08:00	13:14:00			
1	6	2022-09-26	16	>80%	Light	Light	None	65	13:16:00	13:30:00			
1	7	2022-09-26	17	>80%	Light	Light	None	65	13:08:00	13:25:00			1 x Tussock Skink
1	9	2022-09-26	16	>80%	Slight	Light	None	88	14:30:00	14:37:00			3 x Tussock Skink
1	10	2022-09-26	15	>80%	Slight	Light	None	88	14:39:00	14:47:00			
1	11	2022-10-04	14	>80%	Light	None	None	74	10:08:00	10:20:00			2 x Tussock Skink
1	12	2022-10-04	14	>80%	Light	None	None	74	10:28:00	10:39:00			1 x Common Blue-tongued Lizard <i>Tiliqua scincoides</i>
1	13	2022-10-04	14	>80%	Light	None	None	74	10:40:00	10:52:00			1 x Common Blue-tongued Lizard
1	14	2022-10-04	14	>80%	Light	None	None	74	11:38:00	11:44:00			
1	15	2022-10-04	14	>80%	Light	None	None	75	11:57:00	12:07:00			1 x Spotted Marsh Frog

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
1	16	2022-10-04	14	>80%	Light	None	None	73	12:08:00	12:16:00			4 x Spotted Marsh Frog 1 x Large Striped Skink
1	17	2022-10-04	14	>80%	Light	None	None	74	12:23:00	12:30:00			1 x Spotted Marsh Frog 1 x Unidentified Frog
2	9	2022-10-17	11.6	60-80%	Slight	None	None	78	10:03:00	10:11:00			1 x Unidentified Skink
2	10	2022-10-17	12	60-80%	Slight	None	None	75	10:14:00	10:22:00			
2	4	2022-10-17	13.5	60-80%	Slight	None	None	58	11:04:00	11:12:00			
2	5	2022-10-17	13.4	60-80%	Slight	None	Light	56	11:20:00	11:31:00			
2	6	2022-10-17	13.3	40-60%	Slight	None	None	58	11:35:00	11:45:00			
2	7	2022-10-17	14	40-60%	Slight	None	None	56	11:46:00	11:53:00			
2	2	2022-10-17	14.5	20-40%	Slight	None	None	67	12:38:00	12:44:00			1 x Eastern Brown Snake <i>Pseudonaja textilis</i>
2	12	2022-10-18	13.6	40-60%	Slight	None	None	74	11:53:00	11:59:00			
2	13	2022-10-18	13.6	40-60%	Slight	None	None	74	12:01:00	12:09:00			1 x Little Whip Snake <i>Parasuta flagellum</i>
2	17	2022-10-18	13.2	40-60%	Slight	None	None	71	10:19:00				
2	16	2022-10-18	13.7	40-60%	Slight	None	None	69	10:41:00	10:52:00			4 x Spotted Marsh Frog
2	14	2022-10-18	13	20-40%	Slight	None	None	72	10:53:00	11:00:00			4 x Striped Marsh Frog <i>Limnodynastes peronii</i>
2	15	2022-10-18	13	20-40%	Slight	None	None	72	11:03:00	11:17:00			1 x Spotted Marsh Frog
2	11	2022-10-18	13.7	40-60%	Slight	None	None	74	11:30:00	11:44:00			
2	8	2022-10-18	14.3	40-60%	Slight	None	None	76	12:17:00	12:28:00			
2	1	2022-10-17	15.3	20-40%	Slight	None	None	63	12:16:00	12:27:00			7 x Tussock Skink 2 x Spotted Marsh Frog

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
3	9	2022-10-25	16.6	20-40%	Slight	Moderate	None	95	08:54:00	09:11:00			Lots of ants and big spider nest funnel
3	1	2022-10-25	17.7	20-40%	Slight	Moderate	None	94	09:43:00	10:10:00			2 x Tussock Skink 1 x Spotted Marsh Frog
3	2	2022-10-25	18.8	40-60%	Slight	Moderate	None	85	10:21:00	10:32:00			
3	3	2022-10-25	19.6	40-60%	Slight	None	None	83	10:46:00	11:15:00			
3	5	2022-10-25	21.2	20-40%	None	Moderate	None	74	11:35:00	11:48:00			
3	6	2022-10-25	21	40-60%	None	Moderate	None	76	11:53:00	12:11:00			
3	3	2022-10-25	20.8	20-40%	None	Moderate	None	80	12:15:00	12:28:00			
3	17	2022-10-25	19.6	20-40%	Slight	Moderate	None	82	14:15:00	14:47:00			3 x Unidentified Skink
3	8	2022-10-25	19.6	20-40%	None	Moderate	None	83	15:09:00	15:19:00			
3	13	2022-11-03	14.4	>80%	Slight	Light	None	65	12:46:00	13:00:00			
3	12	2022-11-03	14.4	>80%	Light	Light	None	65	13:02:00	13:21:00			
3	11	2022-11-03	14.6	60-80%	Slight	Light	None	66	13:27:00	13:53:00			
3	14	2022-11-03	13.4	>80%	Slight	Light	None	67	14:22:00	14:54:00			
3	15	2022-11-03	13.5	>80%	Slight	Light	None	70	14:57:00	15:17:00			
3	16	2022-11-03	13.3	>80%	Slight	Light	None	70	15:27:00	15:59:00			
4	9	2022-11-08	24	<20%	Slight	None	None	57	10:00:00	10:05:00			
4	10	2022-11-08	24	<20%	Slight	None	None	57	10:06:00	10:13:00			
4	14	2022-11-08	24	<20%	Slight	None	None	53	10:38:00	10:45:00			5 x Spotted Marsh Frog
4	15	2022-11-08	24	<20%	Slight	None	None	53	10:46:00	10:54:00			
4	16	2022-11-08	25	<20%	None	None	None	53	10:55:00	11:01:00			2 x Spotted Marsh Frog
4	17	2022-11-08	26	<20%	Slight	Light	None	50	11:05:00	11:16:00			

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
4	8	2022-11-08	26	<20%	None	Light	None	50	11:31:00	11:38:00			
4	12	2022-11-08	26	60-80%	Light	Light	None	51	13:18:00	13:26:00			
4	13	2022-11-08	25	60-80%	Light	Light	None	51	13:28:00	13:37:00			2 x Little Whip Snake 1 x Common Blue-tongued Lizard
4	11	2022-11-08	26	>80%	Slight	Light	None	51	13:47:00	13:57:00			1 x Little Whip Snake 1 x Common Blue-tongued Lizard
4	2	2022-11-08	24	60-80%	Slight	Light	None	53	14:18:00	14:22:00			
4	1	2022-11-08	24	60-80%	Slight	Light	None	54	14:30:00	14:38:00			4 x Unidentified Skink
4	3	2022-11-08	24	60-80%	Slight	Light	None	58	14:47:00	14:59:00			
4	4	2022-11-10	20.4	>80%	Slight	Light	Light	85	15:04:00	15:11:00			4 x Tussock Skink
4	6	2022-11-10	20.3	>80%	Slight	Light	Light	86	15:18:00	15:31:00			1 x Tussock Skink
4	5	2022-11-10	18.9	>80%	Light	Moderate	Moderate	69	15:19:00	15:34:00			2 x Tussock Skink
5	9	2022-11-15	13.3	>80%	Light	Moderate	Light	49	09:02:00	09:21:00			2 x Spotted Marsh Frog
5	10	2022-11-15	13.2	>80%	Strong	Moderate	Moderate	55	09:23:00	09:41:00			1 x Spotted Marsh Frog
5	1	2022-11-15	10.1	60-80%	Slight	Moderate	None	67	09:53:00	10:12:00			1 x Southern Grass Skink <i>Pseudemoia entrecasteauxii</i> 2 x Tussock Skink
5	2	2022-11-15	11.5	40-60%	Light	Moderate	None	58	10:28:00	10:47:00			1 x Eastern Brown Snake
5	3	2022-11-15	11.8	20-40%	Slight	Moderate	None	56	11:58:00	12:14:00			2 x Spotted Marsh Frog
5	4	2022-11-15	12.8	40-60%	Light	Moderate	None	58	12:24:00	12:44:00			
5	5	2022-11-15	12.5	60-80%	Light	Moderate	None	44	12:51:00	13:10:00			

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
5	6	2022-11-15	12.8	>80%	Strong	Moderate	Light	63	13:12:00	13:32:00			
5	7	2022-11-15	12.6	>80%	Strong	Moderate	Light	57	13:33:00	13:52:00			
5	14	2022-11-15	9.9	>80%	Slight	Moderate	None	72	14:16:00	14:34:00			2 x Spotted Marsh Frog
5	16	2022-11-15	10.4	60-80%	Slight	Moderate	None	67	14:35:00	14:56:00			1 x Large Striped Skink
5	15	2022-11-15	10.2	60-80%	Slight	Moderate	None	67	14:56:00	15:12:00			
5	17	2022-11-15	10.9	40-60%	Slight	Moderate	None	65	15:01:00	15:22:00			2 x Large Striped Skink
5	8	2022-11-15	11.8	>80%	Slight	Moderate	None	58	15:32:00	15:48:00			3 x Spotted Marsh Frog
5	13	2022-11-15	12.1	60-80%	Light	Moderate	None	59	16:00:00	16:19:00			
5	12	2022-11-15	11.7	>80%	Slight	Moderate	None	56	16:21:00	16:40:00			
5	11	2022-11-15	11.7	60-80%	Light	Moderate	None	56	16:46:00	17:04:00			1 x Spotted Marsh Frog
6	5	2022-12-06	16	20-40%	Light	Light	None	79	10:50:00	11:03:00			
6	14	2022-12-06	17.4	>80%	Slight	Light	None	75	12:02:00	12:14:00			1 x Spotted Marsh Frog
6	13	2022-12-06	18	20-40%	Slight	Light	None	65	13:24:00	13:33:00			
6	1	2022-12-06	13.4	>80%	Slight	Moderate	Light	94	09:45:00	09:53:00			1 x Unidentified Skink
6	2	2022-12-06	14.7	60-80%	None	Moderate	None	93	10:03:00	10:11:00			1 x Southern Grass Skink 1 x Spotted Marsh Frog
6	3	2022-12-06	15.6	60-80%	Light	Moderate	None	83	10:18:00	10:29:00			
6	4	2022-12-06	16.2	60-80%	Slight	Moderate	None	79	10:37:00	10:46:00			
6	7	2022-12-06	16.4	40-60%	Slight	Moderate	None	79	10:52:00	11:01:00			1 x Eastern Brown Snake
6	6	2022-12-06	16.7	40-60%	Light	Moderate	None	78	11:02:00	11:10:00			

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
6	16	2022-12-06	17.4	40-60%	Light	Moderate	None	75	12:02:00	12:12:00			1 x Little Whip Snake 1 x Common Blue-tongued Lizard 1 x Tiger Snake <i>Notechis scutatus</i>
6	15	2022-12-06	17.1	60-80%	Light	Moderate	None	68	12:14:00	12:22:00			1 x Tiger Snake
6	17	2022-12-06	17.2	60-80%	Light	Moderate	None	68	12:30:00	12:38:00			1 x Tiger Snake
6	11	2022-12-06	17.6	20-40%	Light	Moderate	None	67	13:09:00	13:18:00			1 x Little Whip Snake
6	12	2022-12-06	17.9	20-40%	Light	Moderate	None	69	13:27:00	13:37:00			
6	8	2022-12-06	18.2	20-40%	Slight	Moderate	None	63	13:48:00	13:57:00			
6	10	2022-12-06	18	<20%	Light	Moderate	None	64	14:05:00	14:12:00			
7	2	2022-12-13	15.1	60-80%	Strong	Heavy	None	56	10:09:00	10:17:00			6 x Tussock Skink 1 x Spotted Marsh Frog
7	1	2022-12-13	15	40-60%	Strong	Heavy	None	56	10:28:00	10:33:00			9 x Tussock Skink 1 x Spotted Marsh Frog
7	3	2022-12-13	15.3	60-80%	Strong	Heavy	None	57	10:42:00	10:51:00			
7	4	2022-12-13	16.2	>80%	Strong	Heavy	None	52	11:00:00	11:09:00			2 x Tussock Skink
7	5	2022-12-13	16.7	>80%	Strong	Heavy	None	52	11:15:00	11:41:00			
7	6	2022-12-13	16.3	>80%	Strong	Heavy	None	54	11:43:00	11:50:00			2 x Unidentified Skink
7	7	2022-12-13	16	>80%	Strong	Heavy	None	54	11:52:00	11:57:00			1 x Little Whip Snake 1 x Tussock Skink

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
7	14	2022-12-13	17.2	>80%	Strong	Heavy	Light	51	12:45:00	12:52:00			2 x Unidentified Skink 1 x Tussock Skink 1 x Eastern Blue-tongue Lizard
7	15	2022-12-13	12.2	>80%	Strong	Heavy	Light	86	13:26:00	13:31:00			1 x Spotted Marsh Frog 1 x Tussock Skink
7	16	2022-12-13	12.6	>80%	Strong	Heavy	Light	86	13:32:00	13:39:00			1 x Little Whip Snake 5 x Tussock Skink
7	17	2022-12-13	12.4	>80%	Strong	Heavy	Light	89	13:42:00	13:52:00			8 x Tussock Skink 1 x Eastern Blue-tongue Lizard
7	11	2022-12-13	12.9	>80%	Strong	Heavy	Light	78	14:12:00	14:16:00			3 x Tussock Skink
7	13	2022-12-13	12.3	>80%	Strong	Heavy	Light	85	14:31:00	14:38:00			
7	12	2022-12-13	11.3	>80%	Strong	Heavy	Light	87	14:40:00	14:48:00			3 x Tussock Skink 1 x Eastern Blue-tongue Lizard
7	8	2022-12-13	12.3	>80%	Strong	Heavy	None	85	14:55:00	15:04:00			9 x Tussock Skink
7	9	2022-12-13	12.6	>80%	Strong	Heavy	None	82	15:10:00	15:16:00			2 x Tussock Skink 2 x Unidentified Skink
7	10	2022-12-13	13.2	>80%	Light	Heavy	None	78	15:18:00	15:23:00			7 x Tussock Skink
8	10	2022-12-20	21.2	<20%	Light	None	None	54	13:10:00	13:17:00			
8	9	2022-12-20	21	<20%	Slight	None	None	54	13:09:00	13:16:00			
8	8	2022-12-20	21.3	<20%	Slight	None	None	55	12:59:00	13:03:00			*Many tiles shattered from slashing/mowing
8	11	2022-12-20	21	<20%	Slight	None	None	55	12:46:00	12:51:00			1 x Little Whip Snake
8	13	2022-12-20	21.1	<20%	Slight	None	None	55	12:30:00	12:39:00			

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
8	12	2022-12-20	21.1	<20%	Light	None	None	55	12:30:00	12:43:00			
8	17	2022-12-20	17.9	<20%	Slight	None	None	55	11:47:00	12:00:00			
8	16	2022-12-20	18.7	<20%	Light	None	None	69	11:24:00	11:39:00			
8	15	2022-12-20	17.9	<20%	Slight	None	None	62	11:35:00	11:39:00			
8	14	2022-12-20	18.2	<20%	Slight	None	None	62	11:24:00	11:32:00			
8	1	2022-12-20	17.4	<20%	Slight	None	None	65	10:53:00	10:59:00			1 x Tussock Skink
8	2	2022-12-20	19.7	<20%	Slight	None	None	50	10:39:00	10:46:00			
8	3	2022-12-20	17.4	<20%	Slight	None	None	68	10:22:00	10:27:00			1 x Spotted Marsh Frog
8	6	2022-12-20	17.2	<20%	Light	None	None	69	10:06:00	10:12:00			
8	5	2022-12-20	17.9	<20%	Slight	None	None	62	09:53:00	10:05:00			
8	7	2022-12-20	16.7	<20%	Slight	None	None	66	09:55:00	10:04:00			
8	4	2022-12-20	16.9	<20%	None	None	None	67	09:38:00	09:48:00			1 x Eastern Brown Snake
9	9	2023-01-11	24	<20%	Slight	None	None	58	11:18:00	11:22:00			
9	10	2023-01-11	24	<20%	Slight	None	None	58	11:24:00	11:28:00			
9	4	2023-01-11	24.2	<20%	Slight	None	None	63	11:58:00	12:05:00			
9	5	2023-01-11	23.8	<20%	Slight	None	None	62	12:10:00	12:16:00			
9	6	2023-01-11	24.4	<20%	Slight	None	None	61	12:19:00	12:24:00			
9	7	2023-01-11	26	<20%	Slight	None	None	59	12:27:00	12:32:00			
9	3	2023-01-11	26	<20%	Slight	None	None	60	12:44:00	12:50:00			1 x House Mouse <i>Mus musculus</i>
9	1	2023-01-11	27	<20%	Slight	None	None	54	13:32:00	13:41:00			

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
9	2	2023-01-11	27	<20%	Slight	None	None	57	13:43:00	13:49:00			
9	16	2023-01-11	29	<20%	Slight	Light	None	60	14:06:00	14:12:00			
9	15	2023-01-11	29	<20%	Slight	None	None	60	14:13:00	14:18:00			
9	14	2023-01-11	30	<20%	Slight	None	None	60	14:17:00	14:22:00			
9	17	2023-01-11	28	<20%	Slight	None	None	52	14:28:00	14:50:00			
9	13	2023-01-11	28	<20%	Slight	None	None	60	14:58:00	15:02:00			
9	12	2023-01-11	28	<20%	Slight	None	None	58	15:05:00	15:10:00			
9	11	2023-01-11	28	<20%	Slight	None	None	50	15:16:00	15:21:00			
9	8	2023-01-11	28	<20%	Slight	None	None	50	15:29:00	15:32:00			
10	17	2023-01-16	19	>80%	Slight	None	None	70	10:47:00	11:20:00			
10	14	2023-01-16	23	>80%	Slight	None	None	59	11:30:00	12:15:00			
10	15	2023-01-16	24	>80%	None	None	None	56	12:19:00	12:47:00			
10	16	2023-01-16	25	>80%	Slight	None	None	54	12:50:00	13:07:00			1 x Unidentified Skink
10	8	2023-01-16	26	>80%	Slight	None	None	52	14:21:00	14:46:00			* Most tiles smashed/ run over
10	3	2023-01-16	27	>80%	Slight	None	None	50	14:55:00	15:09:00			
10	1	2023-01-16	28	>80%	Slight	None	None	50	15:14:00	15:23:00			
10	5	2023-01-19	18	60-80%	Light	Light	None	54	11:14:00	11:27:00			
10	6	2023-01-19	18	>80%	Light	Light	None	54	11:29:00	11:42:00			2 x Eastern Striped Skink <i>Ctenotus orientalis</i>
10	7	2023-01-19	18	>80%	Light	Light	None	54	11:45:00	11:50:00			2 x Eastern Striped Skink
10	4	2023-01-19	18	>80%	Light	Light	None	54	12:00:00	12:10:00			
10	2	2023-01-19	19	>80%	Light	Light	None	50	13:08:00	13:28:00			

SURVEY	GRID	DATE	TEMP (°C)	CLOUD COVER	WIND	RAIN IN THE PAST 24 HOURS	CURRENT RAIN	RELATIVE HUMIDITY (%)	START TIME	END TIME	SLL REC	SLL SKINS REC	SPECIES RECORDED
10	13	2023-01-19	19	>80%	Light	None	None	52	14:10:00	14:29:00			
10	12	2023-01-19	19	>80%	Light	Light	None	52	14:31:00	14:44:00			
10	9	2023-01-19	19	>80%	Light	Light	None	52	14:55:00	15:03:00			
10	10	2023-01-19	19	>80%	Light	Light	None	51	15:04:00	15:14:00			1 x Eastern Striped Skink

A1.4 CANOPY AND SCATTERED TREES

#	SPECIES		DBH	STATUS	NOTES	TPZ	SITU	SIZE
4	Eucalyptus camaldulensis	River Red-gum	106	Small & Medium hollows		13	P	Large
5	Eucalyptus camaldulensis	River Red-gum	90		Estimated - Bee nest	11	P	Large
6	Eucalyptus camaldulensis	River Red-gum	80	Small & Medium hollows		10	P	Large
7	Eucalyptus camaldulensis	River Red-gum	100	Basal, Large hollows		12	P	Large
8	Eucalyptus camaldulensis	River Red-gum	80	Medium hollows		10	P	Large
9	Eucalyptus camaldulensis	River Red-gum	88	Large & Medium hollows		11	P	Large
10	Eucalyptus camaldulensis	River Red-gum	80		Estimated - Bee nest	10	P	Large
11	Eucalyptus camaldulensis	River Red-gum	90	Large hollows	Estimated - Boxthorn	11	P	Large
12	Eucalyptus camaldulensis	River Red-gum	110	Small & Medium hollows		13	P	Large
13	Eucalyptus camaldulensis	River Red-gum	0	Basal, Small hollows		0	P	Small
14	Eucalyptus camaldulensis	River Red-gum	100			12	P	Large
15	Eucalyptus camaldulensis	River Red-gum	100		Estimated - Bee nest	12	P	Large
16	Eucalyptus camaldulensis	River Red-gum	92	Medium hollows		11	P	Large
17	Eucalyptus camaldulensis	River Red-gum	80			10	P	Large
18	Eucalyptus camaldulensis	River Red-gum	80	Large hollows, Small & Medium hollows		10	P	Large
19	Eucalyptus camaldulensis	River Red-gum	85			10	P	Large
20	Eucalyptus camaldulensis	River Red-gum	110	Small & Medium hollows, Large hollows	Estimated - Boxthorn	13	P	Large
21	Eucalyptus camaldulensis	River Red-gum	120		Estimated - Bee nest	14	P	Large

#	SPECIES		DBH	STATUS	NOTES	TPZ	SITU	SIZE
22	Eucalyptus camaldulensis	River Red-gum	110			13	P	Large
23	Eucalyptus camaldulensis	River Red-gum	100	Medium hollows	Estimated - Boxthorn	12	P	Large
24	Eucalyptus camaldulensis	River Red-gum	100	Small hollows, Basal, Large hollows	Estimated - Bee nest	12	P	Large
27	Eucalyptus camaldulensis	River Red-gum	100		Estimated - Boxthorn	12	P	Large
28	Eucalyptus camaldulensis	River Red-gum	90		Estimated	11	P	Large
29	Eucalyptus camaldulensis	River Red-gum	110	Large hollows		13	P	Large
30	Eucalyptus camaldulensis	River Red-gum	95	Medium hollows		11	P	Large
32	Eucalyptus camaldulensis	River Red-gum	120		Estimated - Bee nest	14	P	Large
35	Eucalyptus camaldulensis	River Red-gum	75	Small hollows, Large hollows,	Dead. Beehive	9	P	Small
54	Eucalyptus camaldulensis	River Red-gum	88			11	P	Large
75	Eucalyptus camaldulensis	River Red-gum	135			16	P	Large
76	Eucalyptus camaldulensis	River Red-gum	80			10	P	Large
1	Eucalyptus camaldulensis	River Red-gum	48			6	St	Small
2	Eucalyptus sp.	Gum	78		Dead red gum stump - Scattered tree	9	St	Small
3	Eucalyptus camaldulensis River Red-gum	River Red-gum	94	Large & Medium hollows		11	St	Large
25	Eucalyptus camaldulensis	River Red-gum	120	Large & Medium hollows		14	St	Large
26	Eucalyptus camaldulensis	River Red-gum	69			8	St	Small
31	Eucalyptus camaldulensis	River Red-gum	81	Small hollows		10	St	Large
33	Eucalyptus camaldulensis	River Red-gum	39			5	St	Small

