TRANSGRID

ENERGYCONNECT (VICTORIAN SECTION)

FLORA AND FAUNA IMPACT ASSESSMENT

JULY 2021

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EnergyConnect (Victorian Section)
Flora and Fauna Impact Assessment

TransGrid

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REV	DATE	DETAILS
Final	19/07/2021	Final report for submission – revised after comments from DELWP

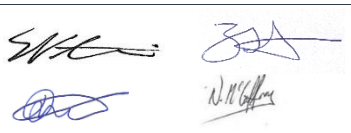
	NAME	DATE	SIGNATURE
Prepared by:	Samantha Vertucci; Danelle Scicluna; Zoe Steven; Nic McCaffrey	19/7/2021	
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

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.
Biodiversity value	Value relating to biodiversity
Bioregion (region)	A bioregion defined in a national system of bioregionalisation (DELWP 2017b). The proposal study area is located mostly within the Robinvale Plains Bioregion.
Canopy Tree	Defined under the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017c) (Guidelines 2017) as a native mature tree (i.e. it can flower) that is greater than 3 metres in height and is normally found in the upper layer of the relevant EVC. It can be a Scattered Tree or a tree in a patch (Refer to 'Scattered Tree' and 'Patch').
Construction footprint	For references to area of land on which works are proposed.
Department of Environment, Land, Water and Planning (DELWP)	The Victorian state environment department, which is responsible for Victoria's climate change, energy, environment, water, forests, planning, local government and emergency management. Formerly known as the Department of Environment and Primary Industries (DEPI).
Department of Agriculture, Water and the Environment (DAWE)	The Commonwealth department which develops and implements national policy, programs and legislation to protect and conserve Australia's natural environment and cultural heritage and administers the EPBC Act. Most recent previous names include: — Department of the Environment and Energy (DoEE) — Department of the Environment (DoE) — Department of Sustainability, Environment, Water, Population and Communities (DSEWPAC) — Department of the Environment, Water, Heritage and the Arts (DEWHA).
Detailed design	The detailed design of the proposal, including construction methodology. This term represents the next phase of proposal development and will further develop the design and construction methodology of the proposal considering: — mitigation measures as recommended in the EIS — any conditions of approval.
Ecological community	An assemblage of species occupying a particular area
Ecological value	Value relating to ecology

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.
Ecology	The relationships between organisms and their environment and the study of these relationships.
EnergyConnect	EnergyConnect is a proposed new electricity interconnector between Wagga Wagga in New South Wales and Robertstown in South Australia, with an additional connection to Red Cliffs in north-west Victoria. EnergyConnect is a joint project between TransGrid and ElectraNet, who operate the transmission networks in New South Wales (NSW) and South Australia (SA), respectively.
Exotic	Introduced from outside the area. Used in the context of this report to refer to species introduced from overseas.
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic components.
Indigenous	Native to the area: not introduced.
Introduced	Not native to the area: not indigenous. Refers to both exotic and non-indigenous Australian native species of plants and animals.
Large Tree	Defined under Guidelines 2017 as a native canopy tree with a Diameter at Breast Height (DBH) greater than or equal to the large tree benchmark for the relevant bioregional EVC. A large tree can be either a large Scattered Tree or a large tree contained within a patch.
Likely	Taken to be a real chance or possibility.
Local population	The population that occurs within a site, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated. The local population of migratory or nomadic fauna species comprises those individuals likely to occur in the proposal study area from time to time or return year to year.
Locality	The area within a 10 km radius of the proposal study area.
Migratory species	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*. The listing of these species relates to international agreements to which Australia is a signatory.
Matters of National Environmental Significance (MNES)	Matters listed pursuant to the *Environment Protection and Biodiversity Conservation Act 1999*. These include: listed threatened species and ecological communities, Migratory species protected under international agreements, wetlands of international importance (listed under the Ramsar Convention), Commonwealth marine environment, World Heritage Properties, National Heritage Places, the Great Barrier Reef Marine Park, Commonwealth marine areas, nuclear actions, and a water resource (in relation to coal seam gas development and large coal mining development).

Nocturnal call playback	A survey technique undertaken (at night) which attempts to stimulate fauna species to call by imitating or playing their call at probable breeding sites.
No-go Zones	Areas of native vegetation which will be retained and protected during construction.
Noxious weed	An introduced species listed under the *Catchment and Land Protection Act 1994*. Under the Act, noxious weeds have specific control and reporting requirements.
Operational footprint	Refers to the areas where the physical infrastructure would be located and the areas where the operational activities would occur. This includes all proposed infrastructure elements such as the proposed transmission line (overhead) and structures, any new substation infrastructure or permanent access tracks. This also includes the corridor containing the transmission line which would require vegetation maintenance (50 metres in width).
Patch	Defined under Guidelines 2017 as 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 trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or any mapped wetland included in the Current Wetlands map, available in DELWP systems and tools.
Potentially Threatening Processes	The state equivalents of Key Threatening Processes, Potentially Threatening Processes are listed under Section 10 of the *Flora and Fauna Guarantee Act 1988* (FFG Act).
(the) Proponent	The proposal is proposed to be undertaken by NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (referred to as TransGrid). TransGrid is the operator and manager of the main high voltage (HV) transmission network in NSW and the Australian Capital Territory (ACT), and is the Authorised Network Operator (ANO) for the purpose of an electricity transmission or distribution network under the provisions of the *Electricity Network Assets (Authorised Transactions) Act 2015* (NSW). Further information on TransGrid can be found at www.transgrid.com.au.
(the) Proposal	The proposal is known as *'EnergyConnect (Victoria)'* The proposal involves the following key features: — construction of about 1.3 kilometres of new double circuit 220kV transmission line, with four new transmission line pole locations. At two of these locations, two poles would be installed. At the remaining locations only a single pole would be installed — the establishment of a formal 50 metre wide corridor for the new transmission line — upgrade of access tracks for use during construction and operation — the decommissioning and removal of the existing transmission line and towers. The description of the proposal as presented in the reports is indicative and based on the current level of design. The proposal would continue to be refined during detailed design.

Proposal footprint	Refers to the area that would be directly impacted by both construction and operation (including the areas that would be impacted by maintenance activities) of the proposal including all proposal infrastructure elements (including the proposed transmission line alignment, i.e. the operational footprint) as well as locations for currently proposed construction elements such as access tracks, laydown and staging areas, brake/winch sites
Proposal study area	The study area for the assessment in this report, which comprises a 200 m wide corridor between NSW/Victoria border at Monak and the Red Cliffs substation facility. It also encompasses the Red Cliffs substation facility and access track off Woomera Avenue into the proposal area. The proposal study area ends at the NSW/Vic boundary, defined as the cadastral boundary. This means that a small part of the bank (and constituent native vegetation) are part of the NSW assessments/component of the project. The proposal would be located within the proposal study area, however the entirety of the proposal study area would not be subject to direct impacts arising from the proposal. Some assessments components will have an additional study area specific to the methodologies of the assessment (e.g. for database searches, or areas of influence due to nature of the impacts). Such areas, where required, are clearly defined in the report.
Protected flora (Victoria)	— 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.
Recovery plan	A plan prepared under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* to assist the recovery of a threatened species, population or ecological community.
Scattered tree	Defined under Guidelines 2017 as a Canopy Tree that does not form part of a remnant patch.
Significant impact	A 'significant impact', as defined by the Commonwealth of Australia (DoEE 2013) is an impact which is "important, notable, or of consequence, having regard to its context or intensity". For Commonwealth-listed values, this is determined through assessment against the relevant Commonwealth criteria for the species or community. For other values, any impact that permanently affects their quality or viability may be considered significant.
Significant value (biodiversity or ecological)	Important, weighty or more than ordinary; typically used to describe a species, community, habitat or ecological relationship which is important at a local, regional, state or federal level. A significant species in this report is one which is listed under the relevant environmental legislation or by DELWP.
Small tree	Defined under Guidelines 2017 as a native canopy tree with a Diameter at Breast Height (DBH) less than the large tree benchmark for the relevant bioregional EVC.
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.

Threatened species, populations and ecological communities	Species, populations and ecological communities listed as Vulnerable, Endangered or Critically Endangered (collectively referred to as Threatened) under state and/or Commonwealth legislation (including FFG Act or the EPBC Act).
Transmission line corridor	An area up to 50 metres wide containing and directly beneath the transmission lines and other infrastructure in which TransGrid has rights to enter to access and maintain infrastructure and vegetation.
Tree protection zone	The area around the base of a tree which should be protected to ensure that root impacts do not occur. Calculated as 12 x the diameter at breast height.
Weed	A plant growing out of place or where it is not wanted, often characterized by high seed production and the ability to colonise disturbed ground quickly. Weeds include both exotic species and Australian native species of plant outside of their natural range. A weed can also be an 'environmental weed' which is any plant that invades native ecosystems and reduce the diversity and/or abundance of native flora or fauna.