#	SPECIES		DBH	STATUS	NOTES	TPZ	SITU	SIZE
34	Eucalyptus camaldulensis	River Red-gum	70			8	St	Small
36	Eucalyptus camaldulensis	River Red-gum	45			5	St	Small
37	Eucalyptus camaldulensis	River Red-gum	20			2	St	Small
38	Eucalyptus camaldulensis	River Red-gum	44	Nest		5	St	Small
39	Eucalyptus camaldulensis	River Red-gum	30			4	St	Small
40	Eucalyptus camaldulensis	River Red-gum	81			10	St	Large
41	Eucalyptus camaldulensis	River Red-gum	25			3	St	Small
42	Eucalyptus camaldulensis	River Red-gum	17			2	St	Small
43	Eucalyptus camaldulensis	River Red-gum	10			1	St	Small
44	Eucalyptus camaldulensis	River Red-gum	23			3	St	Small
45	Eucalyptus camaldulensis	River Red-gum	73			9	St	Small
46	Eucalyptus camaldulensis	River Red-gum	36			4	St	Small
47	Eucalyptus camaldulensis	River Red-gum	32			4	St	Small
48	Eucalyptus camaldulensis	River Red-gum	45			5	St	Small
49	Eucalyptus camaldulensis	River Red-gum	52			6	St	Small
50	Eucalyptus camaldulensis	River Red-gum	33			4	St	Small
51	Eucalyptus camaldulensis	River Red-gum	38			5	St	Small
52	Eucalyptus camaldulensis	River Red-gum	5			1	St	Small
53	Eucalyptus camaldulensis	River Red-gum	85			10	St	Large
55	Eucalyptus camaldulensis	River Red-gum	70	Medium hollows, LooseBark		8	St	Small
56	Eucalyptus camaldulensis	River Red-gum	30			4	St	Small
57	Eucalyptus camaldulensis	River Red-gum	8			1	St	Small

#	SPECIES		DBH	STATUS	NOTES	TPZ	SITU	SIZE
58	Eucalyptus camaldulensis	River Red-gum	9			1	St	Small
59	Eucalyptus camaldulensis	River Red-gum	98	Large hollows		12	St	Large
60	Eucalyptus camaldulensis	River Red-gum	74	Large & Medium hollows		9	St	Small
61	Eucalyptus camaldulensis	River Red-gum	87	Small hollows		10	St	Large
62	Eucalyptus camaldulensis	River Red-gum	90	Basal, Small hollows		11	St	Large
63	Eucalyptus camaldulensis	River Red-gum	110	Small hollows		13	St	Large
64	Eucalyptus camaldulensis	River Red-gum	48			6	St	Small
65	Eucalyptus camaldulensis	River Red-gum	156	Large & Medium hollows	Very large old tree	19	St	Large
66	Eucalyptus camaldulensis	River Red-gum	86	Basal, Large hollows		10	St	Large
67	Eucalyptus camaldulensis	River Red-gum	117	Large hollows		14	St	Large
68	Eucalyptus camaldulensis	River Red-gum	77	Medium hollows		9	St	Small
69	Eucalyptus camaldulensis	River Red-gum	80			10	St	Large
70	Eucalyptus camaldulensis	River Red-gum	50			6	St	Small
71	Eucalyptus camaldulensis	River Red-gum	80			10	St	Large
72	Eucalyptus camaldulensis	River Red-gum	15			2	St	Small
73	Eucalyptus camaldulensis	River Red-gum	30			4	St	Small
74	Eucalyptus camaldulensis	River Red-gum	30			4	St	Small
77	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
78	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
79	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
80	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large

#	SPECIES		DBH	STATUS	NOTES	TPZ	SITU	SIZE
81	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
82	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
83	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
84	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
85	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
86	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
87	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
88	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
89	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
90	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
91	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
92	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
93	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
94	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
95	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
96	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
97	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
98	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
99	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
100	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
101	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
102	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large

#	SPECIES		DBH	STATUS	NOTES	TPZ	SITU	SIZE
103	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
104	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
105	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
106	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
107	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
108	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
109	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large
110	Eucalyptus camaldulensis	River Red-gum	100		Digitised 2021 imagery	12	St	Large

APPENDIX B

LIKELIHOOD OF OCCURRENCE ASSESSMENT

B1.1 LIKELIHOOD OF OCCURRENCE AND IMPACT ASSESSMENT – FLORA

A search of the DELWP’s Victorian Biodiversity Atlas (VBA) and the EPBC Act Protected Matters Search Tool (PMST) was undertaken within a 5 km radius of the study area to identify threatened species with potential to occur. Table B.1 below identifies the results of these searches and the assessment of each species’ likelihood of occurrence within the study area based on the availability of habitat observed during the field assessment.

The brief habitat descriptions for flora are appropriated from the species descriptions on the VicFlora website (Royal Botanic Gardens of Victoria, 2021), and species-specific publicly-available Commonwealth and State government resources, including conservation advice.

Table B.1 Threatened flora species with the potential to occur within the study area

SCIENTIFIC NAME	COMMON NAME	SOURCE	EPBC ACT	FFG ACT	COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTION	LIKELIHOOD OF OCCURRENCE
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VBA PMST	VU		4	16-12-01	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.	Moderate - Possibly occurs there is suitable habitat however a lack of recent records within a 5km radius.
<i>Atriplex paludosa subsp. paludosa</i>	Marsh Saltbush	VBA		en	2	20-02-02	In Victoria occurs west of Wilsons Promontory where it grows on fringes and on coastal and near-coastal saltmarshes. Also some inland occurrences near Murrayville and Lake Hindmarsh in the north-west of the state.	High - Observed.
<i>Ballantinia antipoda</i>	Southern Shepherd's Purse	VBA	EN	cr	1	01/04/1866	Species was presumed to be extinct until recently re-discovered in 1983 on Mt Alexander, near Castlemaine in Central Victoria. Previous records indicate the species occurred in stony or rocky areas on the volcanic plains south-west of Melbourne and on low granite hills and mountains, including Mount Emu, Mount Cole, Mount Langi Ghiran and Mount Buangor in western Victoria where it would grow on moss mats on seepage areas in open habitats.	Low - Study area is highly modified and there is a lack of abundant and recent records within a 5km radius
<i>Calotis anthemoides</i>	Cut-leaf Burr-daisy	VBA		cr	1	16-09-09	Species has a scattered distribution north and west of Melbourne (e.g. Sunshine, Camperdown, Moyston, Dunkeld, Numurkah) where it grows on heavy soils that are prone to waterlogging.	Low - not observed during survey, although could occur amongst high biomass grassland, not easily visible during survey such as across property 17.
<i>Comesperma polygaloides</i>	Small Milkwort	VBA		cr	14	14-11-11	Occasional on heavier soils (clays, alluvium) supporting grassland and grassy woodland communities in central and south-western areas.	Low - not observed during survey, although could occur amongst high biomass grassland, not easily visible during survey such as across property 17.
<i>Corymbia maculata</i>	Spotted Gum	VBA		vu #	1	26-03-13	Only known in Victoria from the Tara Range, south of Buchan. Widely planted as an ornamental.	High - observed Planted along roadsides and around residences, although not considered to naturally occur in the area.
<i>Cullen parvum</i>	Small Scurf-pea	VBA		en	7	04-01-10	In Victoria species is known from a few localities in north-central and south-central areas, and western suburbs of Melbourne, where it grows mainly in grassland or grassy woodland environments, often on basalt-derived soils.	Low - not observed during survey, although could occur amongst high biomass grassland, not easily visible during survey such as across property 17.
<i>Dianella amoena</i>	Matted Flax-lily	PMST	EN	cr			Occurs mainly in lowland grasslands, grassy woodlands, valley grassy forest and creeklines of herb-rich woodland.	Low - not observed during targeted survey.

SCIENTIFIC NAME	COMMON NAME	SOURCE	EPBC ACT	FFG ACT	COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTION	LIKELIHOOD OF OCCURRENCE
<i>Dianella sp. aff. longifolia (Benambra)</i>	Arching Flax-lily	VBA		cr	30	22-12-11	Well drained soils on plains and woodlands in South western Victoria	Low - not observed during targeted survey.
<i>Diuris basaltica</i>	Small Golden Moths Orchid	PMST	EN	cr			Extremely rare on basalt plains grassland immediately to the west of Melbourne.	Low - Study area is highly modified and there are no previous records within a 5km radius. Not observed during targeted survey.
<i>Diuris fragrantissima</i>	Sunshine Diuris	VBA PMST	EN	cr	1	01/11/1897	Endemic to Victoria, the once common orchid is now only known from two populations, one natural near Sunshine, Tottenham and one site in Laverton North where the species was re-introduced. It occurs in grassland habitats dominated by Kangaroo Grass where it grows in inter-tussock spaces. Known habitat also has a high level of native herbs on heavy clay loam soils, or basalt soils often with embedded basalt boulders.	Low - Study area is highly modified and there are no previous records within a 5km radius. Not observed during targeted survey.
<i>Dodonaea procumbens</i>	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 where very rare and in perhaps also in the upper Murray River area (represented by a single, 1883 specimen of uncertain provenance). Grows in low-lying, often winter-wet areas in woodland, low open-forest and grasslands on sands and clays.	Low
<i>Eragrostis trachycarpa</i>	Rough-grain Love-grass	VBA		en	3	01-01-84	A relatively rare grass, apparently confined to seasonally moist sites in the lower catchment of the Gippsland Lakes (between Heyfield and Lakes Entrance).	Low - Species not known to occur in the area. Not observed.
<i>Eucalyptus baueriana subsp. thalassina</i>	Werribee Blue-box	VBA		en	4	19-03-14	Species is restricted to the Werribee River catchment around the Bacchus Marsh area where it grows close to watercourses in alluvial soils.	Low - not recorded during site assessments
<i>Eucalyptus leucoxylon subsp. connata</i>	Melbourne Yellow-gum	VBA		en	2	23-11-10	Occurs on volcanic plains, west of Melbourne, mainly between Bacchus Marsh and Geelong.	Low - not recorded during site assessments
<i>Eucalyptus sideroxylon subsp. sideroxylon</i>	Mugga	VBA		en	1	31-01-07	Occurs in Queensland, New South Wales, Victoria and in South Australia (sparingly established). In Victoria the species is confined to northern Warby Range, South of Winton and the Chiltern area.	Low - no natural occurrences observed during site assessment. Planted around residences. Non-indigenous.
<i>Glycine latrobeana</i>	Clover Glycine	VBA PMST	VU	vu	4	07-11-08	Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands.	Low - Study area is highly modified and is unlikely to support this species
<i>Goodenia macbarronii</i>	Narrow Goodenia	VBA		en	4	20-01-09	In Victoria, apparently confined to forests and grassy environments between Wedderburn and Moyhu in the states north-east and north to the Murray River, usually in damp sandy or silty soils. Species sometimes occurs in seepage areas below farm dams.	Low - not observed during survey.
<i>Lachnagrostis adamsonii</i>	Adamson's Blown-grass	PMST	EN	en			Occurs in and around saline depressions on the Volcanic Plain where recorded from Portarlinton west almost to the South Australian border.	Low - No previous records within a 5km radius, lack of saline depressions.
<i>Lawrencia spicata</i>	Salt Lawrencia	VBA		en	1	01-02-05	Species is occasionally found in saltmarsh communities along the coast, in saline depressions and around salt lakes of south-western Victoria (e.g. Polkemmet near Horsham, Harrow district, Camperdown, Lake Corangamite).	Low - lack of saline depressions.
<i>Lepidium hyssopifolium</i>	Basalt Pepper-cress	PMST	EN	en			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 - not observed.

SCIENTIFIC NAME	COMMON NAME	SOURCE	EPBC ACT	FFG ACT	COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTION	LIKELIHOOD OF OCCURRENCE
<i>Leucochrysum albicans subsp. tricolor</i>	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. Also lack of disturbance / biomass control for this species.
<i>Melaleuca armillaris subsp. armillaris</i>	Giant Honey-myrtle	VBA		en #	4	01-09-15	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.	High - observed. Considered not indigenous.
<i>Nicotiana suaveolens</i>	Austral Tobacco	VBA		en	1	01/01/1770	Occurs in Victoria and New South Wales. In Victoria the species is widespread, most often in drier inland areas occurring in rocky places.	Low - Study area is highly modified and there is a lack of abundant and recent records within a 5km radius. Not observed.
<i>Pimelea spinescens subsp. spinescens</i>	Spiny Rice-flower	VBA PMST	CR	cr	82	15-10-12	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 – not observed during targeted surveys.
<i>Podolepis linearifolia</i>	Basalt Podolepis	VBA		en	2	15-10-12	Distributed throughout central Victoria, extending from near the NSW border to the southern state coastline. Usually grows on heavy clay soils in grasslands but also recorded in grassy woodlands, open forests and around swamps. Two old collections from the Mornington Peninsula and the Wimmera are of doubtful provenance.	Low - No previous records within a 5km radius. Also lack of disturbance / biomass control for this species.
<i>Prasophyllum suaveolens</i>	Fragrant Leek-orchid	VBA	EN	cr	1	26/10/1899	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 - Study area is highly modified and there is a lack of abundant and recent records within a 5km radius
<i>Prostanthera nivea var. nivea</i>	Snowy Mint-bush	VBA		vu #	1	20-01-09	Largely confined to shrubland and open woodland associated with granite outcrops (e.g. Mts Hope, Terrick Terrick, Kooyora and Pilot, and the You Yangs), also in Lerderderg Gorge, Barwon Heads and Anglesea areas.	Low - non-preferred habitat for this species.
<i>Pterostylis cucullata</i>	Leafy Greenhood	PMST	VU	en as <i>subsp. cucullata</i>			Widely distributed but disjunct, mostly occurring in small groups in coastal areas, sometimes near inland watercourses.	Low - Study area is highly modified and there are no previous records within a 5km radius
<i>Rhagodia parabolica</i>	Fragrant Saltbush	VBA		vu #	5	26-02-19	In Victoria confined to a few steep rocky slopes and broad ridges between Sunbury and Geelong (e.g. Jacksons Creek, Long Forest, Werribee Gorge, Steiglitz, Buckley Falls on the Barwon River), but locally rather common.	Low - Study area is highly modified and is unlikely to support this species
<i>Rutidosis leptorhynchoides</i>	Button Wrinklewort	VBA PMST	EN	en	15	30-11-01	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 - Study area is highly modified and is unlikely to support this species
<i>Senecio macrocarpus</i>	Large-headed Fireweed	VBA PMST	VU	cr	31	15-10-12	In Victoria largely confined to remnant <i>Themeda</i> grasslands on loamy clay soils derived from basalt from near Melbourne west to Skipton area. Also known from auriferous ground near Stawell.	High - observed on property 17.

SCIENTIFIC NAME	COMMON NAME	SOURCE	EPBC ACT	FFG ACT	COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTION	LIKELIHOOD OF OCCURRENCE
<i>Senecio psilocarpus</i>	Swamp Fireweed	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 - Study area is generally highly modified and there are no previous records within a 5km radius. Not observed during targeted survey.
<i>Swainsona behriana</i>	Southern Swainson-pea	VBA		en	1	01/11/1894	Species has a widespread but sporadic distribution in Victoria, occurring mostly in lowland areas west of Melbourne, but extending to montane areas in the east (e.g. Omeo, Cobungra, Gelantipy). Usually found in grassland and grassy woodland environments on relatively fertile soils.	Low - Study area is generally highly modified. Lack of recent records within a 5km radius. Not observed during targeted survey.
<i>Tripogonella loliiformis</i>	Rye Beetle-grass	VBA		en	1	28-04-93	Species occurs across all mainland states. In Victoria, it is an uncommon grass of scattered distribution where it grows through drier areas on shallow soil that overly rock. Areas of occurrence include the basalt plains west of Melbourne, the Strathbogie Ranges, Killawarra Forest near Wangaratta, Beechworth, Suggan Buggan and Mt Arapiles.	Low - not observed. Also lack of dusturbance / biomass controll for this species. Likely to habe been outcompeted in what would have been possible habitat.
<i>Xerochrysum palustre</i>	Swamp Everlasting	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. Not observed.

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, # = native but some stands may be alien

B1.2 LIKELIHOOD OF OCCURRENCE ASSESSMENT – FAUNA

A search of the DELWP’s Victorian Biodiversity Atlas (VBA) and the EPBC Act Protected Matters Search Tool (PMST) was undertaken within a 5km radius of the study area to identify threatened species with potential to occur. Table B.2 below identifies the results of these searches and the assessment of each species’ likelihood of occurring within the study area (or adjacent habitat) based on the availability of habitat observed during the field assessment.

The brief habitat descriptions for fauna have been sourced from several sources including Birdlife Australia species profiles, Commonwealth DCCEEW species profiles (SPRAT) and other publicly-available Commonwealth and State government resources.

Table B.2 Threatened fauna species with potential to occur within the study area

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Accipiter novaehollandiae</i>	Grey Goshawk	VBA		en	14	25/04/2019	Found in most forest types, especially tall closed forests, including rainforests.	Low - There are low value habitat resources accross the study area for this species
<i>Actitis hypoleucos</i>	Common Sandpiper	VBA PMST	M	vu	16	12/12/2018	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.	Moderate - Species may periodically forage on muddy edges of wetlands within the study area, including those associated with Lollipop Creek, as well as farm dams.
<i>Anseranas semipalmata</i>	Magpie Goose	VBA		vu	75	28/07/2019	Mainly found in shallow wetlands with dense growth of rushes or sedges. Occasionally on terrestrial habitats feeding on grasses, bulbs and rhizomes. Found in the tropics with smaller numbers present in Victoria, potentially due largely to reintroduction efforts.	Moderate - Species may utilise wetland habitat including shallow marshy areas of Lollipop Creek, as well as nearby grassy paddocks.
<i>Anthochaera phrygia</i>	Regent Honeyeater	PMST	CR	cr			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 <i>Casuarina cunninghamiana</i> and <i>Amyema cambagei</i> are important for feeding and breeding.	Low - There are no records of this species in the locality and the potential habitat within the study area is of low quality for the species.
<i>Antigone rubicunda</i>	Brolga	VBA		en	983	21/07/2019	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 areas around Lollypop Creek and Cherry Creek in the study area, however tends to prefer larger more open wetlands.
<i>Apus pacificus</i>	Fork-tailed Swift	PMST	M		4	8/05/2015	It is almost exclusively aerial, flying from less than 1 m to at least 300 m 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. It sometimes occurs above forests.	Low - species may periodically fly over, although there are few records in the locality.
<i>Ardea alba modesta</i>	Eastern Great Egret	VBA		vu	1549	28/07/2019	Prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands.	High - Species may utilise areas around Lollypop Creek and Cherry Creek in the study area
<i>Ardea intermedia plumifera</i>	Plumed Egret	VBA		cr	4	2/11/2011	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.	Moderate - Species may utilise areas around Lollypop Creek and Cherry Creek in the study area
<i>Ardenna grisea</i>	Sooty Shearwater	PMST	M				Species breeds on islands off New South Wales and Tasmania where they nest in burrows or rock crevices on coastal slopes, ridges and cliff tops, in herbfields, tussock grassland or forest. The Sooty Shearwater forages in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters.	Negligible - Pelagic bird not found inland
<i>Arenaria interpres</i>	Ruddy Turnstone	VBA PMST	M	en	154	20/04/2019	Strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed.	Negligible - Coastal species only. The study area does not support potential habitat for this species.
<i>Aythya australis</i>	Hardhead	VBA		vu	3853	28/07/2019	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.	Low - Study area lacks preferred habitat for the species (large areas of open water)
<i>Biziura lobata</i>	Musk Duck	VBA		vu	3239	28/07/2019	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.	Low - Study area lacks preferred habitat for the species (large areas of open water)
<i>Botaurus poiciloptilus</i>	Australasian Bittern	VBA PMST	EN	cr	69	13/01/2019	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.	Moderate - Although the species usually prefers larger shallow wetlands, parts of Lollipop Creek supporting shallow marsh may periodically support this species.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	PMST	M		197	17/02/2020	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, salt pans and hypersaline salt lakes inland.	Moderate - Although there are no large mudflats within the study area, the species may periodically occur on muddy edges of dams and wetlands associated with Lollipop and Cherry Creeks.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Calidris canutus</i>	Red Knot	VBA PMST	EN, M	en	331	27/04/2019	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps.	Low - The study area supports low value potential habitat for this species only, with no large mudflats.
<i>Calidris ferruginea</i>	Curlew Sandpiper	VBA PMST	CR, M	cr	1448	7/07/2019	Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes.	Low - The study area supports low value potential habitat for this species only, with no large mudflats.
<i>Calidris melanotos</i>	Pectoral Sandpiper	PMST	M		145	7/04/2019	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 - The study area supports low quality potential habitat for this species only, with no open mudflats.
<i>Calidris ruficollis</i>	Red-necked Stint	PMST	M		137	22/04/2021	In Australia, Red-necked Stints are found on the coast, in sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores. They may also be seen in saltworks, sewage farms, saltmarsh, shallow wetlands including lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in salt flats, flooded paddocks or damp grasslands. They are often in dense flocks, feeding or roosting. The Red-necked Stint is a migratory wader, breeding in Siberia and west Alaska and then moving to non-breeding areas in South-East Asia and Australasia. They arrive in Australia from late August to September and leave from early March to mid-April.	Moderate - The species may periodically occur at dams and wetlands associated with creeks if the conditions are right.
<i>Calidris subminuta</i>	Long-toed Stint	PMST	M		16	28/01/2008	In Australia, the Long-toed Stint occurs in a variety of terrestrial wetlands. They prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire. It has also been observed at open, less vegetated shores of larger lakes and ponds and is common on muddy fringes of drying ephemeral lakes and swamps. The Long-toed Stint also frequents permanent wetlands such as reservoirs and artificial lakes. They are uncommon, but not unknown, at tidal estuaries, saline lakes, salt ponds and bore swamps.	Moderate - The species may periodically occur at dams and wetlands associated with creeks if the conditions are right.
<i>Charadrius bicinctus</i>	Double-banded Plover	PMST	M		37	17/02/2015	Fresh or saline terrestrial wetlands, saltmarsh, grasslands and pasture. Non-breeding season migrant in Australia.	Moderate - The species may periodically occur at dams and wetlands associated with creeks in the study area.
<i>Charadrius leschenaultii</i>	Greater Sand Plover	VBA	VU	vu	2	25/01/1978	Occurs across all Australian states in coastal environments, particularly the north, but has been recorded in small numbers in Western Port and Port Phillip Bay in Victoria. Species is almost entirely coastal, found on beaches with mudflats and sandbanks as well as sandy estuarine lagoons. They have occasionally been recorded on near coastal saltworks and salt lakes but are rarely found at shallow freshwater wetlands.	Low - Species is predominantly coastal and is unlikely to occur at any of the habitats within the study area.
<i>Charadrius mongolus</i>	Lesser Sand Plover	VBA PMST	EN, M	en	2	3/06/1978	Occurs in coastal regions across all Australian states but most prominent in northern and eastern areas of Australia. The species is very rarely recorded away from coastal environments, usually inhabiting coastal littoral and estuarine habitats and favouring intertidal sandflats or mudflats in sheltered harbours and bays.	Low - Species is predominantly coastal and is unlikely to occur at any of the habitats within the study area.
<i>Diomedea antipodensis</i>	Antipodean Albatross	PMST	VU, M				A marine, pelagic bird that forages and rests on open water. When breeding, they nest in open patchy vegetation, amongst tussock grassland or shrubs on ridges on Antipodes Island.	Negligible - Pelagic bird not found inland
<i>Diomedea epomophora</i>	Southern Royal Albatross	PMST	VU, M	cr			Species has a circumpolar distribution around south eastern Australia and southern South America. Predominately breeds on Campbell Island.	Negligible - Pelagic bird not found inland
<i>Diomedea exulans</i>	Wandering Albatross	PMST	VU, M	cr			A marine, pelagic bird that has a circumpolar distribution. It feeds in Australian portions of the Southern Ocean and breeds on Macquarie Island on coastal or inland ridges, slopes and plains amongst moss terraces and dense tussock.	Negligible - Pelagic bird not found inland
<i>Diomedea sanfordi</i>	Northern Royal Albatross	PMST	EN, M				A marine, pelagic bird with a range that extends across the Southern Ocean where it inhabits subantarctic, subtropical and occasionally Antarctic waters. Breeds on slopes, ridges, gullies and plateaus of large islands.	Negligible - Pelagic bird not found inland
<i>Egretta garzetta</i>	Little Egret	VBA		en	933	28/07/2019	Little Egrets inhabit mudflats, saltwater and freshwater wetlands, shallow margins of tidal estuaries and inland rivers and lakes. May occasionally forage in grassland. Breeding occurs in colonies.	High - Species may forage in wetlands associated with Lollipop and Cherry Creeks.
<i>Falco hypoleucos</i>	Grey Falcon	PMST	VU	vu			Uncommon in Victoria, with an occasional vagrant from NSW found east of the Great Dividing Range. Usually restricted to arid and semi arid regions, particularly along grassland, shrubland and woodland watercourses. Can occur near wetlands and in open woodlands near the coast.	Low - Vagrant species with no previous records within a 5 km radius
<i>Falco subniger</i>	Black Falcon	VBA		cr	218	19/07/2019	Found in the arid and semi arid zones. It is usually found near watercourses or utilizing patches of isolated trees. It hunts over open wooded grasslands, saltbush plains, bluebush plains and other low vegetation.	Moderate - Based on the number of records in the area, the species is likely to periodically hunt over the study area and may breed in remnant or planted trees along the creeks.
<i>Gallinago hardwickii</i>	Latham's Snipe	PMST	M		60	11/04/2019	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture.	High - species is likely to utilise dense vegetation along Lollipop and Cherry Creeks, particularly near shallow marshy areas. May also roost in pasture near wetlands.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Gallinago megala</i>	Swinhoe's Snipe	PMST	M				Mostly occurring in the northern regions of Australia, this species inhabits wetland edges. This includes freshwater streams, brackish wetlands, billabongs and sewage ponds where dense grass and rushes are prominent around the edges. This species can also occur in drier cultivated areas and market gardens.	Low - No previous records within a 5km radius
<i>Gallinago stenura</i>	Pin-tailed Snipe	PMST	M				Mostly occurs in the northern regions of the country. This species inhabits shallow freshwater swamps, ponds and lakes that support emergent vegetation. They have also been known to occur in drier open wetlands and sewage ponds.	Low - No previous records within a 5km radius
<i>Gelochelidon macrotarsa</i>	Australian Gull-billed Tern	VBA		en as <i>Gelochelidon nilotica macrotarsa</i>	6	27/01/2008	Occur in a range of habitats including freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean.	Low - although some potential habitat occurs within the study area, the low number of records in the locality indicate that this species does not usually reside in the area.
<i>Geopelia cuneata</i>	Diamond Dove	VBA		vu	2	17/01/2019	The species is widely distributed in arid and semi-arid grassland savannah. They gather in small parties or flocks in dry open savanna in mulga areas often among spinifex or grasses. They are also often in open riparian woodland (beside waterways). They breed throughout their range, at any time after heavy rainfall.	Low - Species is rarely recorded in the area and the study area does not support optimal habitat.
<i>Grantiella picta</i>	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 - There are no records of this species in the locality and the potential habitat within the study area is of low quality for the species.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	VBA		en	454	28/07/2019	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs.	High - Species is likely to periodically hunt for prey across the study area. There is limited potential habitat for nesting.
<i>Hieraaetus morphnoides</i>	Little Eagle	VBA		vu	55	26/02/2019	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.	High - Species is likely to periodically hunt for prey across the study area. There is limited potential habitat for nesting.
<i>Hirundapus caudacutus</i>	White-throated Needletail	VBA PMST	VU, M	vu	7	8/02/2018	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns.	Moderate - Species may occasionally fly above the study area.
<i>Hydroprogne caspia</i>	Caspian Tern	VBA		vu	44	11/03/2019	Occur in most coastal regions of Australia and also occur inland along major rivers. 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 - There is minimal potential habitat in the study area for this species.
<i>Ixobrychus dubius</i>	Australian Little Bittern	VBA		en	1	23/11/2006	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.	Low - Despite the presence of potential habitat, particularly in wetlands along Lollipop and Cherry Creeks, the low number of records in the locality indicates that the species is unlikely to occur.
<i>Lathamus discolor</i>	Swift Parrot	VBA PMST	CR	cr	19	30/06/2019	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 <i>Acacia pycnantha</i> .	Low - There is minimal potential habitat in the study area for this species.
<i>Lewinia pectoralis</i>	Lewin's Rail	VBA		vu	107	24/07/2019	Three subspecies occur in Australia, with Rallus pectoralis being the subspecies that occurs on Australia's mainland east coast. Lewin's Rail 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.	High - species may utilise dense vegetation around wetlands, particularly along Lollipop and Cherry Creeks.
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	PMST	M		3	11/11/2007	In Victoria, Broad-billed Sandpipers are an annual visitor in small numbers in coastal regions, with rare inland records. They occur in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms, and in areas with large soft intertidal mudflats, which may have shell or sandbanks nearby. Occasionally they occur on reefs or rocky platforms. They have also been recorded in creeks, swamps and lakes near the coast, particularly those with bare mudflats or sand exposed by receding water.	Low - Very few previous records and minimal potential habitat.
<i>Limosa lapponica (baueri)</i>	Bar-tailed Godwit	VBA PMST	VU, M	vu	24	28/04/2018	Mainly in coastal habitats such as large intertidal sandflats, banks, harbours, coastal lagoons and bays. It is found often around beds of seagrass and nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks.	Low - Predominantly coastal and unlikely to utilise the freshwater habitat within the study area.
<i>Limosa limosa</i>	Black-tailed Godwit	VBA PMST	M	cr	311	30/05/2019	Species is primarily found in coastal habitats including sheltered bays, estuaries, and lagoons with intertidal mudflats or sandflats. It can also be found in sparsely vegetated near-coastal wetlands and has occasionally been recorded on rocky coasts or coral islets.	Low - Predominantly coastal and unlikely to utilise the freshwater habitat within the study area.
<i>Macronectes giganteus</i>	Southern Giant-Petrel	PMST	EN, M	en			Marine bird that occurs in Antarctic to subtropical waters.	Negligible - Pelagic bird not found inland
<i>Macronectes halli</i>	Northern Giant Petrel	PMST	VU, M	en			Found in offshore and inshore waters from Fremantle to Sydney mainly during the winter months.	Negligible - Pelagic bird not found inland

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Motacilla flava</i> (<i>Motacilla tschutschensis</i>)	Yellow Wagtail	PMST	M		1	1/05/2005	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 - Species is rarely recorded in the area.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	PMST	M				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 - There are no records of this species in the locality and the potential habitat within the study area is of low quality for the species.
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	VBA PMST	CR	cr	68	20/07/2020	Usually found in locations associated with coastal saltmarshes and adjacent pastures, close to free-standing water bodies.	Low - Study area does not support coastal saltmarsh.
<i>Numenius madagascariensis</i>	Eastern Curlew	VBA PMST	CR, M	cr	10	14/11/2018	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 - Species prefers coastal habitats and is unlikely to visit the study area.
<i>Numenius minutus</i>	Little Curlew	PMST	M		16	24/02/2008	Generally found in the north regions of Australia from WA to QLD, and rarely found in Victoria except for a few records around Port Phillip Bay. The Little Curlew inhabits freshwater pools, river beds and shallow edges around billabongs and also open woodlands and dry grasslands and floodplains.	Low - although some potential habitat occurs within the study area, the species does not commonly occur in the area and the potential habitat is generally of low quality.
<i>Numenius phaeopus</i>	Whimbrel	VBA		en	1	22/01/2018	The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms.	Low - There is minimal preferred habitat within the study area (mudflats).
<i>Oxyura australis</i>	Blue-billed Duck	VBA		vu	3004	28/07/2019	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 and paperbark Melaleuca.	Moderate - Although there are no large and deep open water areas, the species may occur periodically in wetlands along Lollipop and Cherry Creeks.
<i>Pachyptila turtur subantarctica</i>	Fairy Prion (southern)	PMST	VU				Has a circumpolar distribution, breeding on Macquarie island and other subantarctic islands. Uses areas of low vegetation to nest, burrowing among rocks and below mat forming herbs.	Negligible - Marine bird not found inland
<i>Pandion haliaetus</i> (<i>Pandion cristatus</i>)	Osprey	PMST	M		1	12/02/2018	Tolerates a wide variety of habitats, nesting in any location near a body of water providing an adequate food supply.	Low - Species may hunt over the study area however there are very few previous records in the locality.
<i>Pedionomus torquatus</i>	Plains-wanderer	VBA PMST	CR	cr	9	15/06/2008	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 - Study area does not support potential habitat for this species, with only dense grassy habitats and modified agricultural land.
<i>Phalaropus lobatus</i>	Red-necked Phalarope	PMST	M		24	11/05/2007	Has been recorded at a number of locations in Victoria, usually occurring in both inland and coastal aquatic environments such as lakes, swamps, artificial wetlands and sewage farms.	Low - Study area supports low quality potential habitat only.
<i>Philomachus pugnax</i>	Ruff (Reeve)	PMST	M		18	16/02/2008	Fresh, brackish or saline wetlands with exposed mud flats, occasionally on sheltered coasts, harbours, estuaries, sewage farms and salt works.	Low - Study area lacks preferred habitat with no large exposed mudflats.
<i>Pluvialis fulva</i>	Pacific Golden Plover	VBA PMST	M	vu	115	22/03/2019	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as Sarcocornia, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks.	Low - Study area lacks preferred habitat for this species
<i>Pluvialis squatarola</i>	Grey Plover	VBA PMST	M	vu	6	6/04/2018	In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes.	Low - Study area lacks preferred habitat for this species
<i>Polytelis swainsonii</i>	Superb Parrot	VBA	VU	en	1	24/04/1999	The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums and box eucalypts such as Yellow Box or Grey Box . The species also seasonally occurs in box-pine and Boree woodlands.	Low - There are no recent records in the locality and the study area supports low quality potential habitat only.
<i>Rhipidura rufifrons</i>	Rufous Fantail	PMST	M		2	1/04/2007	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 - Habitat within the study area is suboptimal and there are very few records of the species in the locality.
<i>Rostratula australis</i>	Australian Painted-snipe	VBA PMST	EN	cr	6	12/01/2012	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.	Moderate - Although there are few past records of the species in the locality, the species is somewhat cryptic and there is potential habitat along the creeks within the study area.
<i>Spatula rhynchotis</i>	Australasian Shoveler	VBA		vu	3648	28/07/2019	Uses a wide variety of wetlands; prefers large permanent lakes or swamps that have abundant cover.	Moderate - Although there are no large open water areas, the species may occur along Lollipop and Cherry Creeks.
<i>Sternula albifrons</i>	Little Tern	VBA PMST	M	cr	460	13/07/2019	Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches.	Negligible - Species occurs in coastal habitats only.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Sternula nereis (nereis)</i>	Fairy Tern	VBA PMST	VU as <i>Sternula nereis nereis</i>	cr	484	28/07/2019	Nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline.	Low - Species is predominantly coastal - preferred habitat not present in the study area.
<i>Stictonetta naevosa</i>	Freckled Duck	VBA		en	863	28/07/2019	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. Prefers permanent fresh water swamps and creeks with heavy growth of cumbungi (bullrushes), lignum or tea-tree.	Moderate - The species may occur along Lollipop and Cherry Creeks.
<i>Thalassarche bulleri</i>	Buller's Albatross	PMST	VU, M	en			Marine, pelagic species which breeds in New Zealand and occurs off the Australian coast from Coffs Harbour, south to Tasmania and west to Eyre Peninsula. They inhabit subtropical and subantarctic waters of the southern Pacific Ocean.	Negligible - Pelagic bird, not found inland
<i>Thalassarche bulleri platei</i>	Northern Buller's Albatross	PMST	VU				Marine, pelagic species which is a non-breeding visitor to Australian waters that sometimes reaches the east coast. In Australia, the species occurs over inshore, offshore and pelagic waters where it dives for food from the waters surface.	Negligible - Pelagic bird, not found inland
<i>Thalassarche cauta</i>	Shy Albatross	PMST	EN, M	en			An endemic breeder to Australia, the species congregates around southern Australia and Tasmania where it breeds on just three island colonies; Albatross Island, Pedra Branca and the Mewstone. The species occurs along coastlines and large bays but spends most of its time at sea.	Negligible - Pelagic bird, not found inland
<i>Thalassarche chrysostoma</i>	Grey-headed Albatross	PMST	EN, M	en			A marine, pelagic bird that inhabits subantarctic, subtropical, and occasionally Antarctic waters in the Pacific, Indian, Atlantic and Southern Oceans. They breed on Macquarie Island and remain at sea when not breeding.	Negligible - Pelagic bird, not found inland
<i>Thalassarche impavida</i>	Campbell Albatross	PMST	VU, M				A non breeding visitor to Australian waters that inhabits sub-Antarctic and subtropical waters. Most commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales.	Negligible - Pelagic bird, not found inland
<i>Thalassarche melanophris</i>	Black-browed Albatross	PMST	VU, M				Marine species that inhabits Antarctic, subantarctic and temperate waters and occasionally enters the tropics. It forages around the breaks of continental and island shelves and across nearby underwater banks. In the non-breeding season it follows cold water currents north to the continental shelves of Australia, South America and Africa where it can occur in coastal and inshore waters and sometimes enter fjords and channels.	Negligible - Species is marine
<i>Thalassarche salvini</i>	Salvin's Albatross	PMST	VU, M				Salvin's Albatross is a non-breeding visitor to Australian waters. It is a marine species that occurs in subantarctic and subtropical waters, both inshore and offshore where it is known to enter harbours and bays. Species is rarely found in pelagic waters.	Negligible - Species is marine
<i>Thalassarche steadi</i>	White-capped Albatross	PMST	VU, M				A marine species that occurs in subantarctic and subtropical waters, both inshore and offshore where it is known to enter harbours and bays. Species is rarely found in pelagic waters.	Negligible - Species is marine
<i>Thinornis cucullatus (cucullatus)</i>	Hooded Plover	VBA PMST	VU	vu	1	13/04/2017	The Hooded Plover is found predominately in coastal and subcoastal freshwater lakes, marshes, coastal lagoons and beaches. Beaches with seaweed and dunes typically have more abundant populations.	Negligible - Species is coastal, occurring primarily around beaches
<i>Tringa brevipes</i>	Grey-tailed Tattler	VBA PMST	M	cr	3	24/02/2019	This migratory species has a primarily northern Australian coastal distribution, often inhabiting sheltered coasts with rock platforms or intertidal mudflats. It has been known to occur in mangrove fringed estuaries and lagoons, and is occasionally found around near-coastal wetlands in sewage farms and saltworks.	Low - Species is predominantly coastal - preferred mudflat habitat not present in the study area.
<i>Tringa glareola</i>	Wood Sandpiper	VBA PMST	M	en	106	7/04/2019	Found in well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes with emergent aquatic plants and taller fringing vegetation.	Moderate - There is a small amount of low quality potential habitat within the study area in wetlands along the creeks.
<i>Tringa nebularia</i>	Common Greenshank	VBA PMST	M	en	944	9/06/2019	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 - There is no preferred habitat within the study area for this species
<i>Tringa stagnatilis</i>	Marsh Sandpiper	VBA PMST	M	en	668	2/04/2019	Permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks.	Low - There is no preferred habitat within the study area for this species
<i>Turnix pyrrhotorax</i>	Red-chested Button-quail	VBA		en	4	26/11/2010	Dense grasslands, and open, grassy, woodland of Acacia, River Red Gum and Black box or Melaleuca, but also in crops and weedy fields with dense ground cover, and from coastal plains.	Moderate - Study area supports weedy fields with dense ground cover, the species may occur.
<i>Tyto novaehollandiae</i>	Masked Owl	VBA		cr	1	16/04/1884	Found in forests, woodlands, timbered waterways and open country on the fringe of these areas. They prefer tall trees with hollows for nesting and roosting.	Low - There is no preferred habitat within the study area for this species and no recent records in the locality.
<i>Xenus cinereus</i>	Terek Sandpiper	VBA PMST	M	en	104	11/06/2017	Mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire.	Low - There is no preferred habitat within the study area for this species
<i>Antechinus minimus maritimus</i>	Swamp Antechinus	PMST	VU	vu			Habitat includes dense wet heathlands, tussock grasslands, sedgeland, damp gullies, swamps and some shrubby woodlands, often in landscape settings with little exposure to the sun.	Low - No previous records in a 5km radius of the study area

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Dasyurus maculatus maculatus</i>	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.	Negligible - There is no preferred habitat within the study area for this species and no nearby records
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot	VBA	EN	en	1	07/07/1881	Inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types. Within these vegetation communities they typically inhabit areas of dense ground cover.	Low - There is no preferred habitat within the study area for this species and no recent nearby records
<i>Miniopterus orianae oceanensis</i>	Eastern Bent-winged Bat	VBA		cr	2	17/02/2016	Species occurs along the east and north-west coasts of Australia where they inhabit caves but also use derelict mines, storm-water tunnels, buildings and other man-made structures as roosting sites.	Low - There are no potential roosting sites within the study area and very few recent records within a 5km radius, although the species may periodically forage in the area.
<i>Ornithorhynchus anatinus</i>	Platypus	VBA		vu	33	8/11/2015	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 - There is some potential habitat within the study area, particularly the higher quality, deeper and treed sections of Lollipop Creek. However, connectivity to other areas of potential platypus habitat is poor.
<i>Perameles gunnii</i>	Eastern Barred Bandicoot	VBA	EN	en	6	6/02/1982	Extinct in the wild in Victoria.	Negligible - Species is extinct in the wild in Victoria
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VBA PMST	VU	vu	7	26/02/2019	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.	Moderate - The species may periodically fly over or visit remnant and planted eucalypts to forage, however there is minimal potential habitat within the study area.
<i>Caretta caretta</i>	Loggerhead Turtle	PMST	EN, M				The Loggerhead Turtle occurs in the waters of coral and rocky reefs, seagrass beds and muddy bays throughout eastern, northern and western Australia, although are uncommon in South Australia, Victoria and Tasmania. They nest on open, sandy beaches free from light pollution, and show fidelity to both their foraging and breeding areas.	Negligible - Species is marine
<i>Chelonia mydas</i>	Green Turtle	PMST	VU, M				Green Turtles spend their first five to ten years drifting on ocean currents before they begin to use shallow benthic foraging habitats such as seaweed-rich coral reefs and inshore seagrass pastures in tropical and subtropical areas of the Indo-Pacific region.	Negligible - Species is marine
<i>Delma impar</i>	Striped Legless Lizard	VBA PMST	VU	en	6	24/08/1990	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 (previously moderate) - The study area supports patches of native grassland vegetation. However, the species was not recorded during targeted surveys undertaken in the 2022-2023 Striped Legless Lizard season.
<i>Dermochelys coriacea</i>	Leatherback Turtle	PMST	EN, M	cr			Leatherback turtles occur in tropical and temperate waters across Australia. While no major nesting sites have been recorded in Australia, the species has been recorded feeding in the coastal waters of all Australian States including south-east Australia from Tasmania, Victoria and eastern South Australia.	Negligible - Species is marine
<i>Emydura macquarii</i>	Murray River Turtle	VBA		cr	1	7/12/2006	Primarily found in the Murray River Basin and its major tributaries.	Low - Very few previous records and species is not usually known from the area.
<i>Pseudemoia pagenstecheri</i>	Tussock Skink	VBA		en	2	18/03/2016	Found in the Grampians in the west through the basalt plains west of Melbourne to the North-east Victoria. Among medium to long grass tussocks in open grasslands where trees are absent or sparse.	High - Study area is highly modified but species is considered likely to occur in areas of remnant and uncultivated grassland. Targeted surveys for Striped Legless Lizard in 2022 will also target this species.
<i>Tympanocryptis pinguicolla</i>	Grassland Earless Dragon	PMST	EN	cr			Only three known extant subpopulations (genetically distinct) remaining, which are found in New South Wales and the Australian Capital Territory. The species may have declined to extinction in Victoria. The Grassland Earless Dragon inhabits natural temperate grasslands. The species utilises burrows of wolf spiders, burrows of wood crickets, embedded surface rocks and tussocks which are critical habitat components for their survival.	Low - No previous records within a 5km radius, species considered extinct in Victoria.
<i>Litoria raniformis</i>	Growling Grass Frog	VBA PMST	VU	vu	120	1/03/2019	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 (previously moderate) - Species has the potential to utilise areas of Lollypop Creek and Cherry Creek within the study area, however was not recorded during targeted surveys. There is the potential for the species to recolonise and the possibility that the species is present but was undetectable in the study area at the time of survey.
<i>Pseudophryne bibronii</i>	Brown Toadlet	VBA		en	1	4/05/1962	Usually found singly under rocks and logs on slopes in grasslands or beside ditches. Found both in wet and dry sclerophyll forest. Breeding congregations usually occur in inundated grassy areas beside gutters, small creeks etc.	Low - There is no preferred habitat and no recent records in the locality
<i>Galaxiella pusilla</i>	Eastern 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 – There are no nearby records of this species.
<i>Lamna nasus</i>	Mackerel Shark	PMST	M				In Australia, the species occurs in waters from southern Queensland to south-west Australia where they typically occur in oceanic waters off the continental shelf, although they occasionally enter coastal waters.	Negligible - Species is marine

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC Act	FFG ACT				
<i>Nannoperca obscura</i>	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 – There are no previous records nearby and the species is not known from the catchment associated with the creeks in the study area.
<i>Prototroctes maraena</i>	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 5 km radius and potential habitat is low quality. The closest records are associated with the Barwon River to the west and Maribyrnong River to the east.
<i>Tandanus tandanus</i>	Freshwater Catfish	VBA		en	2	16/05/2013	In Victoria the species has been recorded in northern regions of the Murray Darling Basin that border NSW. It is a benthic species that is more commonly found in slow flowing streams and lakes.	Low - Site is not located near known primary habitat and there are few records within a 5 km radius and none from the catchment associated with the creeks in the study area.
<i>Synemon plana</i>	Golden Sun Moth	VBA PMST	VU	vu	82	29/11/2017	This species occurs in Natural Temperate Grasslands, exotic grassland and some secondary grassland. Larvae feed on the roots of native grasses, particularly wallaby grasses <i>Rytidosperma spp.</i> They also feed on the introduced noxious weed Chilean Needlegrass <i>Nassella neesiana</i> .	Low - The study area supports patches of native grassland vegetation as well as thick areas of Chilean Needlegrass. However, grassland and exotic grassy areas are quite dense without the inter-tussock space preferred by the species. The species was not recorded during targeted surveys undertaken in the 2021-22 Golden Sun Moth season.