ABBREVIATIONS

AEMO	Australian Energy Market Operator
CaLP Act	Victorian *Catchment and Land Protection Act 1994*
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Area
DELWP	Victorian Department of Environment, Land, Water and Planning
DAWE	Commonwealth Department of Agriculture, Water and the Environment
EPA	Environment Protection Authority Victoria
EVC	Ecological Vegetation Class
EE Act	Victorian *Environment Effects Act 1978*
EES	Environment Effects Statement
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FFG Act	Victorian *Flora and Fauna Guarantee Act 1988*
GIS	Geographic Information System. a system for storing and manipulating geographical information on computer
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
Guidelines 2017	*Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017c)
HV	High voltage
LGA	Local government area
MNES	Matters of National Environmental Significance - Matters listed pursuant to the *Environment Protection and Biodiversity Conservation Act 1999*
NEM	National Electricity Market
NGZ	No-go Zone
NSW	New South Wales
MW	Megawatts
P&E Act	Victorian *Planning and Environment Act 1987*
PMST	Protected Matters Search Tool
REZ	Renewable Energy Zone
SA	South Australia
sp.	Abbreviation of species (single)
spp.	Abbreviation of species (multiple)
SRZ	Structural Root Zone
subsp.	Abbreviation of subspecies
TPZ	Tree Protection Zone

VBA	Victorian Biodiversity Atlas
VicAdv	Species on the Victorian Advisory List (Victorian rare or threatened advisory lists administered by DELWP)
WoNS	Weed of National Significance – weed listed by the Commonwealth of Australia based on invasiveness, potential for spread and environmental, social and/or economic impacts

EXECUTIVE SUMMARY

TransGrid (electricity transmission operator in New South Wales (NSW)) and ElectraNet (electricity transmission operator in South Australia (SA)) are seeking regulatory and environmental planning approval for the construction and operation of a new High Voltage (HV) interconnector between NSW and SA, with an additional connection to Red Cliffs in north-west Victoria. Collectively, the proposed interconnector is known as EnergyConnect.

EnergyConnect comprises several components or 'sections' (shown on Figure 1.1). The Victorian Section (referred to herein as 'the proposal') is the subject of this report. TransGrid is the proponent for the proposal.

WSP has been commissioned on behalf of TransGrid to prepare this flora and fauna impact assessment to inform the statutory planning approvals for the proposal.

The purpose of the flora and fauna assessment is to identify potential impacts and recommend appropriate management during the construction and operation of the proposal. This report also provides an assessment of 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.*

METHODS

The following scope of works was undertaken:

- desktop review of flora and fauna databases and relevant biodiversity strategies, policies and legislation
- review previously completed or other assessments relevant to the proposal study area
- vegetation mapping and habitat hectare assessments
- mapping of large trees and habitat trees within 15 metres of the construction footprint
- habitat assessment for threatened species
- targeted flora and fauna surveys for species/groups with the potential to occur (as indicated by desktop assessment and habitat assessment). This included:
  - flora surveys of the proposal study area across September and October 2020
  - bird surveys, mammal trapping, terrestrial and arboreal remote camera trapping, bat detector surveys, duskwatching, reptile surveys (tiles and active searches), invertebrate surveys
- prepare and refine an assessment of the likelihood of occurrence of threatened species and communities listed under the EPBC Act, FFG Act and advisory lists
- assess the potential ecological impacts of development and provide recommendations to avoid, minimise or mitigate and offset ecological impacts
- evaluate implications of relevant biodiversity policy and legislation and triggers for permits/approvals (including FFG Act permit, EPBC Act referral, permit to remove native vegetation).

RESULTS

The proposal study area is largely comprised of native vegetation, and despite being dissected by numerous tracks and being impacted by previous clearing for the existing transmission line, is in good condition. Seven Ecological Vegetation Classes (EVCs) were recorded across the proposal study area which includes a total area of 26.190 hectares (ha). No scattered trees were recorded although 39 large trees were mapped.

Nineteen flora species of conservation significance were recorded. Three of these are FFG Act listed and the remainder are advisory list species only. No EPBC Act listed flora were recorded. There are a number of FFG Act and advisory list species that were not recorded, but may still occur (likely in low numbers if present) in the proposal study area.

Three fauna species of conservation significance were recorded: Brown Treecreeper, Lace Monitor, and Yellow-faced Whip-snake. An additional 31 fauna species may occur at least periodically although were not recorded in current surveys. This includes one species listed as vulnerable under the EPBC Act and two listed as migratory.

No EPBC Act or FFG Act listed communities were recorded within the proposal study area.

IMPACTS AND MITIGATION

Based on the current proposal footprint, the proposal would impact 5.419 ha of native vegetation including 18 large trees and 52 trees with hollows or nests (some trees being both large and with hollows/nests). This takes into account no-go zones and includes tree protection zone (TPZ) impacts for large trees.

Impacts on 12 flora species of conservation significance would occur, with all records of the remaining seven species potentially being able to be retained, as they are either located outside of the proposal footprint, or they are located within the proposed corridor but outside the footprint of the poles. The flora species which were not recorded but still have the potential to occur in the proposal study area are unlikely to be substantially impacted by the proposal, if present. Some habitat for fauna species of conservation significance will also be impacted, including hollow-bearing trees. Impacts on flora and fauna species are considered unlikely to be significant, particularly with the mitigation recommended for the proposal.

Impact minimisation and mitigation recommendations are provided in Section 5 and include, but are not limited to:

- arborist assessment of trees, particularly those outside of the proposal footprint which may be impacted by TPZ impacts or pruning
- methods of clearing and maintaining the transmission line corridor which avoid or minimise impacts on the understorey, such as chainsaws
- leaving stumps within the transmission line corridor as tall as possible
- re-use of timber felled on site for habitat, such as for use as habitat logs and replacement hollows
- fauna management measures and clearing controls, such as two-stage clearing
- no-go zones to avoid and minimise impacts to native vegetation outside of the full-clearance areas and tracks
- stringent measures (e.g. sediment and erosion control, no-zo zones etc.) to ensure there are no impacts on the Murray River, including the banks and waterway (this has been assumed for this report).

LEGISLATION AND POLICY

Environment Protection and Biodiversity Conservation (EPBC) Act 1999

Two Matters of national environmental significance (MNES) are relevant to the proposal: 'listed threatened species and ecological communities' and 'migratory species'. The specific species with the potential to be present within these MNES categories are:

1. Regent Parrot – vulnerable
2. Fork-tailed Swift – migratory (impacts unlikely)
3. Sharp-tailed Sandpiper – migratory (impacts unlikely).

Based on the assessment completed in this report, it is highly unlikely that the proposal would have a significant impact on any MNES. A referral to the Department of Agriculture, Water and Environment (DAWE) under the EPBC Act is unlikely to be recommended.

National Parks Act 1975

The proposal study area is located within Kings Billabong Park which is managed by Parks Victoria under Schedule Three ('other parks') of the *National Parks Act 1975*. TransGrid is seeking to enter an agreement for the use of land within Kings Billabong Park to the extent required by the proposal.

Environment Effects Act 1978

Due to the low level of native vegetation clearance (5.419 ha), and the level of impacts on recorded or likely present threatened species or communities, an Environment Effects Statement referral is not recommended for impacts on ecological values.

Flora and Fauna Guarantee Act 1988 (FFG Act)

A permit under the FFG Act will be required for the removal of 16 species listed as Protected Flora (non-threatened) and 12 flora species on the previous and new Threatened List.

Planning and Environment Act 1987 and the Guidelines for the Removal, Destruction or Lopping of Native Vegetation

The proposed removal of vegetation is located within DELWP Location 2 and is greater than 0.5 ha. As such, an application to remove native vegetation will need to follow a Detailed Risk pathway under the Guidelines. Offset requirements for the proposed removal of vegetation are outlined in a native vegetation removal (NVR) report sourced from DELWP.

For planning implications, refer to the planning report for the proposal.

Wildlife Act 1975

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*. Fauna salvage is likely to be required due to the hollow-bearing trees and nest trees present in the proposal study area, as well as habitat for terrestrial fauna.

Catchment and Land Protection Act 1994 (CaLP Act)

The field survey identified regionally controlled and restricted weeds within the proposal study area which are likely to require management during and after construction.

Mildura Planning Scheme

Schedule 1 to the Environmental Significance Overlay (ESO1) applies to most of the proposal study area, except for the existing developed section of the substation.

For planning implications, refer to the planning report for the proposal.

1 INTRODUCTION

1.1 PROPOSAL CONTEXT AND OVERVIEW

TransGrid (electricity transmission operator in New South Wales (NSW)) and ElectraNet (electricity transmission operator in South Australia (SA)) are seeking regulatory and environmental planning approval for the construction and operation of a new High Voltage (HV) interconnector between NSW and SA, with an additional connection to Red Cliffs in north-west Victoria. Collectively, the proposed interconnector is known as EnergyConnect.

EnergyConnect comprises several components or 'sections' (shown on Figure 1.1). The Victorian Section (referred to herein as 'the proposal') is the subject of this report.

EnergyConnect aims to secure increased electricity transmission between SA, NSW and Victoria in the near term, while facilitating the longer-term transition of the energy sector across the National Electricity Market (NEM) to low emission energy sources. The proposal forms a part of the missing transmission link between the SA and NSW transmission networks. The upgrade to the existing transmission line between Buronga and Red Cliffs would relieve system constraints and allow for NSW, SA and Victorian consumers to benefit from significant amounts of low-cost, large-scale solar generation in south-west NSW. The proposal is an essential component of EnergyConnect.

The proposal would be carried out by NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (referred to as TransGrid).

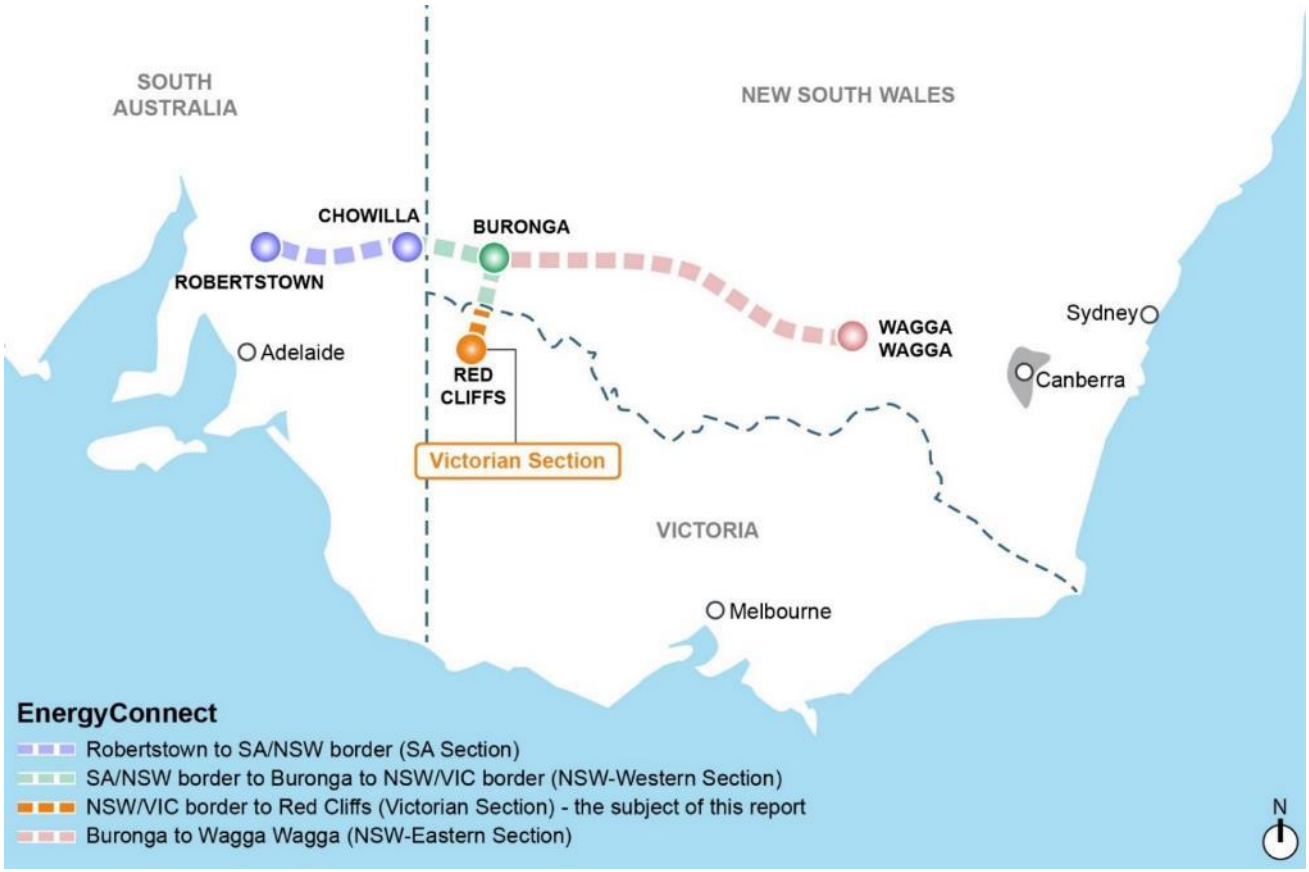


Figure 1.1 Overview of EnergyConnect

1.2 THE PROPOSAL

1.2.1 KEY FEATURES OF THE PROPOSAL

The proposal comprises the upgrade of an existing TransGrid 220 kV single circuit transmission line between the NSW/Victorian border and the Red Cliffs substation to a 220 kV double circuit transmission line. Specifically this comprises:

- site establishment works including vegetation clearance, minor access track improvements and construction of tower pad and laydown areas
- construction of about 1.3 kilometres of new double circuit 220 kV transmission line, with four new transmission line pole locations. At two of the four locations, a double arrangement (i.e. two poles) would be installed. At the remaining locations only a single pole structure would be installed
- the decommissioning and removal of the existing 220 kV single circuit transmission line and towers once the new line is operational. Decommissioning activities would include removal of all existing towers, fittings and conductors from the corridor. Some sub surface footings would be left in place to minimise excavation and disturbance
- the establishment of a formal 50 metre wide corridor for the new transmission line and poles
- vegetation removal required to maintain appropriate clearances between ground vegetation and transmission lines. Vegetation with a growth potential above four metres in height, within a 50-metre corridor below transmission lines, would require ongoing maintenance throughout the operation to ensure electrical safety clearances and protection zones are maintained. The required clearance of vegetation within the corridor would be undertaken in accordance with TransGrid maintenance guides
- upgrade of access tracks for use during construction and operation.

An overview of the proposal is provided in Figure 1.2.

The connection of the new transmission line to the Red Cliffs substation and disconnection of existing transmission line within the substation boundary would be undertaken as a separate scope of works and planning approvals process by AusNet.

The new line would also connect to a new line on the NSW side of the border (part of the NSW – Western Section of EnergyConnect). The planning approvals for this component are being progressed separately under NSW planning processes.

Construction of the proposal would commence in mid-2021. Construction timeframes for the proposal are subject to approvals, and the final program would be confirmed during detailed design.

1.2.2 PROPOSAL LOCATION AND STUDY AREA

The proposal is located in the Kings Billabong Park, Red Cliffs, in the Sunraysia region within the Mildura Local Government Area and is approximately 16 kilometres from Mildura and 544 kilometres from Melbourne. The proposal study area is within the Robinvale Plains Bioregion and the Mallee Catchment Management Authority (CMA) area.

The proposal study area comprises a 200 metres (m) wide corridor that extends for about 1.3 kilometres (km) and extends from the Red Cliffs substation, to the north-east where it meets the Victorian/NSW border at the Murray River. The proposal study area ends at the NSW/Vic boundary, defined as the cadastral boundary. This means that a small part of the bank (and constituent native vegetation) are part of the NSW – Western Section EnergyConnect project. The proposal study area also encompasses the Red Cliffs substation facility and access track into the proposal area.

The proposal study area is approximately 33.15 hectares (ha) and follows the existing 220 kV transmission line corridor and also encompasses the Red Cliffs substation facility and access track into the proposal study area (Figure 1.2). The bulk of the proposal study area is classified as Crown Reserve with the remainder typically freehold land.

The proposal study area occurs within Kings Billabong Park, a reserve of over 2,199 ha managed by Parks Victoria (Parks Victoria 2018) assigned under Schedule Three of the *National Parks Act 1975*. The management plan for the park (Parks Victoria 2008) which guided the protection of habitat and the recreational activities in the park, has been superceded by the approved River Red Gum Parks Management Plan (Parks Victoria 2018), which covers over 100 parks along the Murray, Goulburn and Ovens river corridors.

Parts of Kings Billabong Park have high river health and biodiversity values (VEAC 2007) with the wetlands in the park ('Kings Billabong Wetlands') listed on the Directory of Important Wetlands (Environment Australia 2001). Part of this nationally important wetland occurs nearby the proposal study area, with one part of the wetland complex approximately 50 m from the proposal study area boundary (not including the access track into the site which passes close to it) and approximately 100 m from the existing transmission line.