Conservation Status used in the table above:

Conservation Status in Australia

Listing under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999:

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

Conservation Status in Victoria

Status under the Flora and Fauna Guarantee Act 1988

cr = Critically Endangered, en = Endangered, vu = Vulnerable

APPENDIX C

MAPPING

C1.

HISTORIC RECORDS AND MODELLING

Werribee Station

Figure C-1
Desktop Assessment

Legend

- Threatened Flora Species Records
- Threatened Fauna Species Records
- Watercourse
- PSP Boundary
- PSP Study Area
- Current Wetland
- Ramsar Wetland
- Environmental Significance Overlay
- Parks and Reserves
- Melbourne Strategic Assessment - Biodiversity Conservation Strategy
- Melbourne Strategic Assessment - Regional Rail Link

Modelled Vegetation – NV 2005

- Cane Grass Wetland
- Plains Grassland
- Plains Grassy Wetland
- Plains Grassy Woodland



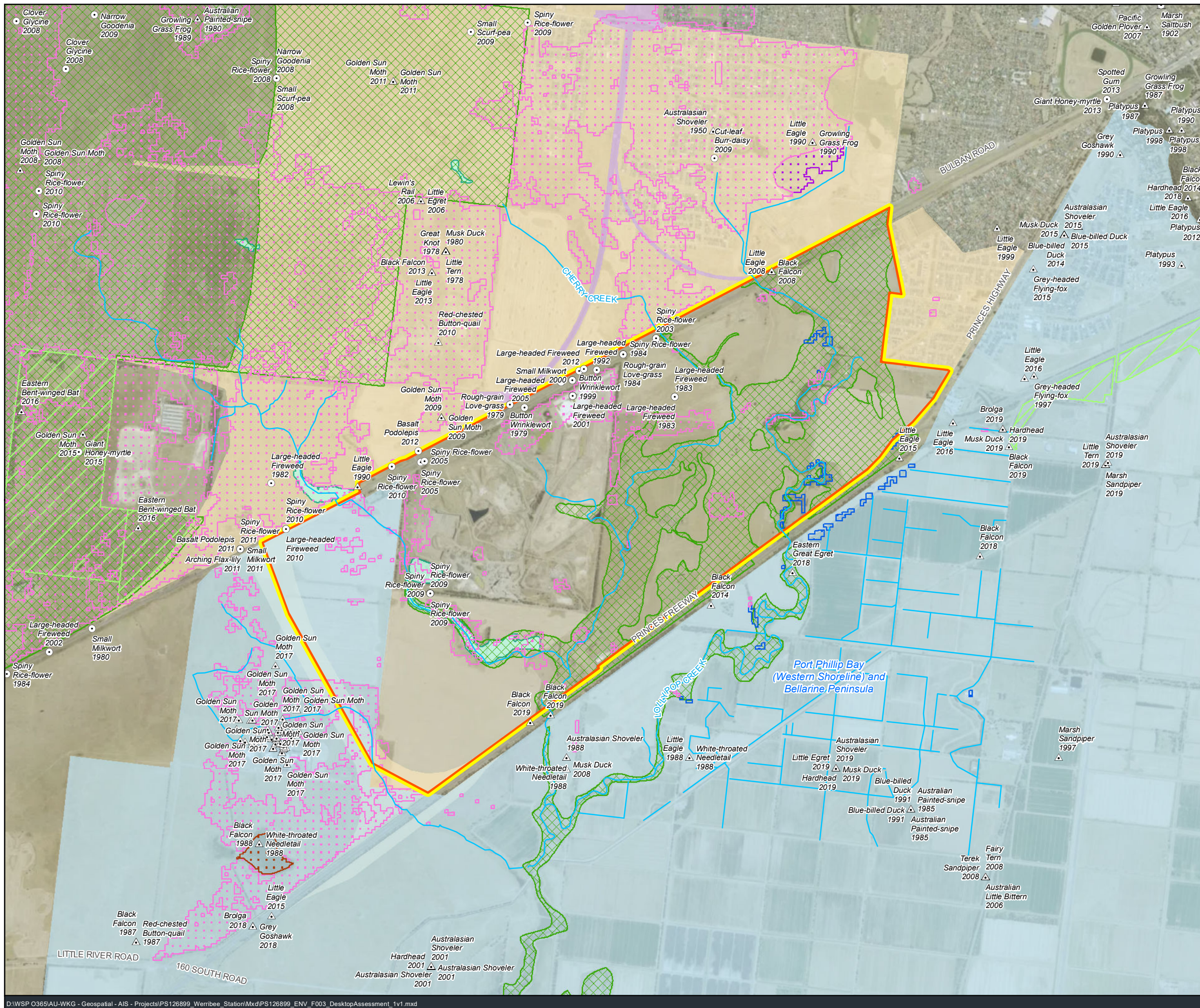
0 200 400
Meters

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A3

1:30,000 Date: 07-Apr-22

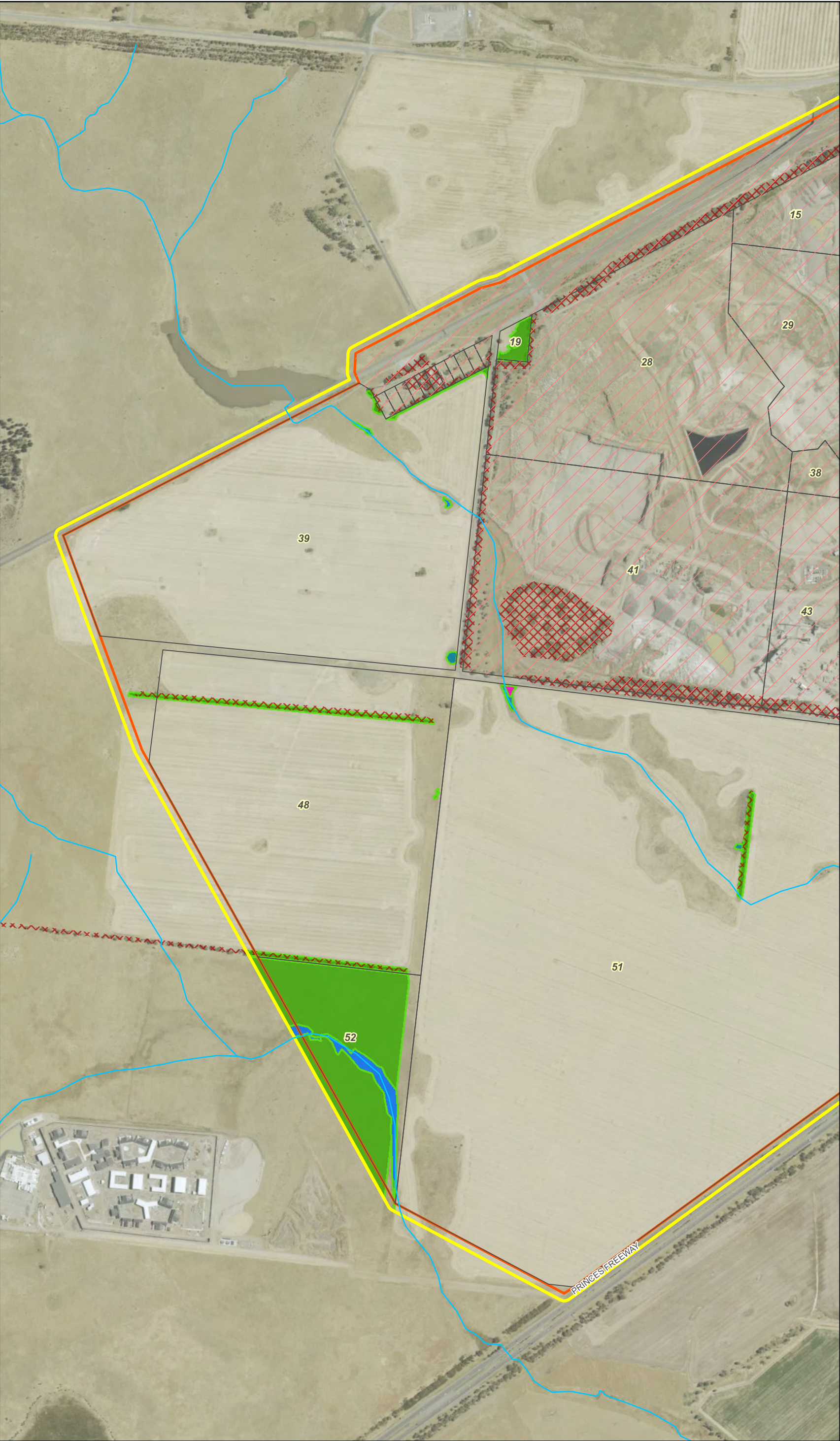
Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. WSP is a Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty Ltd.



C2.

ECOLOGICAL VALUES



Legend

Indigenous Trees

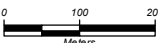
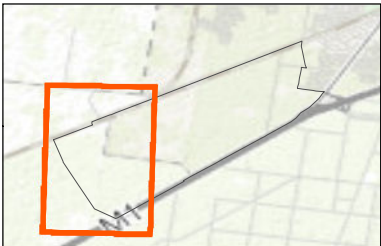
- Small Tree
- Large Tree
- Habitat Trees
- Watercourse
- No Acces

Property #

- PSP Study Area
- PSP Boundary
- Revegetation

Native Vegetation Patches

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Woodland 55
- Plains Grassland Lighter Soils 132 62
- Plains Grassy Wetland 125
- Tall Marsh 821



Coordinate system: GDA2020 MGA Zone 55

Scale ratio correct when printed at A3

1:10,000

Date: 08-Apr-22

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty

Legend

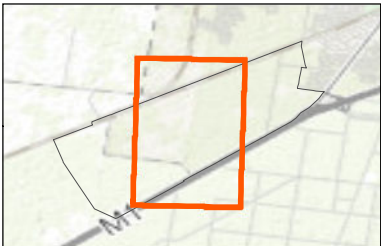
Indigenous Trees

- Small Tree
- Large Tree
- Habitat Trees
- Watercourse
- No Acces

- Property #
- PSP Study Area
- PSP Boundary
- Revegetation

Native Vegetation Patches

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Woodland 55
- Plains Grassland Lighter Soils 132 62
- Plains Grassy Wetland 125
- Tall Marsh 821



Coordinate system: GDA2020 MGA Zone 55

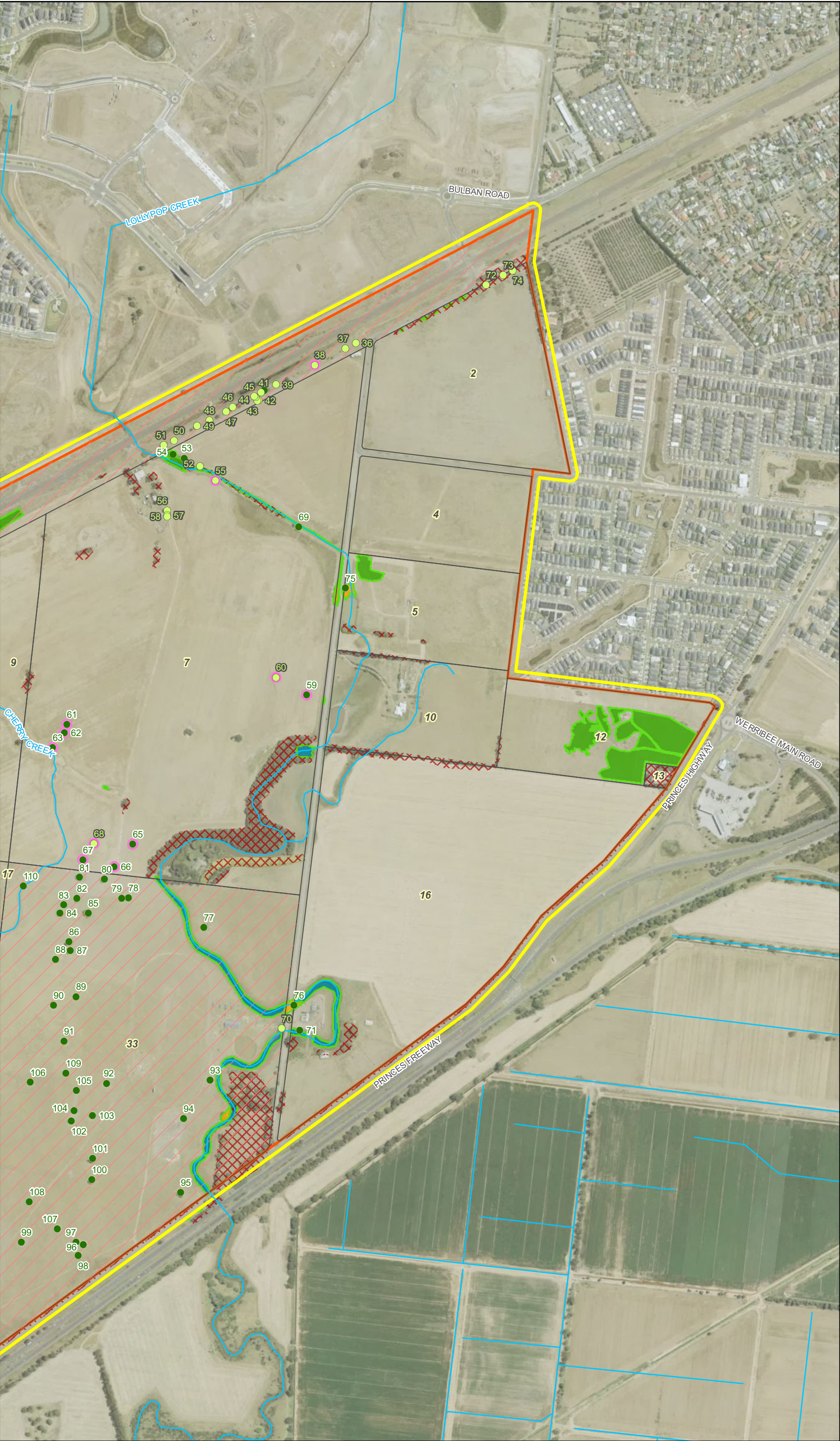
Scale ratio correct when printed at A3

1:10,000

Date: 08-Apr-22

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty



Legend

Indigenous Trees

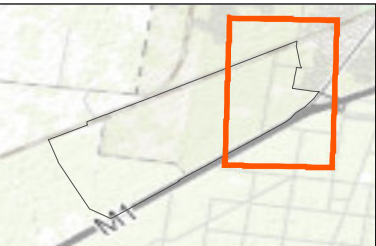
- Small Tree
- Large Tree
- Habitat Trees
- Watercourse
- No Acces

Property #

- PSP Study Area
- PSP Boundary
- Revegetation

Native Vegetation Patches

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Woodland 55
- Plains Grassland Lighter Soils 132 62
- Plains Grassy Wetland 125
- Tall Marsh 821



0 100 200
Meters

Coordinate system: GDA2020 MGA Zone 55

Scale ratio correct when printed at A3

1:10,000

Date: 08-Apr-22

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty

C3.

TARGETED FLORA SURVEY EFFORT

Legend

Significant Flora Observed

- Atriplex Paludosa Subsp. Paludosa Marsh Saltbush
- Rhagodia parabolica Fragrant Saltbush
- Senecio Macrocarpus Large-Headed Fireweed

Survey Tracks

- 27 October 2021
- 9 November 2021
- 16 November 2021
- 23 November 2021
- 29 July 2022
- 12 August 2022
- Watercourse

- Property #
- PSP Study Area
- PSP Boundary

EPBC Act communities

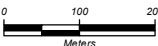
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Natural Temperate Grassland of the Victorian Volcanic Plain - mapped over fence
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

FFG Act communities

- Western Basalt Plains Grassland

Native Vegetation Patches

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Woodland 55
- Plains Grassland Lighter Soils 132 62
- Plains Grassy Wetland 125
- Tall Marsh 821



Coordinate system: GDA2020 MGA Zone 55

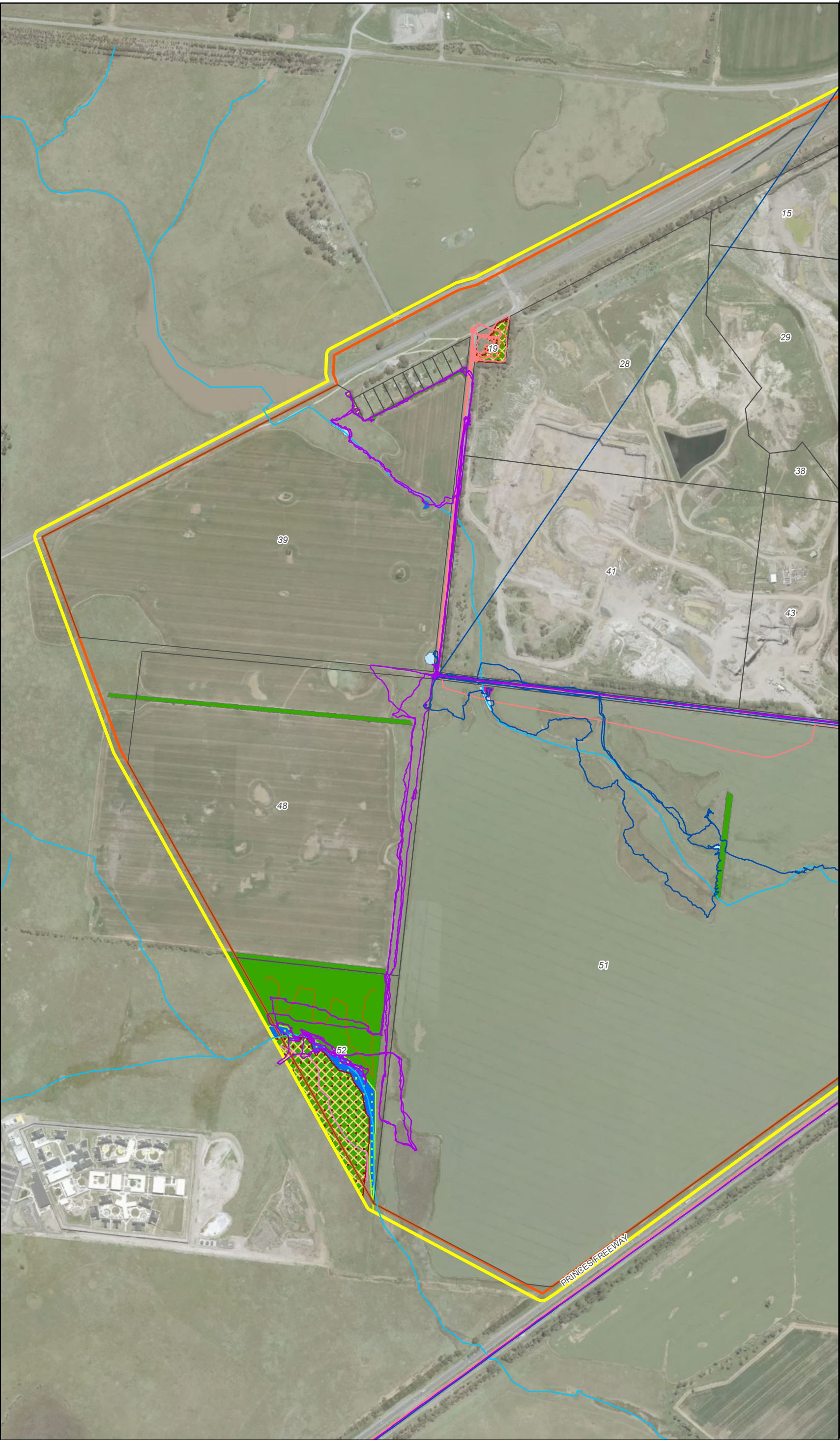
Scale ratio correct when printed at A3

1:10,000

Date: 14/02/2023

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty Ltd.





Werribee Station

Figure C-3
Targeted Flora Survey

Legend

Significant Flora Observed

- Atriplex Paludosa Subsp. Paludosa Marsh Saltbush
- Rhagodia parabolica Fragrant Saltbush
- Senecio Macrocarpus Large-Headed Fireweed

Survey Tracks

- 27 October 2021
- 9 November 2021
- 16 November 2021
- 23 November 2021
- 29 July 2022
- 12 August 2022
- Watercourse
- Property #
- PSP Study Area
- PSP Boundary

EPBC Act communities

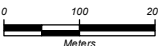
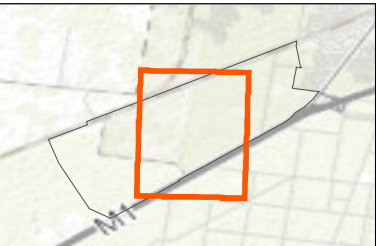
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Natural Temperate Grassland of the Victorian Volcanic Plain - mapped over fence
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

FFG Act communities

- Western Basalt Plains Grassland

Native Vegetation Patches

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Woodland 55
- Plains Grassland Lighter Soils 132 62
- Plains Grassy Wetland 125
- Tall Marsh 821



Coordinate system: GDA2020 MGA Zone 55

Scale ratio correct when printed at A3

1:10,000

Date: 14/02/2023

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty Ltd.