A total of 393 native flora species and 179 native fauna species have been recorded in the Kings Billabong Park including 82 significant flora species and 31 significant fauna species (VEAC 2007). As these records were collated in 2007, the species list is likely to be an underestimate, although may also include some species that no longer occur at that location.

The proposal study area is located approximately 30 kms from the Southern NSW Mallee Key Biodiversity Area (KBA) (Birdlife Australia 2020) which includes Murray Cliffs National Park to the east, and approximately 60 km north of the Murray Sunset Hattah & Annuello KBA, including Hattah-Kulkyne and Murray-Sunset National Parks.

Figure 1.2 Proposal Study Area overview

1.3 PURPOSE OF THIS TECHNICAL REPORT

WSP has been commissioned by TransGrid to prepare this flora and fauna impact assessment to support the statutory planning approvals for the proposal. The purpose of the flora and fauna assessment is to identify potential impacts and recommend appropriate management during the construction and operation of the proposal.

This report also provides an assessment of 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*.

1.3.1 OBJECTIVES AND SCOPE

The purpose of this assessment is to map and assess the significant ecological values of the proposal study area, help inform the detailed design of the proposal, and inform the planning pathways and ecological approvals process.

The following scope of work was undertaken:

- desktop review of flora and fauna databases and relevant biodiversity strategies, policies and legislation
- review previously completed or other assessments relevant to the study area
- vegetation mapping and habitat hectare assessments
- habitat assessment for threatened species
- targeted flora and fauna surveys for species/groups with the potential to occur (as indicated by desktop assessment and habitat assessment)
- a likelihood of occurrence assessment for threatened species and communities listed under the EPBC Act, FFG Act and advisory lists
- assess the potential ecological impacts of development and provide recommendations to avoid, minimise or mitigate and offset ecological impacts
- evaluate implications of relevant biodiversity policy and legislation and triggers for permits/approvals (including FFG Act permit, EPBC Act referral, permit to remove native vegetation).

1.3.2 IMPACT AREA AND ASSUMPTIONS

The new transmission line would be located adjacent to the existing transmission line, which would be removed following completion of the new line. The proposal footprint impact area encompasses all areas to be impacted for the construction and operation/maintenance of the proposal, specifically:

- Permanent full clearing for the new pole locations
- Temporary full clearing and grading (with groundcover to be rehabilitated post-works) for:
    - crane pad and pole assembly laydown areas
    - tower demolition laydown areas
    - stringing laydown areas (puller)
- Clearing and ongoing maintenance of vegetation with a growth potential of over four metres height and with some currently over 4m in height in a 25 m buffer of the new transmission line (50 m-wide corridor), referred to as ‘partial clearing’ in this report. This includes the area which was cleared for the current transmission line, which has partially regrown since originally being cleared and is only maintained without canopy in a narrow band. Within the full corridor, clearing of any habitat zone with canopy (or potentially regenerating canopy) has been assumed. However, vegetation removal will be undertaken by hand with chainsaws only with no heavy vehicle or equipment access required.
- Clearing, grading, filling-in of soft spots, drainage and tree pruning required for tracks. For trees where the trunk is are not located within the easement or within the track clearing area, pruning of only up to 1/3 of the tree canopy has been assumed.

The proposal footprint and locations of clearing requirements are provided on Figure 1.3.

In this assessment, and based on consultation with TransGrid, it is assumed that:

- no impacts will occur outside of the mapped proposal footprint; all batters, grading, laydowns, drainage works, pruning, parking, etc, are to occur within the impact footprint
- the access tracks will require minor works only and will not impact any TPZ or require substantial pruning (>1/3 of a tree canopy)
- no impacts will occur to the Murray River (banks or waterway).

Figure 1.3 Proposal footprint

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	DELWP ACCREDITED ASSESSOR ^
Samantha Vertucci	BSc (Hons)	Senior Ecologist – Project coordination, vegetation and habitat hectare assessment, fauna targeted survey, tree assessment, lead report author	Yes
Nic McCaffrey	BSc	Principal Ecologist – Ecology project director/botanical lead. Vegetation and habitat hectare assessment, botanical field survey, flora reporting, report approval	Yes
Rodney van der Ree	BSc (Hons), PhD	Technical executive (Ecology) – Fauna targeted survey, mitigation advice and review	No
Zoë Steven	BSc (Hons), M. Environnent	Senior Ecologist – Botanical field survey, tree assessment	Yes
Danelle Scicluna	BEnvSc	Ecologist – Desktop assessment reporting	No
Justin Pegg	BSc, M. Env&Sus	Senior Ecologist – Report review	Yes
Ian Sluiter	BSc (Hons), PhD	Subconsultant – Ogyris Ecological Research Targeted flora survey, *Camponotus* ant survey/Mildura Ogyris Butterfly habitat assessment, report review and provision of local expertise	N/A
Geoffrey Allen	BSc (Hons)	Subconsultant – Ogyris Ecological Research Targeted flora survey, *Camponotus* ant survey/Mildura Ogyris Butterfly habitat assessment, reptile survey (tile turning)	N/A
Robert Gration	PGCert App.Sc, M.WldMgt	Subconsultant – EcoAerial Bat detector data analysis	N/A
Robert Suansri	BSc, BEc	Senior GIS Consultant	N/A

^ Current list of accredited native vegetation assessors found here: https://www.environment.vic.gov.au/__data/assets/pdf_file/0026/51785/DELWP-VQA-AccreditedAssessorListAug2020.wbk.pdf

2.2 DATABASE AND LITERATURE REVIEW

A database search and literature review were undertaken for an indication of the ecological values of the proposal study area, and potential constraints to the proposal. 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 ten kilometre buffer of the proposal study area.

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 proposal study area and the broader locality. The following sources of information were consulted:

- Commonwealth EPBC Act Protected Matters Search Tool – ten kilometre buffer of the proposal study area (Department of Agriculture Water and the Environment 2020)
- the Victorian Biodiversity Atlas – ten kilometre radius of the proposal study area (DELWP 2020d)
- the Department of Environment, Land, Water and Planning (DELWP) NatureKit online tool (DELWP 2020c)
- the Commonwealth Department of Agriculture, Water and the Environment (DAWE) online Species Profile and Threats Database (DAWE 2020)
- Victorian Rare or Threatened Species Advisory Lists (DEPI 2014; DSE 2009, 2013)
- eBird (Cornell Lab of Ornithology 2020)
- The Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017c)
- Biodiversity Information Tools used in Victoria's Native Vegetation Permitted Clearing Regulations and the Native Vegetation Information Management System (DELWP 2020b)
- Sites of significance studies, wetlands and any publicly available reports such as the Victorian Environmental Assessment Council (VEAC) River Red Gums Forests Investigation (VEAC 2008)
- Vegetation Quality Assessment Manual (DSE 2004b)
- aerial imagery to determine habitat extents and linkages
- relevant legislation, government policy and strategies.

2.3 FIELD SURVEY SUMMARY

Detailed methods for flora and fauna survey are provided in Sections 2.4 (flora/vegetation) and 2.5 (fauna). The survey is summarised in the table below.

Table 2.2 Field survey summary

TARGET / SURVEY TYPE	DATES	SURVEY METHODS	RELEVANT GUIDELINES
Vegetation ground-truthing, habitat hectare assessments, initial threatened flora assessment	15 and 16 July 2020	Mapping of Ecological Vegetation Classes (EVCs) and habitat hectare assessments as per standard methods.	Vegetation Quality Assessment Guidelines (Department of Sustainability and Environment 2004)
Targeted flora surveys and Mildura Ogyris Butterfly habitat assessment (sugar ant *Camponotus terebris* survey)	17 September 2020	Half day walkover of study area by subconsultant Ogyris Ecological Research	No relevant guidelines
Targeted flora surveys	22-24 September 2020	Transects throughout proposal study area, focusing on areas of potential impact.	No relevant guidelines for the species of interest.

TARGET / SURVEY TYPE	DATES	SURVEY METHODS	RELEVANT GUIDELINES
Large tree and habitat tree assessment	22 September 2020	Mapping of all large trees and all hollow-bearing trees within 20 m of a preliminary impact footprint which includes the current proposal footprint.	Vegetation Quality Assessment Guidelines (Department of Sustainability and Environment 2004)
Bird surveys	22-24 September 2020 and 19 and 20 October 2020	Three 20 minute 2 ha plots undertaken twice (once in September, once in October), meander surveys (opportunistic survey also undertaken during other surveys)	Survey guidelines for Australia's threatened birds (DEWHA 2010)
Bat survey	24 September to early-mid October (bat detector deployment 1) 18 to 21 October 2020 (bat detector deployment 1) 19 and 20 October (dusk-watching and active surveys)	Three bat detectors deployed for approximately two weeks in September. Re-positioned and deployed for one week in October. Dusk-watching and active bat detector survey in October.	Survey guidelines for Australia's threatened bats (Department of Environment Water Heritage and the Arts 2010)
Mammal and nocturnal fauna survey	24 September to 22 October (terrestrial cameras) 18-22 October (arboreal cameras) 19-22 October 2020 (elliott traps) 22 and 23 September (call-playback) and 19 and 20 October (call-playback and spotlighting)	30 elliott traps deployed over three nights. Two nights of spotlighting. 7 terrestrial remote cameras deployed for four weeks, 7 arboreal remote cameras deployed for four nights.	No relevant guidelines for the species of interest
Reptile survey	24 September (Tile placement) Survey across September and October 2020	150 tiles deployed and checked 6 times for reptiles. Opportunistic log-turning and checks of leaf litter.	No relevant guidelines for the species of interest

2.4 DETAILED SURVEY METHODS: VEGETATION AND SIGNIFICANT FLORA SPECIES

Vegetation assessments and flora surveys were undertaken in July and September 2020. The following was undertaken:

- mapping and categorising native vegetation
- habitat hectare assessments
- an assessment of the extent and condition of threatened ecological communities
- targeted surveys for significant flora
- large tree and habitat tree assessments.

More information about these assessments are provided in the following sections.

2.4.1 CATEGORISING VEGETATION WITHIN THE STUDY AREA

Field validation (or ground-truthing) of extant vegetation modelling (DEPI 2009) and previously undertaken vegetation mapping was undertaken to map and assess native vegetation as per the *Guidelines for the removal, destruction or lopping of native vegetation* (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 per the following.

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 DELWP systems and tools.

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

The locations of scattered trees were recorded with a handheld GPS where they did not meet the criteria for a remnant patch.

Revegetation is extensive at some sites and can have different implications and exemptions under planning laws. When revegetation / planted vegetation is recorded as a site, it is classified as indigenous, native to Victoria, native to Australia or exotic.

2.4.2 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. This methodology is outlined in *Vegetation Quality Assessment Manual-Guidelines for applying the habitat hectares scoring method* (DSE 2004b). 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 EVC. Each EVC has a benchmark of optimal values which are found on DELWP's website (DELWP 2018). Site assessments are undertaken using the DSE *Vegetation Quality Field Assessment Sheet* (Version 1.3 October 2004) (DSE 2004b). Further to the site condition criteria, the habitat hectare process also requires an assessment of the site in a landscape context (DSE 2004b).

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, sites receive a score less than 60. 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 14 August 2020 by two ecologists who are accredited by DELWP in the method.

2.4.3 THREATENED ECOLOGICAL COMMUNITIES

The EPBC Act and FFG Act listed communities with the potential to occur (as informed by desktop assessment) were assessed on site.

There is no specific criteria which determines the presence of FFG Act communities except for an informal method of comparing site characteristics and floristics with community descriptions in (DELWP undated).

The EPBC Act communities were assessed against the relevant EPBC Act listing criteria.

2.4.4 SIGNIFICANT FLORA SURVEYS

An initial exploratory survey for threatened flora was undertaken on 15 and 16 July 2020 during habitat hectare assessments. Follow up detailed surveys for significant flora species were undertaken on 17 September by local subconsultants and on 22-24 September 2020 by WSP. The local botanists (Ogyris Ecological Research) were employed in conjunction with experienced WSP botanists to provide habitat-specific expertise and assist in species identification (refer Section 2.1).

The flora surveys were undertaken using transects and random meanders, with the aim to cover the entire construction footprint thoroughly during suitable seasons for the target flora (generally early spring, dependant on weather conditions). Some survey was conducted outside of this footprint to provide context for the records made within the footprint, and to help inform any changes in the footprint if required. GPS tracks were used to record the survey effort for each survey. Significant flora survey effort is shown on Figure 2.1.

Target species were the species of conservation significance identified as potentially present based on desktop assessment (approximately 57 species), but any other species of significance observed were also recorded opportunistically. The precise location (usually ± 3 m) of any significant species were recorded with a hand-held GPS. The number of plants were counted at each occurrence, except for the widespread species Sarcozona *Sarcozona praecox*, which was surveyed using four 10 x 10 m randomly-placed plots to capture the variability in density of this species.

The location and species of any high threat / noxious weeds were also recorded during these surveys.

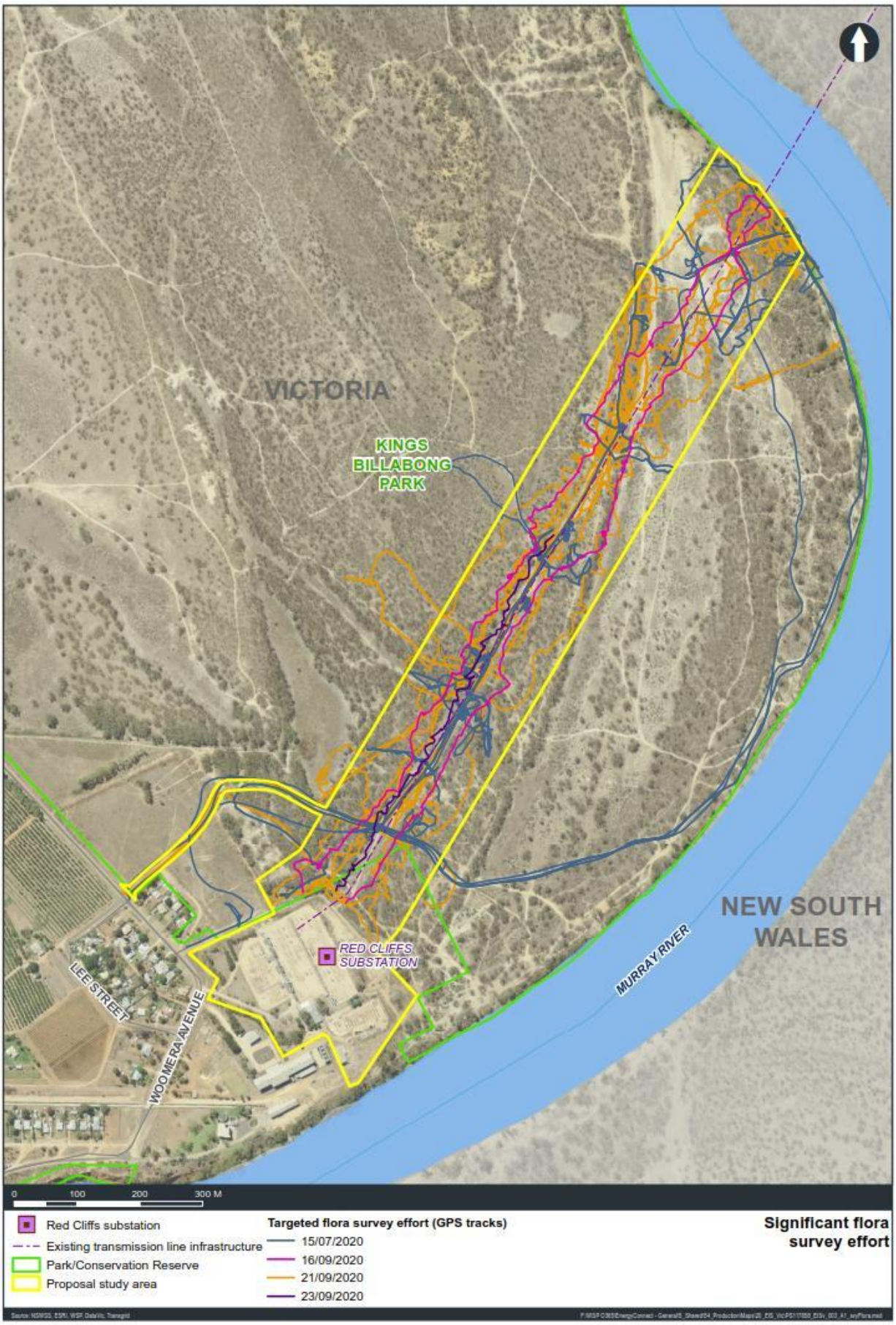


Figure 2.1 Significant flora survey effort

2.4.5 LARGE TREE AND HABITAT TREE SURVEYS

Mapping of large trees is required to calculate impacts to large trees and offsetting requirements under DELWP's *Guidelines for the removal, destruction or lopping of native vegetation* (2017) (the Guidelines). Large trees are defined as canopy species with a diameter at breast height greater or equal to the benchmark for the Ecological Vegetation Class (EVC).

Mapping of hollow-bearing trees is required to determine the likely impact of the proposal on fauna species which are reliant on hollows (particularly threatened species, if present). Hollow-bearing trees may be small or large trees.