Legend

Significant Flora Observed

- Atriplex Paludosa Subsp. Paludosa Marsh Saltbush
- Rhagodia parabolica Fragrant Saltbush
- Senecio Macrocarpus Large-Headed Fireweed

Survey Tracks

- 27 October 2021
- 9 November 2021
- 16 November 2021
- 23 November 2021
- 29 July 2022
- 12 August 2022
- Watercourse
- Property #
- PSP Study Area
- PSP Boundary

EPBC Act communities

- Natural Temperate Grassland of the Victorian Volcanic Plain
- Natural Temperate Grassland of the Victorian Volcanic Plain - mapped over fence
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

FFG Act communities

- Western Basalt Plains Grassland

Native Vegetation Patches

- Aquatic Herbland 653
- Creekline Grassy Woodland 68
- Plains Grassy Woodland 55
- Plains Grassland Lighter Soils 132 62
- Plains Grassy Wetland 125
- Tall Marsh 821



Coordinate system: GDA2020 MGA Zone 55

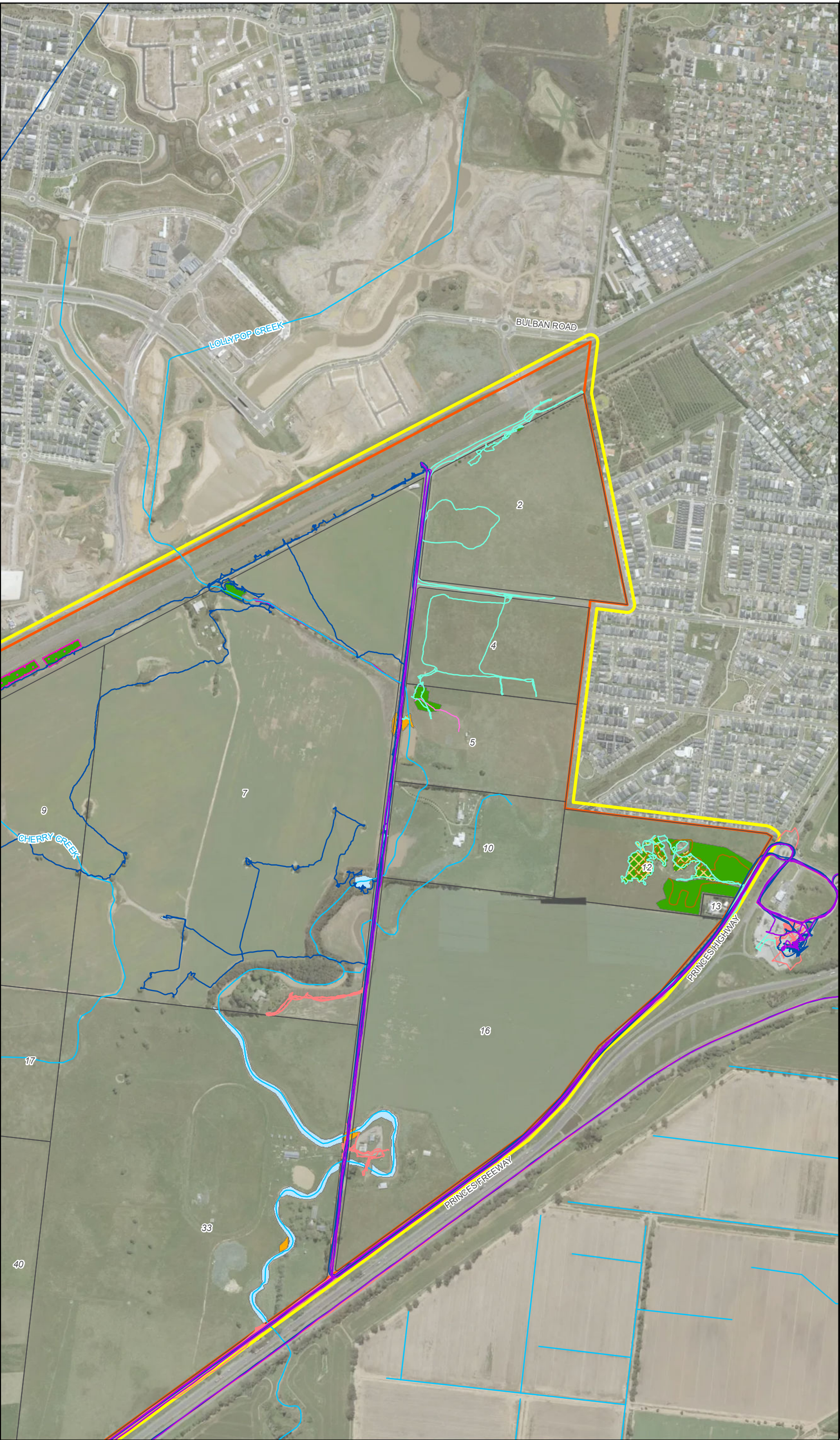
Scale ratio correct when printed at A3

1:10,000

Date: 14/02/2023

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCISI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty Ltd.

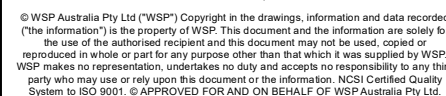


C4.

TARGETED FAUNA SURVEY EFFORT



■ Unvegetated shallow water





Werribee Junction Precinct

Figure C-4
Targeted Fauna Survey Effort

Legend

- Growing Grass Frog Survey Locations
- Striped Legless Lizard Survey Grids

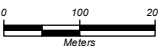
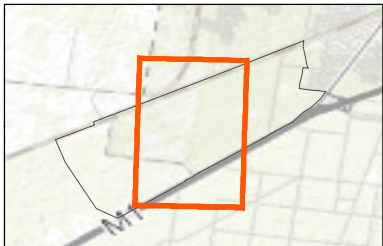
Golden Sun Moth Survey Tracks

- 29 November 2021
- 6 December 2021
- 14 December 2021
- 17 December 2021
- 21 December 2021
- 10 January 2022
- Watercourse
- No Access

- Property #
- PSP Boundary
- PSP Study Area

Understory Fauna Habitats

- Aquatic - deep marsh
- Deep water
- Ephemeral shallow marsh - high quality
- Ephemeral shallow marsh - lower quality
- Highly modified uncultivated land
- Remnant grassland inc. Wallaby Grass
- Uncultivated low quality grassland
- Unvegetated shallow water



Coordinate system: GDA2020 MGA Zone 55

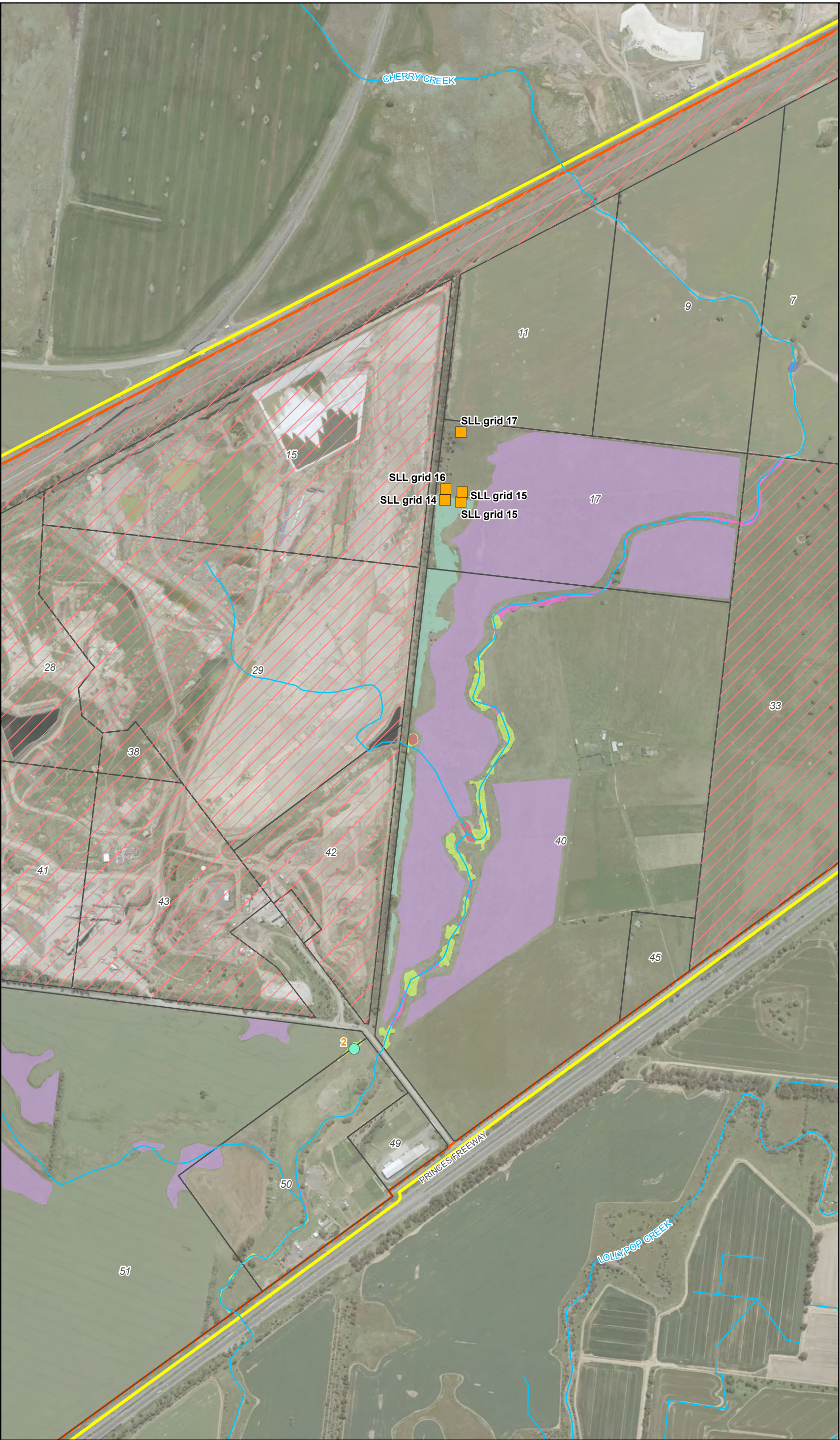
Scale ratio correct when printed at A3

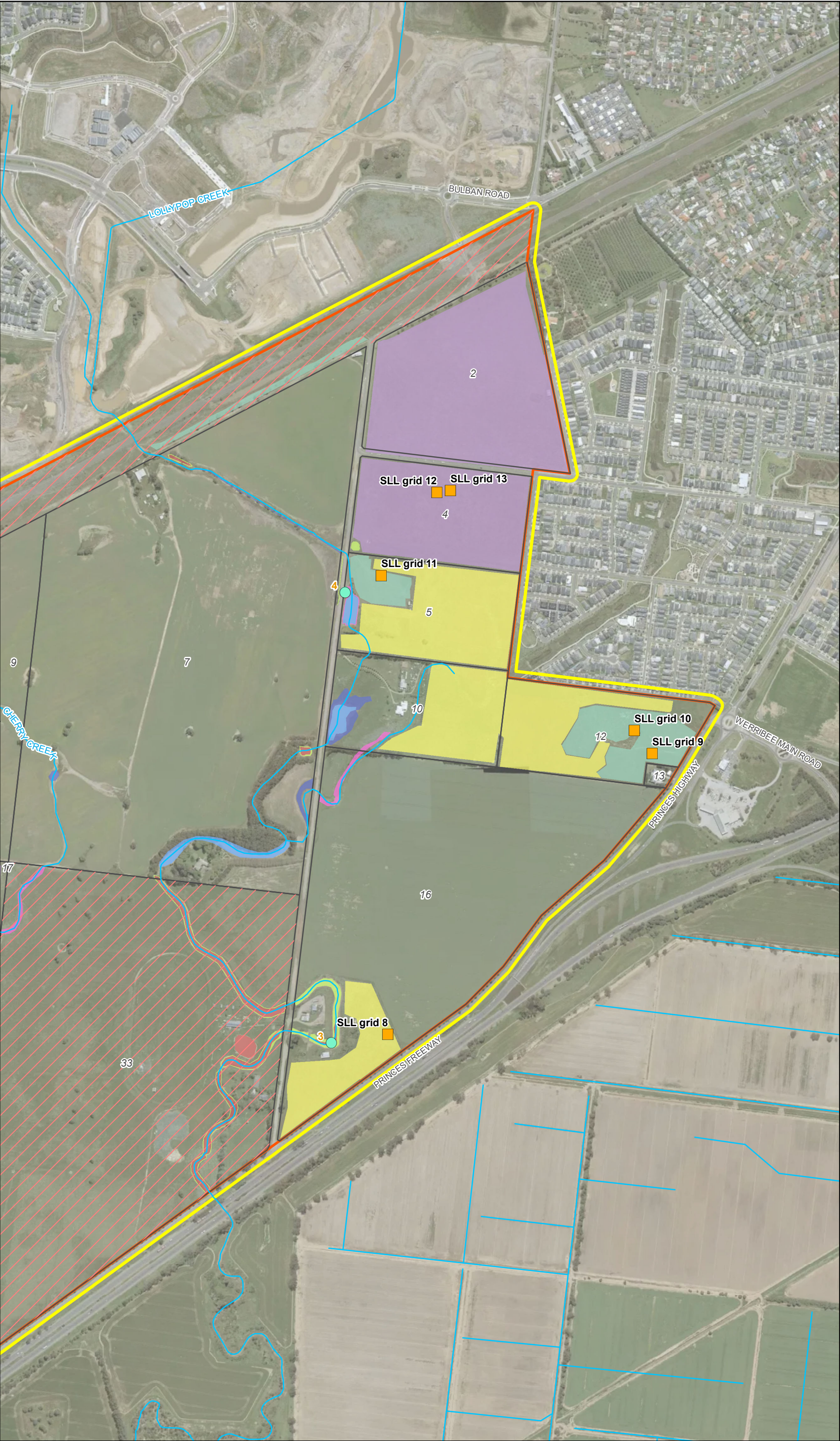
1:10,000

Date: 8/02/2023

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty Ltd.





Legend

- Growling Grass Frog Survey Locations
- Striped Legless Lizard Survey Grids

Golden Sun Moth Survey Tracks

- 29 November 2021
- 6 December 2021
- 14 December 2021
- 17 December 2021
- 21 December 2021
- 10 January 2022
- Watercourse
- No Access

- Property #
- PSP Boundary
- PSP Study Area

Understory Fauna Habitats

- Aquatic - deep marsh
- Deep water
- Ephemeral shallow marsh - high quality
- Ephemeral shallow marsh - lower quality
- Highly modified uncultivated land
- Remnant grassland inc. Wallaby Grass
- Uncultivated low quality grassland
- Unvegetated shallow water



Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A3
1:10,000 Date: 8/02/2023

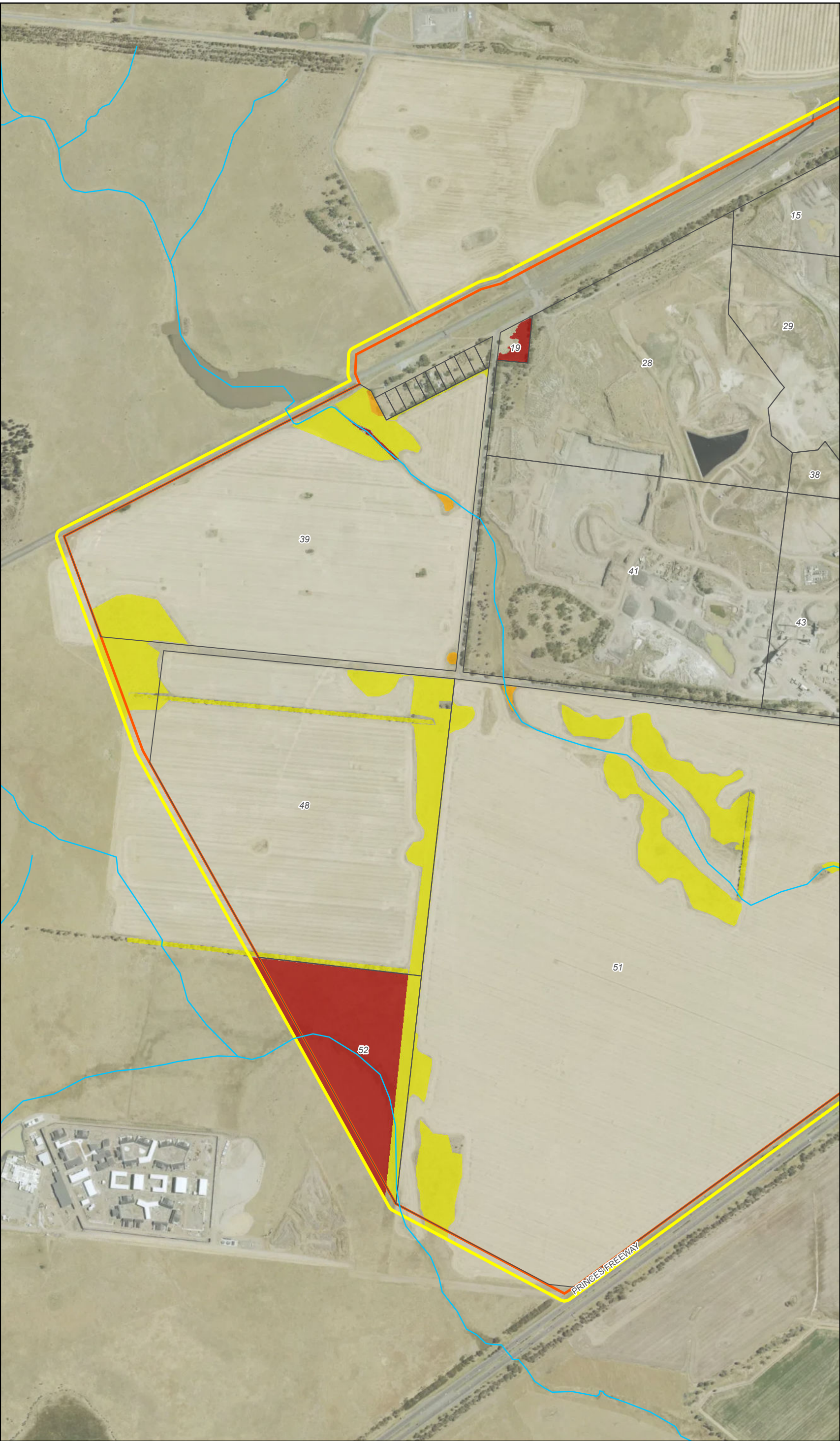
Data sources: DELWP, WSP 2022
© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty Ltd.

C5.

HABITAT RETENTION PRIORITY

Legend

- Watercourse
- Property #
- PSP Boundary
- PSP Study Area
- Retention Priority
 - High
 - Moderate
 - Low

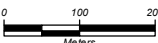
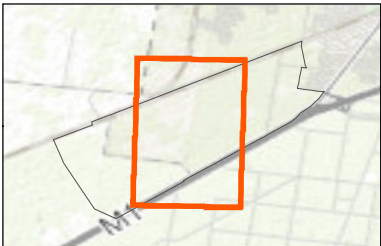
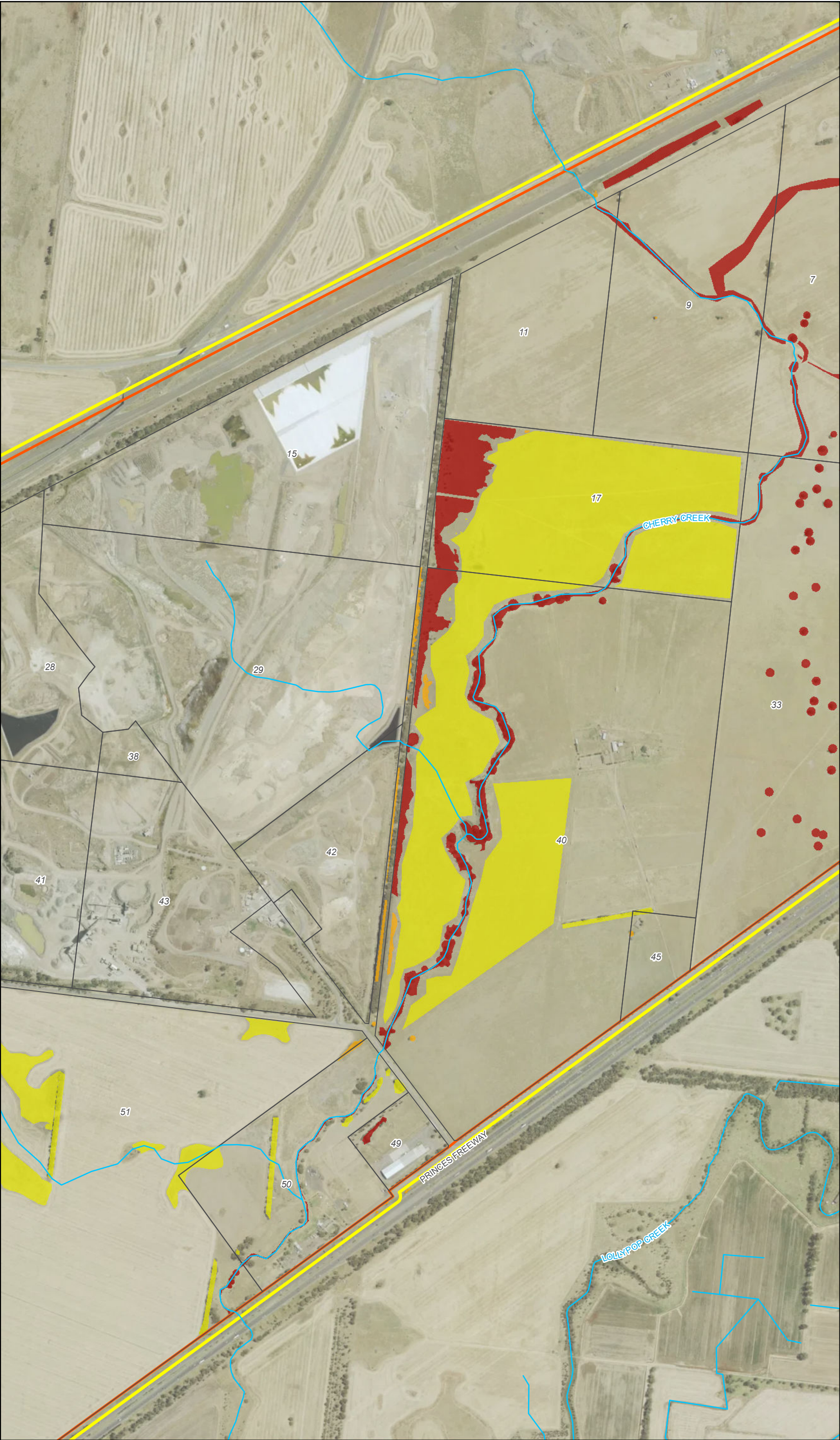


Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A3
1:10,000 Date: 08-Apr-22

Data sources: DELWP, WSP 2022
© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty

Legend

- Watercourse
- Property #
- PSP Boundary
- PSP Study Area
- Retention Priority
 - High
 - Moderate
 - Low



Coordinate system: GDA2020 MGA Zone 55

Scale ratio correct when printed at A3

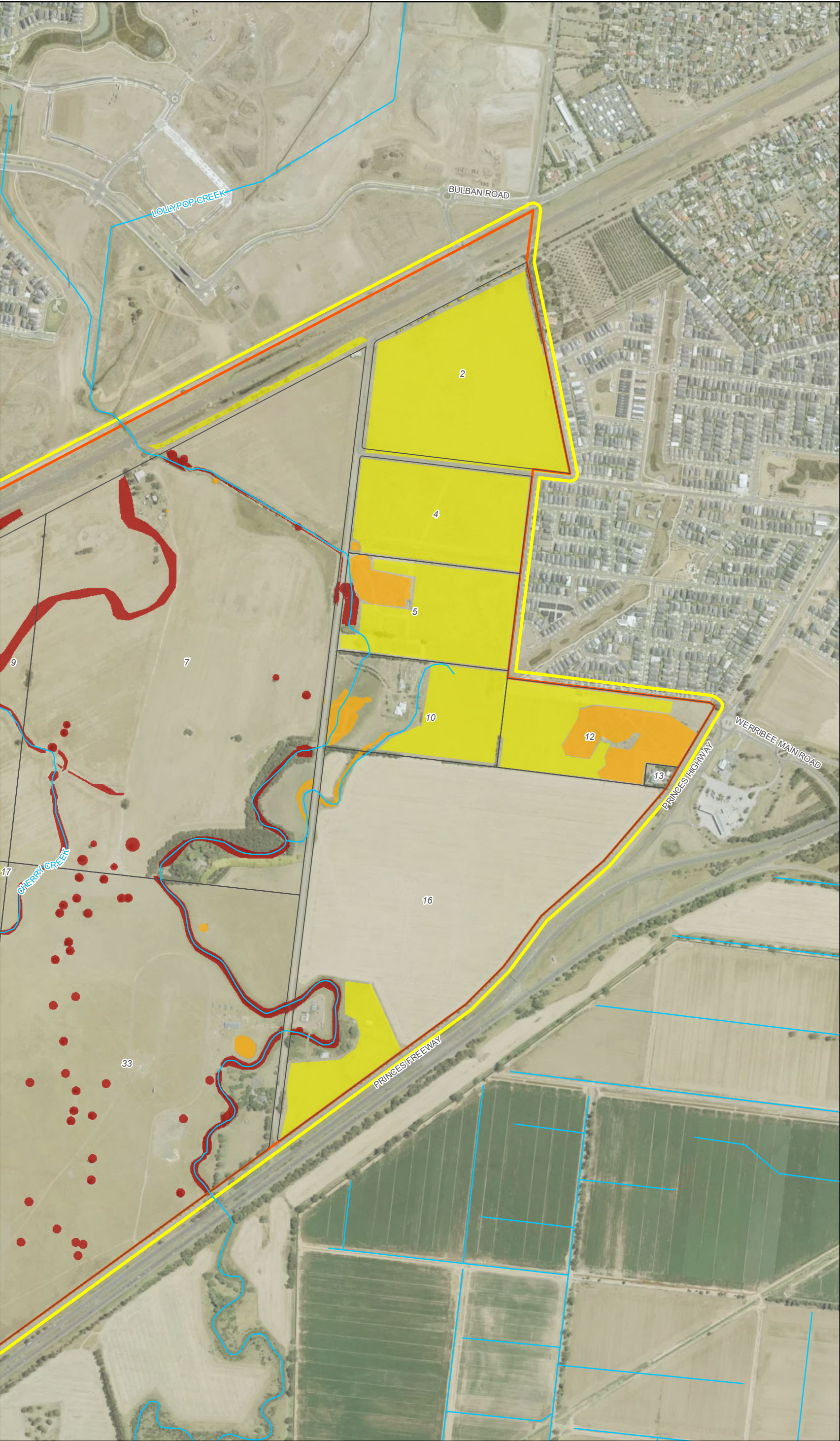
1:10,000

Date: 08-Apr-22

Data sources: DELWP, WSP 2022

© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty

Figure C-5
Habitat Retention Priority Map



Legend

- Watercourse
- Property #
- PSP Boundary
- PSP Study Area
- Retention Priority**
 - High
 - Moderate
 - Low



Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A3
1:10,000 Date: 08-Apr-22

Data sources: DELWP, WSP 2022
© WSP Australia Pty Ltd ("WSP") Copyright in the drawings, information and data recorded ("the information") is the property of WSP. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that which it was supplied by WSP. WSP makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information. NCSI Certified Quality System to ISO 9001. © APPROVED FOR AND ON BEHALF OF WSP Australia Pty

APPENDIX D

NATIVE VEGETATION PATCHES, HABITAT
HECTARE SCORING, AND ENSYM
ATTRIBUTION

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: 29/03/2022
Time of issue: 3:24 pm

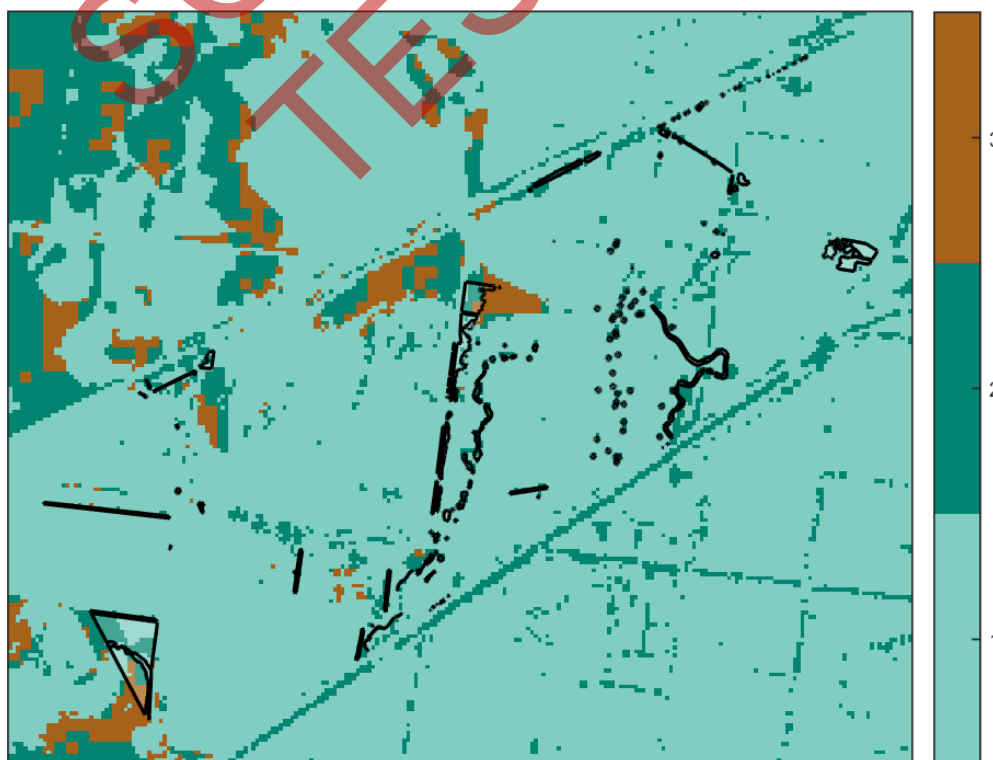
Report ID: Scenario Testing

Project ID WSP_EnSym_Werribee_1

Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	40.157 ha
Extent of past removal	0.000 ha
Extent of proposed removal	40.157 ha
No. Large trees proposed to be removed	75
Location category of proposed removal	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species. The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map); and a wetland designated under the Convention on Wetlands of International Importance (the Ramsar Convention).

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 amount¹	0.942 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Wyndham City Council
Minimum strategic biodiversity value score ²	0.361
Large trees*	6 large trees
Species offset amount³	19.630 species units of habitat for Prickly Arrowgrass, <i>Triglochin mucronata</i> 9.813 species units of habitat for Red-chested Button-quail, <i>Turnix pyrrhothorax</i> 19.930 species units of habitat for Small Golden Moths, <i>Diuris basaltica</i> 20.088 species units of habitat for Heath Spear-grass, <i>Austrostipa exilis</i> 0.272 species units of habitat for Sunshine Diuris, <i>Diuris fragrantissima</i>
Large trees*	69 trees
* The total number of large trees that the offset must protect	75 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).

SCENARIO
TESTING

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:

$$\text{Species habitat units} = \text{extent} \times \text{condition} \times \text{species landscape factor} \times 2, \text{ where the species landscape factor} = 0.5 + (\text{habitat importance score}/2)$$

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:

$$\text{General habitat units} = \text{extent} \times \text{condition} \times \text{general landscape factor} \times 1.5, \text{ where the general landscape factor} = 0.5 + (\text{strategic biodiversity value score}/2)$$

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
1-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.470		0.007	General
2-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.700	0.011	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.484	0.011	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.484	0.011	503984 Heath Spear-grass <i>Austrostipa exilis</i>
3-St		vvp_0132	Endangered	1	no	0.200	0.071	0.038	0.460	0.700	0.013	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.700	0.013	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.700	0.013	503984 Heath Spear-grass <i>Austrostipa exilis</i>
4-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.466	0.674	0.024	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.674	0.024	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.674	0.024	503984 Heath Spear-grass <i>Austrostipa exilis</i>
5-St		vvp_0132	Endangered	0	no	0.200	0.031	0.030	0.470	0.560	0.009	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.560	0.009	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.560	0.009	503984 Heath Spear-grass <i>Austrostipa exilis</i>
6-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460		0.015	General
7-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.470		0.007	General
8-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.470	0.640	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.640	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.640	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
9-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.465	0.009	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.450	0.009	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.465	0.009	503984 Heath Spear-grass <i>Austrostipa exilis</i>
10-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.660	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.660	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
11-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460		0.007	General
12-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460		0.007	General
13-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.680	0.024	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.193	0.024	503984 Heath Spear-grass <i>Austrostipa exilis</i>
14-St		vvp_0132	Endangered	0	no	0.200	0.031	0.009	0.460		0.002	General
15-St		vvp_0132	Endangered	0	no	0.200	0.031	0.018	0.460		0.004	General
16-St		vvp_0132	Endangered	0	no	0.200	0.031	0.016	0.460		0.003	General
17-St		vvp_0132	Endangered	0	no	0.200	0.031	0.013	0.460		0.003	General
18-St		vvp_0132	Endangered	0	no	0.200	0.031	0.020	0.460		0.004	General
19-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460		0.007	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
20-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460		0.007	General
21-St		vvp_0132	Endangered	0	no	0.200	0.031	0.028	0.460	0.594	0.009	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.525	0.009	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.594	0.009	503984 Heath Spear-grass <i>Austrostipa exilis</i>
22-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.590	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.590	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.590	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
23-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.580	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.580	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.580	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
24-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.536	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.536	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.536	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
25-St		vvp_0132	Endangered	0	no	0.200	0.031	0.021	0.460	0.540	0.006	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.540	0.006	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.540	0.006	503984 Heath Spear-grass <i>Austrostipa exilis</i>
26-St		vvp_0132	Endangered	1	no	0.200	0.071	0.042	0.460	0.429	0.012	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.429	0.012	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.429	0.012	503984 Heath Spear-grass <i>Austrostipa exilis</i>
27-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.505	0.009	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.505	0.009	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.505	0.009	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
28-St		vvp_0132	Endangered	0	no	0.200	0.031	0.027	0.460		0.006	General
29-St		vvp_0132	Endangered	0	no	0.200	0.031	0.014	0.460		0.003	General
30-St		vvp_0132	Endangered	0	no	0.200	0.031	0.019	0.460		0.004	General
31-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.657	0.023	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.592	0.023	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.592	0.023	503984 Heath Spear-grass <i>Austrostipa exilis</i>
32-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.610	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.384	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.610	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
33-St		vvp_0132	Endangered	1	no	0.200	0.071	0.066	0.460	0.432	0.019	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.432	0.019	503984 Heath Spear-grass <i>Austrostipa exilis</i>
34-St		vvp_0132	Endangered	1	no	0.200	0.071	0.066	0.460	0.497	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.497	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
35-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.506	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.298	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.506	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
36-St		vvp_0132	Endangered	0	no	0.200	0.031	0.029	0.470	0.690	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.690	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.690	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
37-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.390	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.390	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.390	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
38-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.474	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.474	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.474	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
39-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.497	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.497	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.497	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
40-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.460	0.380	0.009	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.380	0.009	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.380	0.009	503984 Heath Spear-grass <i>Austrostipa exilis</i>
41-St		vvp_0132	Endangered	1	no	0.200	0.071	0.062	0.470	0.590	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.231	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.231	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
42-St		vvp_0132	Endangered	0	no	0.200	0.031	0.028	0.450	0.346	0.008	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.346	0.008	503984 Heath Spear-grass <i>Austrostipa exilis</i>
43-St		vvp_0132	Endangered	1	no	0.200	0.071	0.042	0.450	0.336	0.011	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.336	0.011	503984 Heath Spear-grass <i>Austrostipa exilis</i>
44-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.470	0.670	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.670	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.670	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
45-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.200	0.570	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.570	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.570	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
46-St		vvp_0132	Endangered	0	no	0.200	0.031	0.031	0.200	0.570	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.570	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.570	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
47-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.450	0.450	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.450	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.450	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
48-St		vvp_0132	Endangered	1	no	0.200	0.071	0.061	0.460	0.512	0.018	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.512	0.018	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.512	0.018	503984 Heath Spear-grass <i>Austrostipa exilis</i>
49-St		vvp_0132	Endangered	1	no	0.200	0.071	0.061	0.460	0.510	0.018	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.510	0.018	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.510	0.018	503984 Heath Spear-grass <i>Austrostipa exilis</i>
50-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.570	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.570	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.570	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
51-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.580	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.580	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.580	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
52-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.573	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.573	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.573	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
53-St		vvp_0132	Endangered	1	no	0.200	0.071	0.067	0.460	0.570	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.570	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.570	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
54-St		vvp_0132	Endangered	1	no	0.200	0.071	0.067	0.460	0.570	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.462	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.462	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
55-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.501	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.501	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.501	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
56-St		vvp_0132	Endangered	1	no	0.200	0.071	0.067	0.460	0.490	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.490	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.490	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
57-St		vvp_0132	Endangered	1	no	0.200	0.071	0.067	0.460	0.436	0.019	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.436	0.019	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.436	0.019	503984 Heath Spear-grass <i>Austrostipa exilis</i>
58-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.424	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.424	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.424	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
59-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460		0.015	General
60-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.458	0.300	0.018	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.250	0.018	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.250	0.018	503984 Heath Spear-grass <i>Austrostipa exilis</i>
61-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.450		0.015	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
62-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.450	0.540	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.540	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.540	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
63-St		vvp_0132	Endangered	1	no	0.200	0.071	0.070	0.450	0.270	0.018	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.270	0.018	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.270	0.018	503984 Heath Spear-grass <i>Austrostipa exilis</i>
64-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.450	0.300	0.018	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.105	0.018	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.105	0.018	503984 Heath Spear-grass <i>Austrostipa exilis</i>
65-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.360	0.019	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.360	0.019	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.360	0.019	503984 Heath Spear-grass <i>Austrostipa exilis</i>
66-St		vvp_0132	Endangered	1	no	0.200	0.071	0.063	0.460	0.570	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.570	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.570	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
67-St		vvp_0132	Endangered	1	no	0.200	0.071	0.063	0.460	0.570	0.020	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.570	0.020	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.570	0.020	503984 Heath Spear-grass <i>Austrostipa exilis</i>
68-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.461	0.570	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.519	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.519	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
69-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.350	0.019	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.350	0.019	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.350	0.019	503984 Heath Spear-grass <i>Austrostipa exilis</i>
70-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.474	0.479	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.288	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.288	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
71-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.552	0.460	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.359	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.359	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
72-St		vvp_0132	Endangered	1	no	0.200	0.071	0.070	0.880	0.630	0.023	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.239	0.023	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.239	0.023	503984 Heath Spear-grass <i>Austrostipa exilis</i>
73-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.530	0.630	0.023	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.102	0.023	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.102	0.023	503984 Heath Spear-grass <i>Austrostipa exilis</i>
74-St		vvp_0132	Endangered	1	no	0.200	0.071	0.070	0.880	0.630	0.023	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.630	0.023	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.630	0.023	503984 Heath Spear-grass <i>Austrostipa exilis</i>
75-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.608	0.592	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.592	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.592	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
76-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.450		0.015	General
77-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460		0.015	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
78-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460	0.330	0.019	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.276	0.019	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.276	0.019	503984 Heath Spear-grass <i>Austrostipa exilis</i>
79-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.450	0.570	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.566	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.566	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
80-St		vvp_0132	Endangered	1	no	0.200	0.071	0.071	0.460		0.015	General
1-P	Patch	vvp_0653	Endangered	0	no	0.540	1.243	1.243	0.959	0.695	1.137	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.196	1.020	10019 Red-chested Button-quail <i>Turnix pyrrhotorax</i>
										0.695	1.137	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.695	1.137	503984 Heath Spear-grass <i>Austrostipa exilis</i>
2-P	Patch	vvp_0132	Endangered	0	no	0.159	0.017	0.017	0.470		0.003	General
3-P	Patch	vvp_0132	Endangered	0	no	0.322	0.163	0.163	0.526	0.639	0.086	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.529	0.080	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.529	0.080	503984 Heath Spear-grass <i>Austrostipa exilis</i>
4-P	Patch	vvp_0132	Endangered	0	no	0.268	0.075	0.075	0.950	0.671	0.033	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.671	0.033	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.671	0.033	503984 Heath Spear-grass <i>Austrostipa exilis</i>
5-P	Patch	vvp_0653	Endangered	0	no	0.390	0.049	0.049	0.607	0.680	0.032	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.195	0.032	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.195	0.032	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
6-P	Patch	vvp_0125	Endangered	0	no	0.145	0.031	0.031	0.470	0.650	0.008	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.650	0.008	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.650	0.008	503984 Heath Spear-grass <i>Austrostipa exilis</i>
7-P	Patch	vvp_0068	Endangered	0	no	0.220	0.218	0.218	0.469	0.710	0.082	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.618	0.082	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.618	0.082	503984 Heath Spear-grass <i>Austrostipa exilis</i>
8-P	Patch	vvp_0068	Endangered	4	no	0.220	0.288	0.288	0.464	0.623	0.103	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.623	0.103	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.623	0.103	503984 Heath Spear-grass <i>Austrostipa exilis</i>
9-P	Patch	vvp_0068	Endangered	1	no	0.250	0.071	0.071	0.470	0.667	0.029	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.667	0.029	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.667	0.029	503984 Heath Spear-grass <i>Austrostipa exilis</i>
10-P	Patch	vvp_0068	Endangered	2	no	0.260	0.295	0.295	0.470	0.633	0.125	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.633	0.125	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.633	0.125	503984 Heath Spear-grass <i>Austrostipa exilis</i>
11-P	Patch	vvp_0068	Endangered	6	no	0.290	0.833	0.833	0.470	0.603	0.387	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.604	0.387	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.604	0.387	503984 Heath Spear-grass <i>Austrostipa exilis</i>
12-P	Patch	vvp_0068	Endangered	5	no	0.280	0.364	0.364	0.470	0.659	0.169	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.659	0.169	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.659	0.169	503984 Heath Spear-grass <i>Austrostipa exilis</i>
13-P	Patch	vvp_0068	Endangered	0	no	0.130	0.058	0.058	0.467	0.686	0.013	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.510	0.013	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.510	0.013	503984 Heath Spear-grass <i>Austrostipa exilis</i>
14-P	Patch	vvp_0068	Endangered	2	no	0.250	0.089	0.089	0.460	0.650	0.037	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.650	0.037	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.650	0.037	503984 Heath Spear-grass <i>Austrostipa exilis</i>
15-P	Patch	vvp_0068	Endangered	1	no	0.250	0.069	0.069	0.468	0.558	0.027	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.471	0.027	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.471	0.027	503984 Heath Spear-grass <i>Austrostipa exilis</i>
16-P	Patch	vvp_0068	Endangered	2	no	0.250	0.055	0.055	0.470	0.550	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.550	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.550	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
17-P	Patch	vvp_0068	Endangered	1	no	0.250	0.096	0.096	0.460	0.510	0.036	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.278	0.036	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.278	0.036	503984 Heath Spear-grass <i>Austrostipa exilis</i>
18-P	Patch	vvp_0125	Endangered	0	no	0.145	0.016	0.016	0.470	0.670	0.004	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.670	0.004	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.670	0.004	503984 Heath Spear-grass <i>Austrostipa exilis</i>
19-P	Patch	vvp_0132	Endangered	0	no	0.295	0.039	0.039	0.470		0.013	General
20-P	Patch	vvp_0132	Endangered	0	no	0.145	0.150	0.150	0.470		0.024	General
21-P	Patch	vvp_0132	Endangered	0	no	0.145	0.037	0.037	0.469	0.630	0.009	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.214	0.009	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.214	0.009	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
22-P	Patch	vvp_0132	Endangered	0	no	0.145	0.021	0.021	0.463	0.630	0.005	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.178	0.005	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.178	0.005	503984 Heath Spear-grass <i>Austrostipa exilis</i>
23-P	Patch	vvp_0132	Endangered	0	no	0.145	0.004	0.004	0.460		0.001	General
24-P	Patch	vvp_0132	Endangered	0	no	0.145	0.635	0.635	0.469		0.102	General
25-P	Patch	vvp_0132	Endangered	0	no	0.145	0.163	0.163	0.470	0.710	0.041	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.023	0.041	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.023	0.041	503984 Heath Spear-grass <i>Austrostipa exilis</i>
26-P	Patch	vvp_0132	Endangered	0	no	0.145	0.149	0.149	0.469		0.024	General
27-P	Patch	vvp_0068	Endangered	0	no	0.200	0.132	0.132	0.470	0.640	0.043	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.127	0.043	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.127	0.043	503984 Heath Spear-grass <i>Austrostipa exilis</i>
28-P	Patch	vvp_0132	Endangered	0	no	0.145	0.169	0.169	0.470		0.027	General
29-P	Patch	vvp_0132	Endangered	0	no	0.145	0.020	0.020	0.470	0.649	0.005	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.649	0.005	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.649	0.005	503984 Heath Spear-grass <i>Austrostipa exilis</i>
30-P	Patch	vvp_0132	Endangered	0	no	0.145	0.097	0.097	0.470	0.532	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.532	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.532	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
31-P	Patch	vvp_0132	Endangered	0	no	0.145	0.081	0.081	0.470	0.642	0.019	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.642	0.019	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.642	0.019	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
32-P	Patch	vvp_0653	Endangered	0	no	0.159	0.074	0.074	0.470		0.013	General
33-P	Patch	vvp_0068	Endangered	0	no	0.260	0.056	0.056	0.470	0.653	0.024	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.653	0.024	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.653	0.024	503984 Heath Spear-grass <i>Austrostipa exilis</i>
34-P	Patch	vvp_0132	Endangered	0	no	0.145	0.049	0.049	0.470	0.660	0.012	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.660	0.012	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.660	0.012	503984 Heath Spear-grass <i>Austrostipa exilis</i>
35-P	Patch	vvp_0068	Endangered	0	no	0.170	0.109	0.109	0.470	0.462	0.027	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.370	0.027	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.370	0.027	503984 Heath Spear-grass <i>Austrostipa exilis</i>
36-P	Patch	vvp_0068	Endangered	0	no	0.260	0.055	0.055	0.470	0.686	0.024	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.686	0.024	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.686	0.024	503984 Heath Spear-grass <i>Austrostipa exilis</i>
37-P	Patch	vvp_0821	Vulnerable	0	no	0.336	0.052	0.052	0.470		0.019	General
38-P	Patch	vvp_0653	Endangered	0	no	0.145	0.074	0.074	0.470		0.012	General
39-P	Patch	vvp_0068	Endangered	0	no	0.260	0.016	0.016	0.470	0.482	0.006	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.482	0.006	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.482	0.006	503984 Heath Spear-grass <i>Austrostipa exilis</i>
40-P	Patch	vvp_0068	Endangered	0	no	0.300	0.115	0.115	0.470	0.541	0.053	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.541	0.053	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.541	0.053	503984 Heath Spear-grass <i>Austrostipa exilis</i>
41-P	Patch	vvp_0068	Endangered	0	no	0.440	0.029	0.029	0.470	0.637	0.021	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.637	0.021	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.637	0.021	503984 Heath Spear-grass <i>Austrostipa exilis</i>
42-P	Patch	vvp_0132	Endangered	0	no	0.200	0.010	0.010	0.470	0.638	0.003	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.638	0.003	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.638	0.003	503984 Heath Spear-grass <i>Austrostipa exilis</i>
43-P	Patch	vvp_0653	Endangered	0	no	0.499	0.026	0.026	0.470	0.700	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.700	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.700	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
44-P	Patch	vvp_0132	Endangered	0	no	0.254	0.004	0.004	0.460	0.590	0.002	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.590	0.002	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.590	0.002	503984 Heath Spear-grass <i>Austrostipa exilis</i>
45-P	Patch	vvp_0132	Endangered	1	no	0.404	0.169	0.169	0.460	0.381	0.094	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.381	0.094	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.381	0.094	503984 Heath Spear-grass <i>Austrostipa exilis</i>
46-P	Patch	vvp_0821	Vulnerable	0	no	0.213	0.191	0.191	0.465	0.565	0.064	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.404	0.064	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.404	0.064	503984 Heath Spear-grass <i>Austrostipa exilis</i>
47-P	Patch	vvp_0653	Endangered	0	no	0.472	0.131	0.131	0.460	0.543	0.095	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.428	0.095	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.428	0.095	503984 Heath Spear-grass <i>Austrostipa exilis</i>
48-P	Patch	vvp_0132	Endangered	0	no	0.145	0.002	0.002	0.460		0.000	General
49-P	Patch	vvp_0132	Endangered	0	no	0.145	0.003	0.003	0.470	0.690	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.690	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.690	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
50-P	Patch	vvp_0132	Endangered	0	no	0.472	0.838	0.838	0.644	0.690	0.668	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.634	0.645	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.634	0.645	503984 Heath Spear-grass <i>Austrostipa exilis</i>
51-P	Patch	vvp_0132	Endangered	0	no	0.472	0.257	0.257	0.470	0.706	0.206	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.706	0.206	503984 Heath Spear-grass <i>Austrostipa exilis</i>
52-P	Patch	vvp_0653	Endangered	0	no	0.186	0.008	0.008	0.460	0.560	0.002	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.560	0.002	503984 Heath Spear-grass <i>Austrostipa exilis</i>
53-P	Patch	vvp_0821	Vulnerable	0	no	0.186	0.015	0.015	0.460	0.630	0.005	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.630	0.005	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.630	0.005	503984 Heath Spear-grass <i>Austrostipa exilis</i>
54-P	Patch	vvp_0068	Endangered	0	no	0.190	0.070	0.070	0.460	0.611	0.022	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.611	0.022	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.611	0.022	503984 Heath Spear-grass <i>Austrostipa exilis</i>
56-P	Patch	vvp_0132	Endangered	0	no	0.172	0.070	0.070	0.460	0.382	0.017	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.143	0.017	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.143	0.017	503984 Heath Spear-grass <i>Austrostipa exilis</i>
57-P	Patch	vvp_0132	Endangered	0	no	0.145	0.223	0.223	0.460	0.513	0.049	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.513	0.049	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.513	0.049	503984 Heath Spear-grass <i>Austrostipa exilis</i>
58-P	Patch	vvp_0132	Endangered	0	no	0.227	0.016	0.016	0.460	0.390	0.005	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.390	0.005	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.390	0.005	503984 Heath Spear-grass <i>Austrostipa exilis</i>
59-P	Patch	vvp_0132	Endangered	0	no	0.145	0.000	0.000	0.930	0.720	0.000	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.720	0.000	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.720	0.000	503984 Heath Spear-grass <i>Austrostipa exilis</i>
60-P	Patch	vvp_0132	Endangered	0	no	0.145	0.001	0.001	0.930	0.720	0.000	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.720	0.000	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.720	0.000	503984 Heath Spear-grass <i>Austrostipa exilis</i>
61-P	Patch	vvp_0132	Endangered	0	no	0.145	0.000	0.000	0.930	0.720	0.000	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.720	0.000	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.720	0.000	503984 Heath Spear-grass <i>Austrostipa exilis</i>
62-P	Patch	vvp_0132	Endangered	0	no	0.145	0.000	0.000	0.470	0.680	0.000	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.680	0.000	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.680	0.000	503984 Heath Spear-grass <i>Austrostipa exilis</i>
63-P	Patch	vvp_0132	Endangered	0	no	0.400	2.627	2.627	0.904	0.751	1.840	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.093	1.586	10019 Red-chested Button-quail <i>Turnix pyrrhotorax</i>
										0.739	1.827	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.739	1.827	503984 Heath Spear-grass <i>Austrostipa exilis</i>
64-P	Patch	vvp_0132	Endangered	0	no	0.145	0.002	0.002	0.470		0.000	General
65-P	Patch	vvp_0132	Endangered	0	no	0.145	0.000	0.000	0.470	0.680	0.000	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.009	0.000	501473 Small Golden Moths <i>Diuris basaltica</i>