For the tree assessment, an ecologist undertook the following within an early indicative construction footprint plus a buffer of approximately 20 m:

- mapped all large trees and recorded their diameter at breast height, (DBH, measured at 1.3 m above the ground) and species
- mapped all trees with cavities (with entrances that can be seen from the ground with binoculars) and recorded the number of visible hollows of each size class
- mapped all trees with other habitat values including nests, dreys or other signs of use by wildlife, such as any white-wash indicating roosting raptors or owls.

2.5 DETAILED SURVEY METHODS: FAUNA

2.5.1 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, roosting and breeding. Habitat assessment was undertaken during vegetation field surveys in July and September 2020.

2.5.2 TARGETED SURVEYS

Targeted surveys for several fauna groups were undertaken to supplement database searches and habitat assessments. Target species were the species of conservation significance identified as potentially present based on desktop assessment. Opportunistic recordings of non-target species were also made throughout the surveys. Fauna survey effort is shown on Figure 2.2.

Figure 2.2 Significant fauna survey effort

TILE SURVEY AND ACTIVE SEARCHES FOR REPTILES

Several threatened reptile species were assessed as having some potential to occur, despite a lack of recent records. Due to the heritage sensitivities present (precluding ground disturbance without heritage assessment), a pitfall trap survey (the preferred method for most of the target species) was not feasible within the timeframe. As such, WSP undertook a combination of active searches (log-turning and searching in leaf litter etc) and a small-scale tile survey using concrete roof tiles. Remote cameras (see survey for mammals) can also record larger reptiles, including Lace Monitors *Varanus varius*, snakes and lizards such as the Western Bluetongue *Tiliqua occipitalis*.

Six lines of 25 tiles were laid in September across the proposal study area, with tiles laid five metres apart. Tiles were checked six times during September and October 2020. Fauna underneath tiles were captured or observed and identified. Tiles were usually checked in the morning to coincide with when reptiles are most likely to be using them for thermoregulation.

For active searches, log rolling (or rock turning where any rocks are present) was restricted to 10-15% of the available habitat present. All habitat features were carefully replaced following disturbance.

No targeted turtle survey was undertaken for this assessment.

BAT DETECTOR AND DUSKWATCHING FOR MICROBATS

The threatened bats assessed as most likely to occur in the study area were Corben's Long-eared Bat *Nyctophilus corbeni* and Southern Myotis *Myotis macropus*. Yellow-bellied Sheathtail bat *Saccolaimus flaviventris* was also considered to have the potential to occur, although with a lower likelihood. Anabat recorder surveys and dusk watching was undertaken for these species.

Survey effort included:

- approx. two weeks of bat detector recording using three stationary bat detectors installed on 24 September 2020. Detectors were moved to a second survey location and batteries replaced on 18 October to survey for another four nights to maximise likelihood of detection. We note that September is a suboptimal season for these species, however the long survey length and extension into October is likely to compensate for this
- two nights of duskwatching with active anabat detectors to observe fishing Myotis.

This survey effort exceeds the survey effort recommended for bats under the Commonwealth survey guidelines (Department of Environment Water Heritage and the Arts 2010) which usually specify a minimum of 16 bat-detector nights over four nights. However, we note that the Commonwealth survey guidelines for Corben's Long-eared Bat specify that follow-up trapping is likely to be required to distinguish this species from other sympatric *Nyctophilus* species, if *Nyctophilus* calls are recorded.

TRAPPING AND CAMERAS FOR MAMMALS

Although there are very few recent records of threatened mammals in the area, the locality is also under-studied for this group. To reduce the risk of discounting a threatened mammal species such as one of the threatened *Pseudomys*, Elliot trapping and survey with remote cameras was undertaken for terrestrial mammals. Arboreal cameras were also used to survey for Western Pygmy Possum and other arboreal mammals. Cameras, both terrestrial and arboreal, can also be effective to survey for some reptiles and birds. The following survey effort was undertaken:

- three nights of trapping with 30 baited Elliot traps (19-22 October 2020)
- seven baited remote terrestrial cameras installed for four weeks (24 September to 22 October). Refer to Figure 2.3 for an example of the camera setup
- seven baited remote arboreal cameras installed for four nights (18 to 22 October).

Figure 2.3 Baited terrestrial camera at the study area

OBSERVATIONAL BIRD SURVEY

There are a number of threatened birds which may occur or are known to occur in the area. One Commonwealth-listed species for which there are recent records is the Regent Parrot, and determination of whether this species was breeding in the study area was particularly important.

Birds were surveyed using standard 20 minute two hectare surveys as well as meander surveys (walking the length of the alignment in woodland on the east or west side of the existing transmission line) and incidental observations during other flora and fauna survey. During 20 minute 2 ha survey and meander survey, all birds which could be identified visually or by call were recorded. Opportunistic observations during other surveys were generally only made for species of conservation significance or species which had not be regularly recorded during the targeted surveys. Surveys were focused on the early to mid-morning window (sunrise to 10 am) with some surveys extended to 11 am in cool weather and some survey undertaken in the late afternoon (4 pm to sunset). Ecologists aimed to achieved comprehensive coverage of the different habitats across the study area through both the 20 minute 2 ha survey points and the opportunistic surveys.

Nesting of raptors (including threatened species) was assessed through both these surveys and through identification of any potential raptor nests (large stick nests) during the tree survey.

This survey effort was sufficient to meet the Commonwealth survey guidelines for Regent Parrot, which specify that survey must include at least 12 hours over at least four days. Survey effort was spread across September and October to maximise detection of species which may pass through but not permanently reside within the area.

CALL-PLAYBACK AND SPOTLIGHTING FOR NOCTURNAL FAUNA

Nocturnal threatened fauna including Barking Owl *Ninox connivens* and Beaked Gecko *Rhynchoedura ornata* were considered to have the potential to occur in the study area. Although less likely, there is also a small potential for Masked Owl *Tyto novaehollandiae* to occur. Spotlighting and call playback were used to survey for these species, as well as pick up nocturnal threatened mammals or reptiles and *Camponotus* ants (refer to Invertebrates below) if present.

The following survey effort was undertaken:

- call-playback for Barking Owl and Masked Owl in September on two nights at one location along the Murray River just after dusk
- in October, two nights of call-playback for both owl species was undertaken at one location along the Murray River just after dusk
- two nights of spotlighting in October for geckos (including the terrestrial species Beaked Gecko) and mammals for two hours each night.

CALL-PLAYBACK METHOD

At the call playback site an initial listening period of approximately 10 minutes was undertaken. This was then followed by the call playback component of the survey which was restricted to two one-minute periods with at least 30 seconds in between. Upon conclusion, there was a 10-minute listening period followed by 10 minutes of spotlighting in the immediate vicinity to check for animals that were attracted by the calls but were not vocalising.

SPOTLIGHTING METHOD

For the spotlighting sessions in October, two hours each night for two ecologists were spent spotlighting in different parts of the alignment, with the aim to cover the different habitat types across the study area.

SURVEY FOR INVERTEBRATES

The Mildura Ogyris Butterfly *Ogyris subterrestris subterrestris* was identified in the desktop assessment as having the potential to occur in the study area. Due to its very specific habitat requirements, a local specialist (Ogyris Ecological Consulting) was employed to undertake habitat assessment and survey for the host ant species *Camponotus terebrans*. An initial survey was conducted in suitable overcast weather in the morning of 17 September 2020. Follow up searches for *Camponotus* ants were undertaken during nocturnal spotlighting by WSP in October 2020, by Ogyris Ecological Consulting on two overcast mornings in October, as well incidentally by both WSP and Ogyris Ecological Consulting during tile-turning and other fauna surveys.

Search effort was concentrated at the base of trees and shrubs, particularly where there was limited to no litter against the trunk. Elsewhere, where Mildura Ogyris Butterfly occurs and eggs have been located (e.g. Hattah-Kulkyne National Park), this is the ideal location for *Camponotus terebrans* ant nests.

Another vulnerable invertebrate, a Jewel Beetle *Temognatha tricolorata*, has been recorded from Kings Billabong Park. Evidence of this species was searched for opportunistically during fauna surveys, by looking for deceased individuals under River Red Gums (in which they feed) or in animal scats.

2.6 LIKELIHOOD OF OCCURRENCE

The absence of a particular species cannot be definitively determined during a relatively 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 2.3. This method uses the habitat requirements of the species, outcomes of an on-site habitat assessment, the degree of habitat connectivity, records of historical and recent presence as identified in the Victorian Biodiversity Atlas (VBA), and modelled presence from the Protected Matters Search Tool (PMST).

Table 2.3 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 a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
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 not seasonally targeted by surveys and that have not been recorded.
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.

2.7 PLANT IDENTIFICATION

Flora species that could not be identified in the field were recorded to the nearest possible family or genus. These were then collected and identified as per protocols of the FFG Act Permit (10009535) for the collection of plant material.

2.8 LIMITATIONS

Common limitations of ecological surveys include:

- the short time period over which they are undertaken and the lack of seasonal sampling, which can lead to a lack of detection of some species
- site conditions, including the presence of threatened species and extent of threatened communities, can change with time. As such, results are indicative of the environmental conditions at the time of assessment, including the presence or otherwise of species and the state of communities
- over-reliance on databases held by third parties which can lead to cryptic or under-studied species being missed.

To help overcome the above limitations:

- The likelihood of presence of threatened flora and fauna species was determined initially through habitat assessment, which is a 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.
- Multiple databases were consulted to maximise background data and assist in assessing species likelihood.
- Targeted flora survey was undertaken across multiple trips in spring to maximise the likelihood of detecting threatened species. The ecologists from WSP who undertook the surveys are highly experienced in flora survey. Two local botanists were also sub consulted to conduct flora survey. They provided valuable local knowledge and broadened the survey window to increase the likelihood of detecting early spring flora.
- Targeted fauna survey was undertaken across multiple trips including early spring and mid spring, to maximise the likelihood of detecting threatened species.

The interior of the substation fence was not accessed for surveys, as such, vegetation and habitat assessment results in this area is indicative only, and no targeted surveys were undertaken in this area. As the works required within the substation fence are not part of this proposal, this level of survey is considered adequate.

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 (06.20) and Victorian *Wildlife Act 1975* Research Permit (10009535). Additionally, all relevant WSP staff are covered under the Victorian FFG Act Permit to take/keep protected flora (10009535). A Parks Victoria permit was also received for the works (Activity numbers; PLA-0011050 and PLA-0011204).

3 RESULTS

3.1 DATABASE AND LITERATURE REVIEW

3.1.1 VBA AND PMST SEARCH RESULTS

The Victorian Biodiversity Atlas (VBA) and Protected Matters Search Tool (PMST) were searched on 7 May 2020 for records of state and/or national conservation significance within a 10 km radius of the proposal study area. The results are summarised below in Sections 3.1.1.1 and 3.1.1.2. The full likelihood of occurrence assessment is provided as Appendix C. Nine significant flora and one significant fauna species have previously been recorded within the proposal study area itself. The location of past records and other database search results are provided on Figure 3.1 and Figure 3.2.

3.1.1.1 FLORA SPECIES

VBA and PMST searches returned a total of 174 significant flora species recorded, or predicted to occur, within 10 km of the study area. Of these, five species are listed under the EPBC Act, 30 are listed under the FFG Act and 173 species are listed on the *Advisory List of Rare and Threatened Plants in Victoria* (DEPI 2014). Consideration of significant flora species returned by database searches is made with reference to the habitat values of the study area and the results of targeted surveys. Summaries of species considered at least moderately likely to occur are provided in Section 3.2.4.1.

3.1.1.2 FAUNA SPECIES

VBA and PMST searches returned a total of 113 significant species recorded, or predicted to occur, within 10 km of the study area. An additional two species were added for consideration based on local knowledge/experience. Of these, 31 species are listed under the EPBC Act as threatened, 10 species are listed under the EPBC Act as migratory, 63 are listed under the FFG Act and 104 species are listed on the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2009), with many species included in more than one list. Consideration of the likelihood of occurrence of significant fauna species is made with reference to the habitat values of the study area and the results of targeted surveys. Summaries of species considered at least moderately likely to occur are provided in Section 3.2.6.4.

3.1.1.3 THREATENED ECOLOGICAL COMMUNITIES

The PMST identified one community listed under the EPBC Act as having the potential to occur within the study area. This community, Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions, is listed as Endangered.

Seven FFG Act listed ecological communities were identified in the desktop search as having the potential to occur, prior to field survey, based on their descriptions (DELWP undated). These were:

- Lowland Riverine Fish Community of the Southern Murray-Darling Basin
- Semi-arid Herbaceous Pine Woodland Community
- Semi-arid Herbaceous Pine-Buloke Woodland Community
- Semi-arid Northwest Plains Buloke Grassy Woodland Community
- Semi-arid Shrubby Pine-Buloke Woodland Community
- Victorian Mallee Bird Community
- Victorian Temperate Woodland Bird Community.

3.1.2 EXTANT VEGETATION MODELLING

DELWP extant vegetation mapping indicated the potential presence of the following EVCs within the proposal study area (DELWP 2020a, 2020b, 2020c):

- Semi-arid Chenopod Woodland 98: community of the arid zone which may occur as a (non-eucalypt) woodland or a shrubland – Vulnerable (conservation status for the Robinvale Plains Bioregion)
- Low Chenopod Shrubland 102: shrubland to 1.5 m which occupies broad, flat alluvial terraces occur along the Murray River, west from Mildura to the border – Depleted
- Riverine Chenopod Woodland 103: confined to heavy clay soils on higher level terraces within or on the margins of riverine floodplains – Depleted
- Lignum Shrubland 808: occupies heavy soil plains along the Murray River, in low-lying areas on higher-level (but still potentially flood-prone) terraces – Least Concern
- Intermittent Swampy Woodland 813: woodland to 15 m which occupies low elevation areas on river terraces supporting species tolerant of or stimulated by inundation – Depleted
- Tall Marsh 821: wetland of tall emergent graminoids which occupies wetlands usually associated with anabranch creeks. Soils are almost permanently moist – Depleted.

A map of the modelled EVCs is provided as Figure 3.1. Most of the study area has been modelled as having a high strategic biodiversity value (0.81 – 1.00) with vegetation in a good condition (0.61 – 0.80) (DELWP 2020b).

The ground-truthing indicated large differences between the modelled and actual on-ground EVC composition. Refer to Section 3.2 for the field survey results.

3.1.3 LITERATURE REVIEW

Literature review findings have been incorporated into the relevant sections of this report. Results from surveys completed for the NSW component of the project across the Murray River from the current study area have been considered when assessing likelihood of occurrence of certain threatened species. The Jacobs (2019) report *Project EnergyConnect - Preliminary Ecological Constraints Assessment (SA, NSW and Red Cliffs spur line into Victoria)* was comprehensive and detailed however it was for a much larger study area and the area of interest was not surveyed in detail (Jacobs 2019).

The findings of that report were considered when preparing this assessment, however this assessment provides much greater certainty regarding the actual ecological values and impacts of the proposal due to the increased survey effort.