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
										0.009	0.000	503984 Heath Spear-grass <i>Austrostipa exilis</i>
66-P	Patch	vvp_0132	Endangered	0	no	0.145	0.002	0.002	0.470		0.000	General
67-P	Patch	vvp_0132	Endangered	0	no	0.145	0.001	0.001	0.470		0.000	General
68-P	Patch	vvp_0132	Endangered	0	no	0.281	0.009	0.009	0.470	0.750	0.005	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.750	0.005	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.750	0.005	503984 Heath Spear-grass <i>Austrostipa exilis</i>
69-P	Patch	vvp_0132	Endangered	0	no	0.145	0.005	0.005	0.470	0.630	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.630	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.630	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
70-P	Patch	vvp_0132	Endangered	0	no	0.145	0.003	0.003	0.470	0.670	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.670	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.670	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
71-P	Patch	vvp_0132	Endangered	0	no	0.349	0.529	0.529	0.653	0.548	0.286	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.548	0.286	503984 Heath Spear-grass <i>Austrostipa exilis</i>
72-P	Patch	vvp_0132	Endangered	0	no	0.172	0.003	0.003	0.470	0.500	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.106	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.106	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
73-P	Patch	vvp_0132	Endangered	0	no	0.145	0.009	0.009	0.470		0.001	General
74-P	Patch	vvp_0132	Endangered	0	no	0.145	0.003	0.003	0.470		0.001	General
75-P	Patch	vvp_0132	Endangered	0	no	0.145	0.004	0.004	0.470	0.500	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.436	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.436	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
76-P	Patch	vvp_0132	Endangered	0	no	0.145	0.004	0.004	0.470		0.001	General
77-P	Patch	vvp_0132	Endangered	0	no	0.145	0.012	0.012	0.470		0.002	General
78-P	Patch	vvp_0132	Endangered	0	no	0.145	0.002	0.002	0.470		0.000	General
79-P	Patch	vvp_0132	Endangered	0	no	0.145	0.009	0.009	0.470	0.530	0.002	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.219	0.002	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.219	0.002	503984 Heath Spear-grass <i>Austrostipa exilis</i>
80-P	Patch	vvp_0055	Endangered	0	no	0.120	0.007	0.007	0.460		0.001	General
81-P	Patch	vvp_0055	Endangered	0	no	0.120	0.004	0.004	0.460		0.001	General
83-P	Patch	vvp_0068	Endangered	1	no	0.450	0.108	0.108	0.450	0.374	0.067	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.374	0.067	503984 Heath Spear-grass <i>Austrostipa exilis</i>
84-P	Patch	vvp_0132	Endangered	0	no	0.240	1.180	1.180	0.460	0.580	0.448	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.004	0.448	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.004	0.448	503984 Heath Spear-grass <i>Austrostipa exilis</i>
85-P	Patch	vvp_0132	Endangered	0	no	0.213	0.008	0.008	0.470	0.690	0.003	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.690	0.003	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.690	0.003	503984 Heath Spear-grass <i>Austrostipa exilis</i>
86-P	Patch	vvp_0132	Endangered	0	no	0.145	0.002	0.002	0.470	0.683	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.683	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.683	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
87-P	Patch	vvp_0132	Endangered	0	no	0.145	0.001	0.001	0.470	0.680	0.000	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.680	0.000	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.680	0.000	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
88-P	Patch	vvp_0132	Endangered	0	no	0.145	0.005	0.005	0.470	0.680	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.680	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.680	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
89-P	Patch	vvp_0132	Endangered	0	no	0.145	0.010	0.010	0.470	0.670	0.002	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.670	0.002	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.670	0.002	503984 Heath Spear-grass <i>Austrostipa exilis</i>
90-P	Patch	vvp_0132	Endangered	0	no	0.145	0.003	0.003	0.466	0.642	0.001	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.642	0.001	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.642	0.001	503984 Heath Spear-grass <i>Austrostipa exilis</i>
91-P	Patch	vvp_0132	Endangered	0	no	0.145	0.299	0.299	0.460	0.630	0.071	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.016	0.071	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.016	0.071	503984 Heath Spear-grass <i>Austrostipa exilis</i>
92-P	Patch	vvp_0068	Endangered	1	no	0.490	0.090	0.090	0.460	0.610	0.071	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.610	0.071	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.610	0.071	503984 Heath Spear-grass <i>Austrostipa exilis</i>
93-P	Patch	vvp_0132	Endangered	0	no	0.213	0.009	0.009	0.460	0.640	0.003	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.640	0.003	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.640	0.003	503984 Heath Spear-grass <i>Austrostipa exilis</i>
94-P	Patch	vvp_0132	Endangered	0	no	0.376	0.130	0.130	0.470	0.656	0.081	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.656	0.081	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.656	0.081	503984 Heath Spear-grass <i>Austrostipa exilis</i>
95-P	Patch	vvp_0132	Endangered	0	no	0.186	0.024	0.024	0.460		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
96-P	Patch	vvp_0132	Endangered	0	no	0.441	2.394	2.394	0.577	0.671	1.764	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.410	1.764	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.410	1.764	503984 Heath Spear-grass <i>Austrostipa exilis</i>
102-P	Patch	vvp_0132	Endangered	0	no	0.379	7.755	7.755	0.872	0.645	4.837	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.201	4.432	10019 Red-chested Button-quail <i>Turnix pyrrhotorax</i>
										0.484	4.845	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.484	4.845	503984 Heath Spear-grass <i>Austrostipa exilis</i>
103-P	Patch	vvp_0132	Endangered	0	no	0.359	4.443	4.443	0.967	0.705	2.721	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.421	2.450	10019 Red-chested Button-quail <i>Turnix pyrrhotorax</i>
										0.592	2.721	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.592	2.721	503984 Heath Spear-grass <i>Austrostipa exilis</i>
104-P	Patch	vvp_0068	Endangered	0	no	0.270	0.022	0.022	0.470	0.656	0.010	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.522	0.010	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.522	0.010	503984 Heath Spear-grass <i>Austrostipa exilis</i>
105-P	Patch	vvp_0125	Endangered	0	no	0.254	0.030	0.030	0.461		0.008	General
106-P	Patch	vvp_0653	Endangered	0	no	0.526	0.060	0.060	0.468		0.035	General
107-P	Patch	vvp_0132	Endangered	0	no	0.240	1.250	1.250	0.434		0.323	General
108-P	Patch	vvp_0132	Endangered	0	no	0.295	0.371	0.371	0.427		0.117	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
109-P	Patch	vvp_0132	Endangered	0	no	0.295	0.146	0.146	0.420		0.046	General
110-P	Patch	vvp_0132	Endangered	0	no	0.295	0.547	0.547	0.431	0.230	0.198	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.007	0.198	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.007	0.198	503984 Heath Spear-grass <i>Austrostipa exilis</i>
111-P	Patch	vvp_0132	Endangered	0	no	0.145	0.375	0.375	0.470	0.690	0.092	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.690	0.092	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.690	0.092	503984 Heath Spear-grass <i>Austrostipa exilis</i>
112-P	Patch	vvp_0132	Endangered	0	no	0.145	0.426	0.426	0.470	0.692	0.105	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.543	0.105	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.543	0.105	503984 Heath Spear-grass <i>Austrostipa exilis</i>
113-P	Patch	vvp_0132	Endangered	0	no	0.145	0.936	0.936	0.470	0.635	0.222	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.047	0.209	10019 Red-chested Button-quail <i>Turnix pyrrhothorax</i>
										0.289	0.222	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.289	0.222	503984 Heath Spear-grass <i>Austrostipa exilis</i>
										0.178	0.272	504414 Sunshine Diuris <i>Diuris fragrantissima</i>
114-P	Patch	vvp_0132	Endangered	0	no	0.145	0.267	0.267	0.470	0.643	0.064	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.638	0.064	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.638	0.064	503984 Heath Spear-grass <i>Austrostipa exilis</i>

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
115-P	Patch	vvp_0132	Endangered	0	no	0.145	0.523	0.523	0.821	0.630	0.124	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.009	0.115	10019 Red-chested Button-quail <i>Turnix pyrrhothorax</i>
										0.526	0.124	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.526	0.124	503984 Heath Spear-grass <i>Austrostipa exilis</i>
82-P	Patch	vvp_0068	Endangered	0	no	0.250	0.048	0.048	0.450	0.288	0.016	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.268	0.016	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.288	0.016	503984 Heath Spear-grass <i>Austrostipa exilis</i>
117-P	Patch	vvp_0653	Endangered	0	no	0.540	0.063	0.063	0.450	0.317	0.045	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.317	0.045	503984 Heath Spear-grass <i>Austrostipa exilis</i>
101-P	Patch	vvp_0653	Endangered	0	no	0.540	1.068	1.068	0.452	0.366	0.787	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.043	0.803	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.113	0.787	503984 Heath Spear-grass <i>Austrostipa exilis</i>
100-P	Patch	vvp_0653	Endangered	0	no	0.540	0.456	0.456	0.450	0.320	0.324	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.159	0.325	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.320	0.324	503984 Heath Spear-grass <i>Austrostipa exilis</i>
116-P	Patch	vvp_0653	Endangered	0	no	0.540	0.721	0.721	0.452	0.330	0.517	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.180	0.517	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.287	0.517	503984 Heath Spear-grass <i>Austrostipa exilis</i>
99-P	Patch	vvp_0653	Endangered	0	no	0.540	0.657	0.657	0.450	0.410	0.500	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>

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
										0.168	0.531	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.322	0.500	503984 Heath Spear-grass <i>Austrostipa exilis</i>
55-P	Patch	vvp_0653	Endangered	0	no	0.240	0.004	0.004	0.460	0.610	0.002	503447 Prickly Arrowgrass <i>Triglochin mucronata</i>
										0.610	0.002	501473 Small Golden Moths <i>Diuris basaltica</i>
										0.610	0.002	503984 Heath Spear-grass <i>Austrostipa exilis</i>

SCENARIO TESTING

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
Prickly Arrowgrass	<i>Triglochin mucronata</i>	503447	Rare	Dispersed	Top ranking map	0.0864
Prickly Arrowgrass	<i>Triglochin mucronata</i>	503447	Rare	Dispersed	Habitat importance map	0.0509
Small Golden Moths	<i>Diuris basaltica</i>	501473	Endangered	Dispersed	Habitat importance map	0.0153
Heath Spear-grass	<i>Austrostipa exilis</i>	503984	Rare	Dispersed	Habitat importance map	0.0135
Sunshine Diuris	<i>Diuris fragrantissima</i>	504414	Endangered	Highly Localised Habitat	Habitat importance map	0.0059
Red-chested Button-quail	<i>Turnix pyrrhotorax</i>	10019	Vulnerable	Dispersed	Habitat importance map	0.0057
Grassland Earless Dragon	<i>Tympanocryptis pinguicollis</i>	12922	Critically endangered	Dispersed	Habitat importance map	0.0039
Basalt Podolepis	<i>Podolepis linearifolia</i>	504658	Endangered	Dispersed	Habitat importance map	0.0037
Plump Swamp Wallaby-grass	<i>Amphibromus pithogastrus</i>	503624	Endangered	Dispersed	Habitat importance map	0.0031
Large-headed Fireweed	<i>Senecio macrocarpus</i>	503116	Endangered	Dispersed	Habitat importance map ; special site	0.0029
Salt Lawrencia	<i>Lawrencia spicata</i>	501888	Rare	Dispersed	Habitat importance map	0.0024
Brackish Plains Buttercup	<i>Ranunculus diminutus</i>	504314	Rare	Dispersed	Habitat importance map	0.0022
Melbourne Yellow-gum	<i>Eucalyptus leucoxylon subsp. connata</i>	504484	Vulnerable	Dispersed	Habitat importance map	0.0021
Snowy Mint-bush	<i>Prostanthera nivea var. nivea</i>	502746	Rare	Dispersed	Habitat importance map	0.0020
Small Scurf-pea	<i>Cullen parvum</i>	502773	Endangered	Dispersed	Habitat importance map	0.0020
Striped Legless Lizard	<i>Delma impar</i>	12159	Endangered	Dispersed	Habitat importance map	0.0019
Tough Scurf-pea	<i>Cullen tenax</i>	502776	Endangered	Dispersed	Habitat importance map	0.0018
Spiny Rice-flower	<i>Pimelea spinescens subsp. spinescens</i>	504823	Endangered	Dispersed	Habitat importance map ; special site	0.0017

Rye Beetle-grass	<i>Tripogon loliiformis</i>	503455	Rare	Dispersed	Habitat importance map	0.0017
Growling Grass Frog	<i>Litoria raniformis</i>	13207	Endangered	Dispersed	Habitat importance map	0.0016
Pale-flower Crane's-bill	<i>Geranium</i> sp. 3	505344	Rare	Dispersed	Habitat importance map	0.0015
Arching Flax-lily	<i>Dianella</i> sp. aff. <i>longifolia</i> (Benambra)	505560	Vulnerable	Dispersed	Habitat importance map	0.0014
Pale Swamp Everlasting	<i>Coronidium gunnianum</i>	504655	Vulnerable	Dispersed	Habitat importance map	0.0013
Rosemary Grevillea	<i>Grevillea rosmarinifolia</i> subsp. <i>rosmarinifolia</i>	504066	Rare	Dispersed	Habitat importance map	0.0011
Branching Groundsel	<i>Senecio cunninghamii</i> var. <i>cunninghamii</i>	503104	Rare	Dispersed	Habitat importance map	0.0011
Fragrant Saltbush	<i>Rhagodia parabolica</i>	502929	Rare	Dispersed	Habitat importance map	0.0010
Coast Twin-leaf	<i>Zygophyllum billardiarei</i>	503615	Rare	Dispersed	Habitat importance map	0.0009
Large-flower Crane's-bill	<i>Geranium</i> sp. 1	505342	Endangered	Dispersed	Habitat importance map	0.0009
Small Milkwort	<i>Comesperma polygaloides</i>	500798	Vulnerable	Dispersed	Habitat importance map	0.0007
Dwarf Brooklime	<i>Gratiola pumilo</i>	503753	Rare	Dispersed	Habitat importance map	0.0007
Waterbush	<i>Myoporum montanum</i>	502240	Rare	Dispersed	Habitat importance map	0.0006
Hairy Tails	<i>Ptilotus erubescens</i>	502825	Vulnerable	Dispersed	Habitat importance map	0.0006
Brolga	<i>Grus rubicunda</i>	10177	Vulnerable	Dispersed	Habitat importance map	0.0005
Matted Flax-lily	<i>Dianella amoena</i>	505084	Endangered	Dispersed	Habitat importance map	0.0004
Common Sandpiper	<i>Actitis hypoleucos</i>	10157	Vulnerable	Dispersed	Habitat importance map	0.0004
Australian Painted Snipe	<i>Rostratula australis</i>	10170	Critically endangered	Dispersed	Habitat importance map	0.0004
Little Egret	<i>Egretta garzetta nigripes</i>	10185	Endangered	Dispersed	Habitat importance map	0.0004
Creeping Rush	<i>Juncus revolutus</i>	501839	Rare	Dispersed	Habitat importance map	0.0003
Dark Wire-grass	<i>Aristida calycina</i> var. <i>calycina</i>	503630	Rare	Dispersed	Habitat importance map	0.0003
Australasian Bittern	<i>Botaurus poiciloptilus</i>	10197	Endangered	Dispersed	Habitat importance map	0.0003
Little Tern	<i>Sterna albifrons sinensis</i>	10117	Vulnerable	Dispersed	Habitat importance map	0.0003

Golden Sun Moth	<i>Synemon plana</i>	15021	Critically endangered	Dispersed	Habitat importance map	0.0003
Blue-billed Duck	<i>Oxyura australis</i>	10216	Endangered	Dispersed	Habitat importance map	0.0003
Freckled Duck	<i>Stictonetta naevosa</i>	10214	Endangered	Dispersed	Habitat importance map	0.0003
Australian Little Bittern	<i>Ixobrychus dubius</i>	10195	Endangered	Dispersed	Habitat importance map	0.0003
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	10226	Vulnerable	Dispersed	Habitat importance map	0.0003
Eastern Great Egret	<i>Ardea modesta</i>	10187	Vulnerable	Dispersed	Habitat importance map	0.0002
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	10045	Vulnerable	Dispersed	Habitat importance map	0.0002
Intermediate Egret	<i>Ardea intermedia</i>	10186	Endangered	Dispersed	Habitat importance map	0.0002
Buloke	<i>Allocasuarina luehmannii</i>	500678	Endangered	Dispersed	Habitat importance map	0.0002
Musk Duck	<i>Biziura lobata</i>	10217	Vulnerable	Dispersed	Habitat importance map	0.0002
Floodplain Fireweed	<i>Senecio campylocarpus</i>	507136	Rare	Dispersed	Habitat importance map	0.0002
Baillon's Crake	<i>Porzana pusilla palustris</i>	10050	Vulnerable	Dispersed	Habitat importance map	0.0002
Button Wrinklewort	<i>Rutidosis leptorhynchoides</i>	502982	Endangered	Dispersed	Habitat importance map	0.0002
Hardhead	<i>Aythya australis</i>	10215	Vulnerable	Dispersed	Habitat importance map	0.0002
Australasian Shoveler	<i>Anas rhynchos</i>	10212	Vulnerable	Dispersed	Habitat importance map	0.0002
Black Falcon	<i>Falco subniger</i>	10238	Vulnerable	Dispersed	Habitat importance map	0.0002
Velvet Daisy-bush	<i>Olearia pannosa subsp. cardiophylla</i>	502317	Vulnerable	Dispersed	Habitat importance map	0.0002
Buloke Mistletoe	<i>Amyema linophylla subsp. orientalis</i>	500217	Vulnerable	Dispersed	Habitat importance map	0.0001
Swamp Diuris	<i>Diuris palustris</i>	501082	Vulnerable	Dispersed	Habitat importance map	0.0001
Black-tailed Godwit	<i>Limosa limosa</i>	528553	Vulnerable	Dispersed	Habitat importance map	0.0001
Port Lincoln Snake	<i>Parasuta spectabilis</i>	12813	Vulnerable	Dispersed	Habitat importance map	0.0001
Common Greenshank	<i>Tringa nebularia</i>	10158	Vulnerable	Dispersed	Habitat importance map	0.0001
Elegant Parrot	<i>Neophema elegans</i>	10307	Vulnerable	Dispersed	Habitat importance map	0.0001

Austral Tobacco	<i>Nicotiana suaveolens</i>	502275	Rare	Dispersed	Habitat importance map	0.0001
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	10220	Vulnerable	Dispersed	Habitat importance map	0.0001
Clumping Golden Moths	<i>Diuris gregaria</i>	504887	Endangered	Dispersed	Habitat importance map	0.0001
Golden Cowslips	<i>Diuris behrii</i>	501061	Vulnerable	Dispersed	Habitat importance map	0.0000
Austral Crane's-bill	<i>Geranium solanderi</i> var. <i>solanderi</i> s.s.	505337	Vulnerable	Dispersed	Habitat importance map	0.0000
Clover Glycine	<i>Glycine latrobeana</i>	501456	Vulnerable	Dispersed	Habitat importance map	0.0000
Curlew Sandpiper	<i>Calidris ferruginea</i>	10161	Endangered	Dispersed	Habitat importance map	0.0000
Late-flower Flax-lily	<i>Dianella tarda</i>	505085	Vulnerable	Dispersed	Habitat importance map	0.0000
White-throated Needletail	<i>Hirundapus caudacutus</i>	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Cane Spear-grass	<i>Austrostipa breviglumis</i>	503268	Rare	Dispersed	Habitat importance map	0.0000
Purple Diuris	<i>Diuris punctata</i>	501084	Vulnerable	Dispersed	Habitat importance map	0.0000
Silky Kidney-weed	<i>Dichondra</i> sp. 1	505786	Rare	Dispersed	Habitat importance map	0.0000

Habitat group

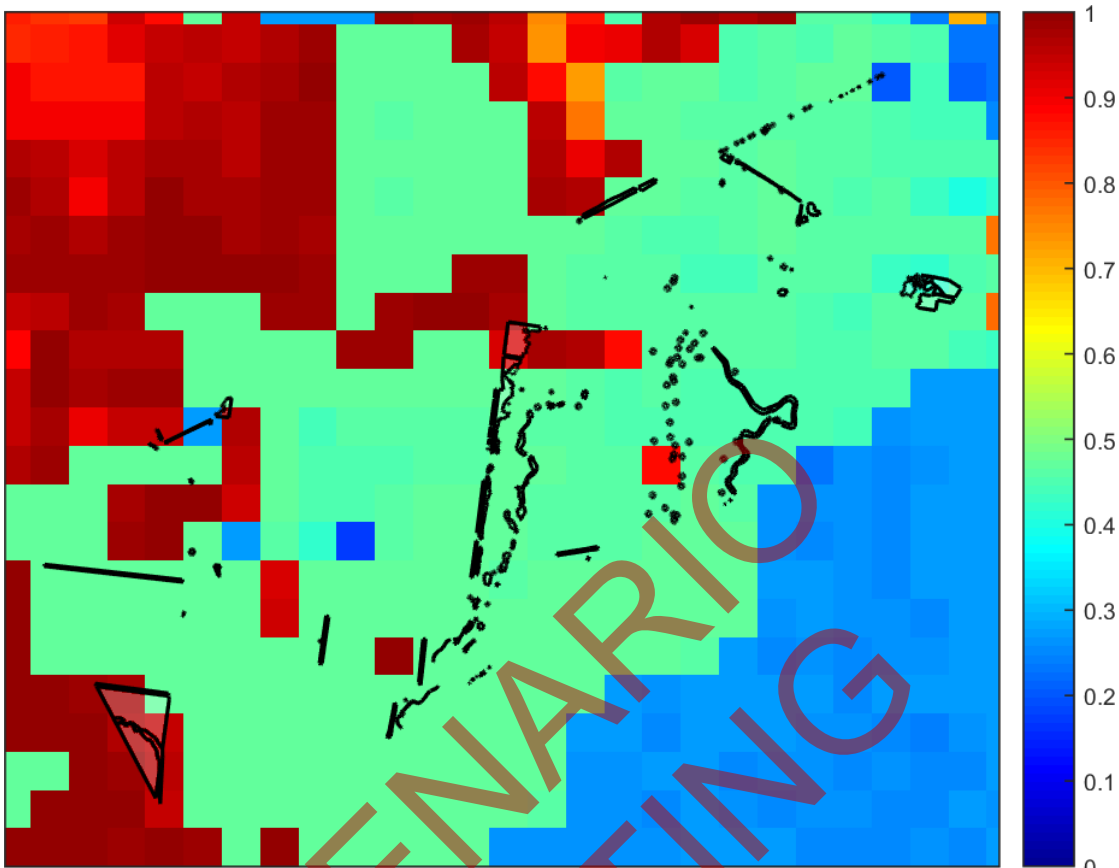
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

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.

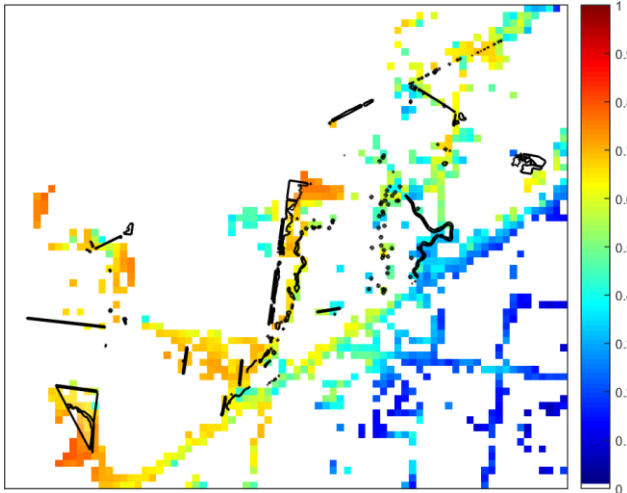
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

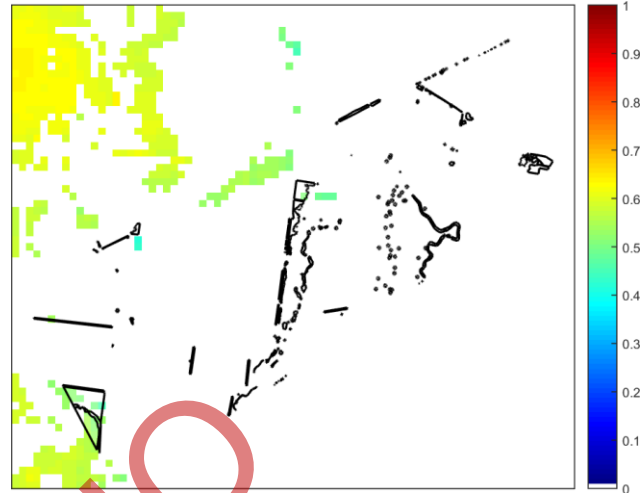


3. Habitat importance maps

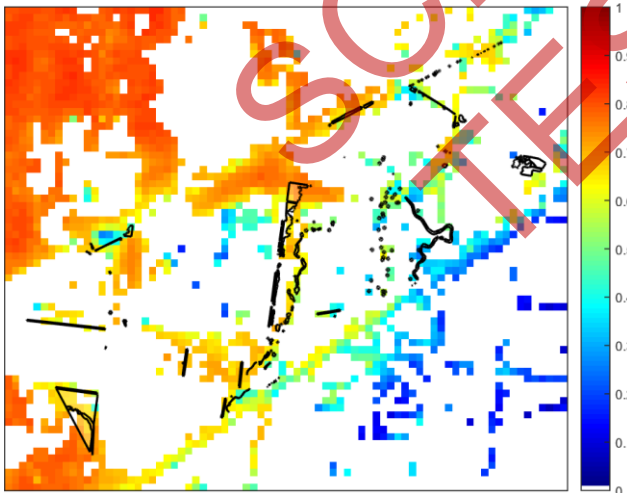
Prickly Arrowgrass
Triglochin mucronata
503447



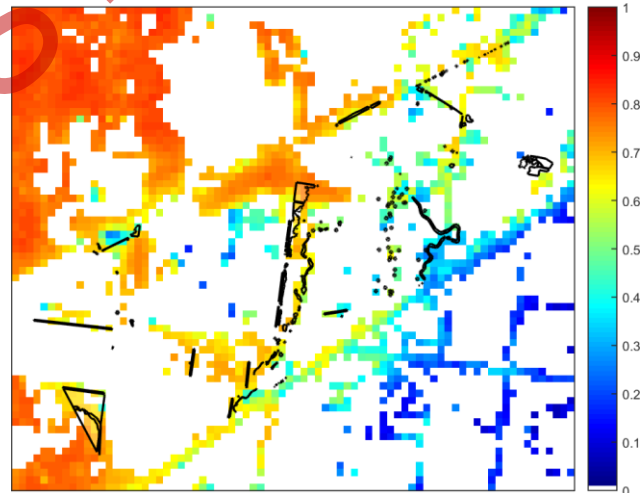
Red-chested Button-quail
Turnix pyrrhothorax
10019



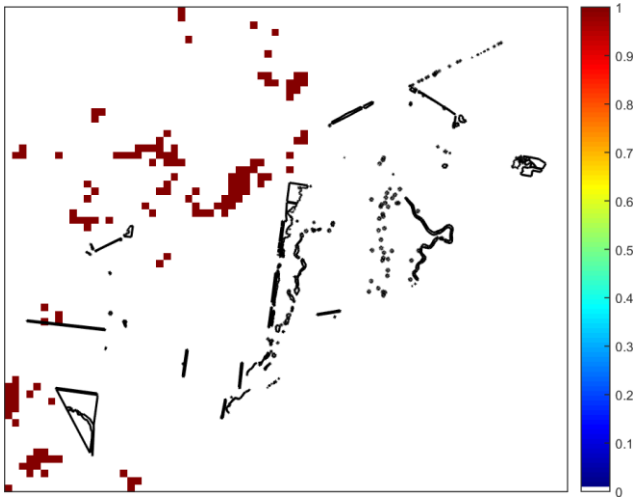
Small Golden Moths
Diuris basaltica
501473



Heath Spear-grass
Austrostipa exilis
503984



Sunshine Diuris
Diuris fragrantissima
504414



SCENARIO
TESTING

D1.1 NATIVE VEGETATION PATCHES

Table D.1 native vegetation patches, habitat hectare scoring, and ensym attribution

EVC	BCS	LARGE TREE	TREE CANOPY	WEEDS	UNDERSTORY	RECRUITMEN	ORGANICLIT	LOGS	LANDSCAPE CONTEXT	SITE COND	STANDARD	HH_H_S	NOTES	EPBC TEC	LARGE TREES	HH_SI	HH_ZI	HH_A
Plains Grassy Wetland 125	E			7	20	6	3		5	36	1.36	0.54		SHW	0	1	P	1.2427
Plains Grassland Lighter Soils 132 62	E			0	5	1	2		5	8	1.36	0.16			0	2	P	0.0169
Plains Grassland Lighter Soils 132 62	E			0	15	3	2		5	20	1.36	0.32			0	3	P	0.1625
Plains Grassland Lighter Soils 132 62	E			9	5	0	2		5	16	1.36	0.27			0	4	P	0.0745
Aquatic Herbland 653	E			7	15	0	3		5	25	1.36	0.39			0	5	P	0.0490
Plains Grassy Wetland 125	E			0	5	0	2		5	7	1.36	0.15			0	6	P	0.0313
Creekline Grassy Woodland 68	E	0	5	0	5	5	2	0	5	17	1	0.22			0	7	P	0.2176
Creekline Grassy Woodland 68	E	5		0	5	5	2	0	5	17	1	0.22			4	8	P	0.2883
Creekline Grassy Woodland 68	E	3	5	0	5	5	2	0	5	20	1	0.25			1	9	P	0.0705
Creekline Grassy Woodland 68	E	5	4	0	5	5	2	0	5	21	1	0.26			2	10	P	0.2948
Creekline Grassy Woodland 68	E	5	4	0	5	5	3	2	5	24	1	0.29			6	11	P	0.8330
Creekline Grassy Woodland 68	E	5	4	0	5	5	2	2	5	23	1	0.28			5	12	P	0.3642
Creekline Grassy Woodland 68	E	0	0	0	5	1	2	0	5	8	1	0.13			0	13	P	0.0576
Creekline Grassy Woodland 68	E	5	4	4	5	0	2	0	5	20	1	0.25			2	14	P	0.0894
Creekline Grassy Woodland 68	E	5	4	4	5	0	2	0	5	20	1	0.25			1	15	P	0.0688
Creekline Grassy Woodland 68	E	5	4	4	5	0	2	0	5	20	1	0.25			2	16	P	0.0552
Creekline Grassy Woodland 68	E	5	4	4	5	0	2	0	5	20	1	0.25			1	17	P	0.0957
Plains Grassy Wetland 125	E			0	5	0	2		5	7	1.36	0.15			0	18	P	0.0164
Plains Grassland Lighter Soils 132 62	E			0	15	0	3		5	18	1.36	0.29			0	19	P	0.0393
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	20	P	0.1502
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	21	P	0.0373
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	22	P	0.0205
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	23	P	0.0044
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	24	P	0.6352
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	25	P	0.1631
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	26	P	0.1489
Creekline Grassy Woodland 68	E	0	3	0	5	5	2	0	5	15	1	0.20			0	27	P	0.1323
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	28	P	0.1694
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	29	P	0.0202

EVC	BCS	LARGE TREE	TREE CANOPY	WEEDS	UNDERSTORY	RECRUITMEN	ORGANICLIT	LOGS	LANDSCAPE CONTEXT	SITE COND	STANDARD	HH_H_S	NOTES	EPBC TEC	LARGE TREES	HH_SI	HH_ZI	HH_A
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	30	P	0.0967
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	31	P	0.0809
Aquatic Herbland 653	E			0	5	0	3		5	8	1.36	0.16			0	32	P	0.0737
Creekline Grassy Woodland 68	E	0	0	4	15	0	2	0	5	21	1	0.26			0	33	P	0.0556
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	34	P	0.0491
Creekline Grassy Woodland 68	E	0	5	0	5	0	2	0	5	12	1	0.17			0	35	P	0.1089
Creekline Grassy Woodland 68	E	0	0	4	15	0	2	0	5	21	1	0.26			0	36	P	0.0552
Tall Marsh 821	V			4	15	0	2		5	21	1.36	0.34			0	37	P	0.0515
Aquatic Herbland 653	E			0	5	0	2		5	7	1.36	0.15			0	38	P	0.0745
Creekline Grassy Woodland 68	E	0	0	4	15	0	2	0	5	21	1	0.26			0	39	P	0.0160
Creekline Grassy Woodland 68	E	3	0	4	15	0	3	0	5	25	1	0.30			0	40	P	0.1153
Creekline Grassy Woodland 68	E	10	5	4	15	0	3	2	5	39	1	0.44			0	41	P	0.0294
Plains Grassland Lighter Soils 132 62	E			4	5	0	2		5	11	1.36	0.20			0	42	P	0.0104
Aquatic Herbland 653	E			9	15	6	3		5	33	1.36	0.50			0	43	P	0.0264
Plains Grassland Lighter Soils 132 62	E	0	3	0	5	5	2		5	15	1.36	0.25			0	44	P	0.0041
Plains Grassland Lighter Soils 132 62	E	4	5	0	10	5	2		5	26	1.36	0.40			1	45	P	0.1688
Tall Marsh 821	V			0	5	3	4		5	12	1.36	0.21	Excavated from channelised drain		0	46	P	0.1909
Aquatic Herbland 653	E			7	15	6	3		5	31	1.36	0.47			0	47	P	0.1306
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	48	P	0.0023
Plains Grassland Lighter Soils 132 62	E	0	0	0	5	0	2		5	7	1.36	0.15			0	49	P	0.0031
Plains Grassland Lighter Soils 132 62	E			7	15	6	3		5	31	1.36	0.47	Mapped over fence - access	NTGVVP	0	50	P	0.8375
Plains Grassland Lighter Soils 132 62	E			7	15	6	3		5	31	1.36	0.47	Mapped over fence - access	NTGVVP	0	51	P	0.2566
Aquatic Herbland 653	E			0	5	3	2		5	10	1.36	0.19			0	52	P	0.0077
Tall Marsh 821	V			0	5	3	2		5	10	1.36	0.19			0	53	P	0.0152
Creekline Grassy Woodland 68	E	2	5	0	5	0	2	0	5	14	1	0.19			0	54	P	0.0703
Aquatic Herbland 653	E			4	5	3	2		5	14	1.36	0.24			0	55	P	0.0164
Plains Grassland Lighter Soils 132 62	E	0	0	4	5				5	9	1.36	0.17			0	56	P	0.0702
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	57	P	0.2228
Plains Grassland Lighter Soils 132 62	E			4	5	2	2		5	13	1.36	0.23			0	58	P	0.0161
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	59	P	0.0002
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	60	P	0.0011

EVC	BCS	LARGE TREE	TREE CANOPY	WEEDS	UNDERSTORY	RECRUITMEN	ORGANICLIT	LOGS	LANDSCAPE CONTEXT	SITE COND	STANDARD	HH_H_S	NOTES	EPBC TEC	LARGE TREES	HH_SI	HH_ZI	HH_A
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	61	P	0.0004
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	62	P	0.0005
Plains Grassland Lighter Soils 132 62	E			7	15	0	3		6	25	1.36	0.40		NTGVVP	0	63	P	2.6266
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	64	P	0.0021
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	65	P	0.0003
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	66	P	0.0016
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	67	P	0.0011
Plains Grassland Lighter Soils 132 62	E			0	15	0	2		5	17	1.36	0.28			0	68	P	0.0095
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	69	P	0.0052
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	70	P	0.0033
Plains Grassland Lighter Soils 132 62	E			4	15	0	3		5	22	1.36	0.35		NTGVVP	0	71	P	0.5287
Plains Grassland Lighter Soils 132 62	E			0	5	2	2		5	9	1.36	0.17			0	72	P	0.0031
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	73	P	0.0089
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	74	P	0.0034
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	75	P	0.0040
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	76	P	0.0044
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	77	P	0.0122
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	78	P	0.0022
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	79	P	0.0090
Plains Grassy Woodland 55	E	0	0	0	5	0	2		5	7	1	0.12			0	80	P	0.0069
Plains Grassy Woodland 55	E	0	0	0	5	0	2		5	7	1	0.12			0	81	P	0.0040
Creekline Grassy Woodland 68	E	5	4	4	5	0	2	0	5	20	1	0.25			0	82	P	0.0883
Creekline Grassy Woodland 68	E	10	5	7	15	0	3	0	5	40	1	0.45			1	83	P	0.1078
Plains Grassland Lighter Soils 132 62	E			4	5	3	2		5	14	1.36	0.24			0	84	P	1.1799
Plains Grassland Lighter Soils 132 62	E			0	5	5	2		5	12	1.36	0.21			0	85	P	0.0085
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	86	P	0.0023
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	87	P	0.0007
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	88	P	0.0050
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	89	P	0.0096
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	90	P	0.0027
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	91	P	0.2990
Creekline Grassy Woodland 68	E	10	5	7	15	5	2	0	5	44	1	0.49			1	92	P	0.0904

EVC	BCS	LARGE TREE	TREE CANOPY	WEEDS	UNDERSTORY	RECRUITMEN	ORGANICLIT	LOGS	LANDSCAPE CONTEXT	SITE COND	STANDARD	HH_H_S	NOTES	EPBC TEC	LARGE TREES	HH_SI	HH_ZI	HH_A
Plains Grassland Lighter Soils 132 62	E			0	5	5	2		5	12	1.36	0.21			0	93	P	0.0087
Plains Grassland Lighter Soils 132 62	E			4	15	3	2		5	24	1.36	0.38			0	94	P	0.1297
Plains Grassland Lighter Soils 132 62	E			0	5	3	2		5	10	1.36	0.19			0	95	P	0.0239
Plains Grassland Lighter Soils 132 62	E			7	15	3	3		6	28	1.36	0.44		NTGVVP	0	96	P	2.3943
Aquatic Herbland 653	E			7	15	6	3		5	31	1.36	0.47			0	97	P	0.5521
Aquatic Herbland 653	E			7	15	6	3		5	31	1.36	0.47			0	98	P	0.0577
Aquatic Herbland 653	E			7	15	6	3		5	31	1.36	0.47			0	99	P	0.5028
Aquatic Herbland 653	E			7	15	6	3		5	31	1.36	0.47			0	100	P	0.3469
Aquatic Herbland 653	E			7	15	6	3		5	31	1.36	0.47			0	101	P	0.8487
Plains Grassland Lighter Soils 132 62	E			4	15	0	3		8	22	1.36	0.38		NTGVVP	0	102	P	7.7551
Plains Grassland Lighter Soils 132 62	E			4	15	0	3		6	22	1.36	0.36		NTGVVP	0	103	P	4.4427
Creekline Grassy Woodland 68	E	0	0	4	15	0	3	0	5	22	1	0.27			0	104	P	0.0218
Plains Grassy Wetland 125	E			4	5	3	3		5	15	1.36	0.25		SHW	0	105	P	0.0295
Aquatic Herbland 653	E			7	17	6	5		5	35	1.36	0.53		SHW	0	106	P	0.0596
Plains Grassland Lighter Soils 132 62	E			4	5	3	2		5	14	1.36	0.24			0	107	P	1.2496
Plains Grassland Lighter Soils 132 62	E			7	5	3	3		5	18	1.36	0.29			0	108	P	0.3713
Plains Grassland Lighter Soils 132 62	E			7	5	3	3		5	18	1.36	0.29			0	109	P	0.1463
Plains Grassland Lighter Soils 132 62	E			7	5	3	3		5	18	1.36	0.29			0	110	P	0.5472
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	111	P	0.3745
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	112	P	0.4263
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	113	P	0.9363
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	114	P	0.2665
Plains Grassland Lighter Soils 132 62	E			0	5	0	2		5	7	1.36	0.15			0	115	P	0.9193

Source: *Insert-source-details*

APPENDIX E

ENSYM REPORT