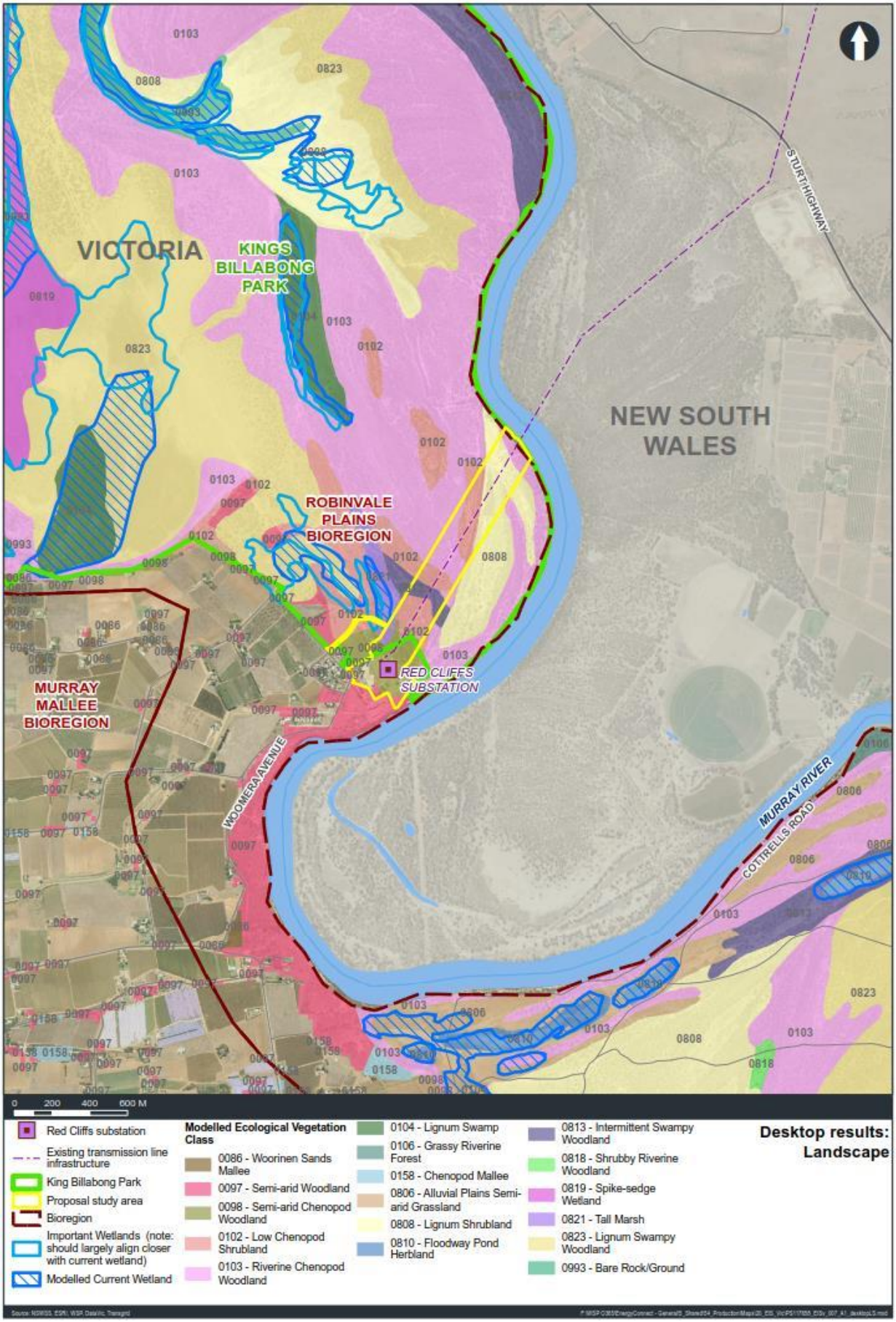


Figure 3.1 Desktop results – landscape

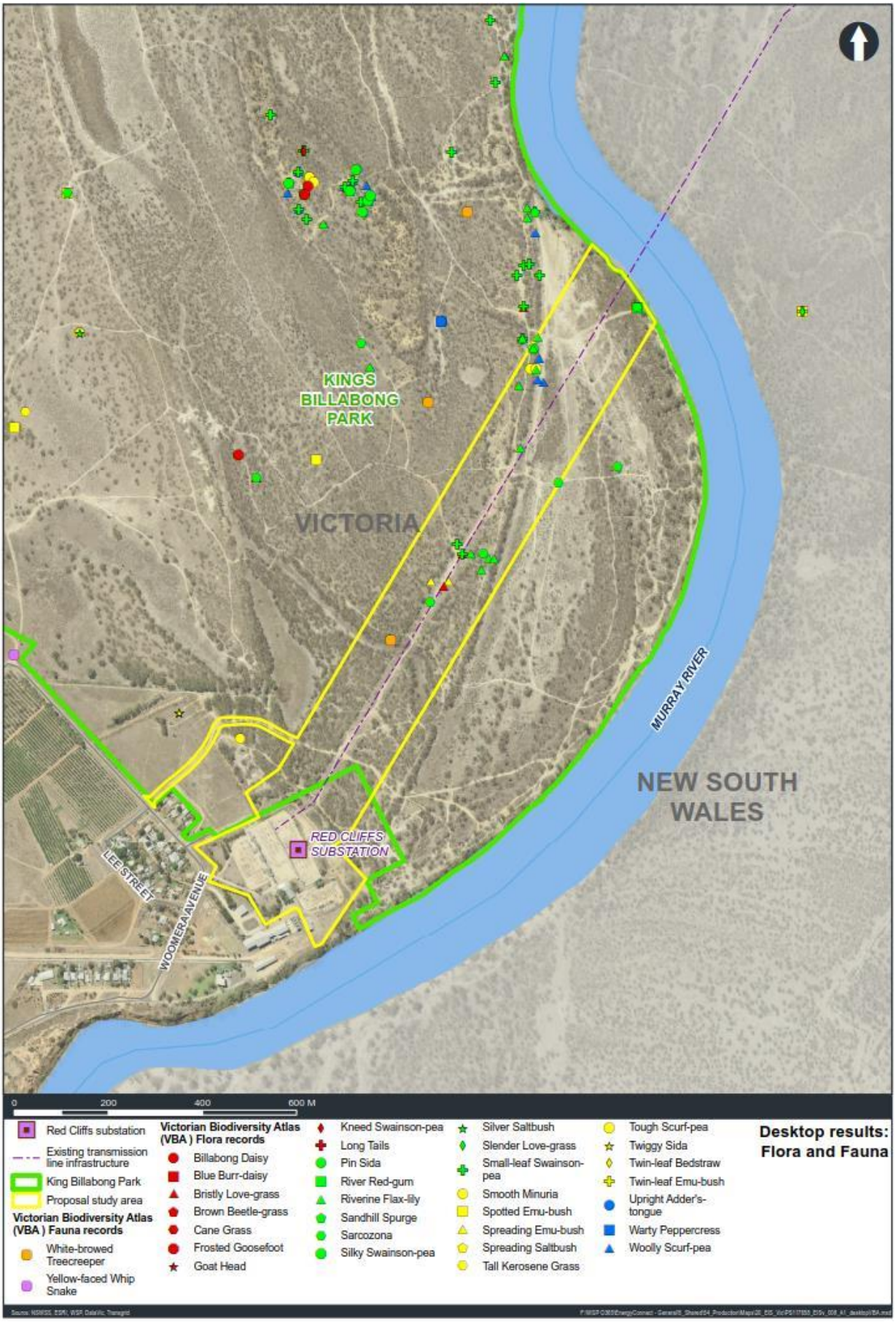


Figure 3.2 Desktop results – VBA flora and fauna records

3.2 FIELD SURVEY RESULTS

3.2.1 GENERAL SITE CONDITION AND DESCRIPTION

The proposal would occur east of the existing transmission line which stretches from across the Murray River south to the substation. An approximately 25 m buffer of the existing line has been cleared and maintained free of trees, although high quality native understorey vegetation remains across a large proportion of this area. The remainder of the proposal study area supports native vegetation which largely has a natural canopy, although it is bisected by numerous cleared vehicle tracks.

The proposal study area mostly supports Black Box dominated woodland on gently undulating terrain. Roughly in the centre of the study area the terrain slopes down toward a dry creek bed. Based on the presence of large dead River Red Gums, it is unlikely this creek bed now receives any regular water. Toward the northern part of the study area, the land slopes down toward a floodplain which is dominated by lignum, sub-saline depression shrubland, and lignum woodland, before a narrow band of River Red Gum-dominated Grassy Forest along the Murray River. The EVCs mapped are described in Section 3.2.2. A small area of semi-arid woodland was recorded near the Red Cliffs substation.

The study area is generally in moderate to good condition, with a low cover of weeds despite regular use of the numerous park tracks by people walking and with 4WDs and motorbikes. The low weed cover is likely largely due to heavy soils and infrequent rain. Soils in the proposal study area and nearby park are mostly cracking clay soils (vertosols) with some alluvial deposits (Agriculture Victoria 2014). There is evidence of past tree removal, including ringbarking of large trees near the Murray River and cutting of trees for firewood, as well as evidence of impacts from rabbits.

Existing development/infrastructure within the proposal study area includes buildings, fencing and infrastructure at the Red Cliffs substation in the south, and four single towers and associated power lines stretching from the substation to (and across) the Murray River. The only other visible development/infrastructure within the study area are vehicle tracks, parking areas along the river and some fencing by Parks Victoria to minimise driving on unauthorised tracks. A boat ramp and associated vehicle parking areas and picnic tables are present along the Murray River east of the study area.

3.2.2 VEGETATION DESCRIPTION AND ECOLOGICAL VEGETATION CLASSES

The vegetation in the proposal study area is best described as remnant patches of native vegetation. Much of the proposal study area supports a natural overstorey, although some areas have been cleared of overstorey (i.e. under the existing transmission line) and some areas are naturally mostly treeless.

Seven different ecological vegetation classes (EVCs) were mapped as summarised in Table 3.1. A total of 26.191 ha of native vegetation was recorded within the proposal study area. Study area specific characteristics of each EVC are discussed below the table, with EVCs ordered by their presence roughly north-south (i.e. from the Murray River heading inland) along the proposal study area.

A map showing the EVCs recorded is provided as Figure 3.3. Habitat zones, which are shown on the map, are discussed in Section 3.2.2.1.

Table 3.1 Summary of Ecological Vegetation Classes in the proposal study area

EVC NUMBER	ECOLOGICAL VEGETATION CLASS	CONSERVATION STATUS FOR ROBINVALE PLAIN BIOREGION	AREA MAPPED (ha)
106	Grassy Riverine Forest	Depleted	0.115
813	Intermittent Swampy Woodland	Depleted	1.375
803	Lignum Shrubland	Least Concern	3.042
823	Lignum Swampy Woodland	Depleted	1.696
103	Riverine Chenopod Woodland	Depleted	16.953
97	Semi-arid Chenopod Woodland	Vulnerable	1.191
820	Sub-saline Depression Shrubland	Depleted	1.819

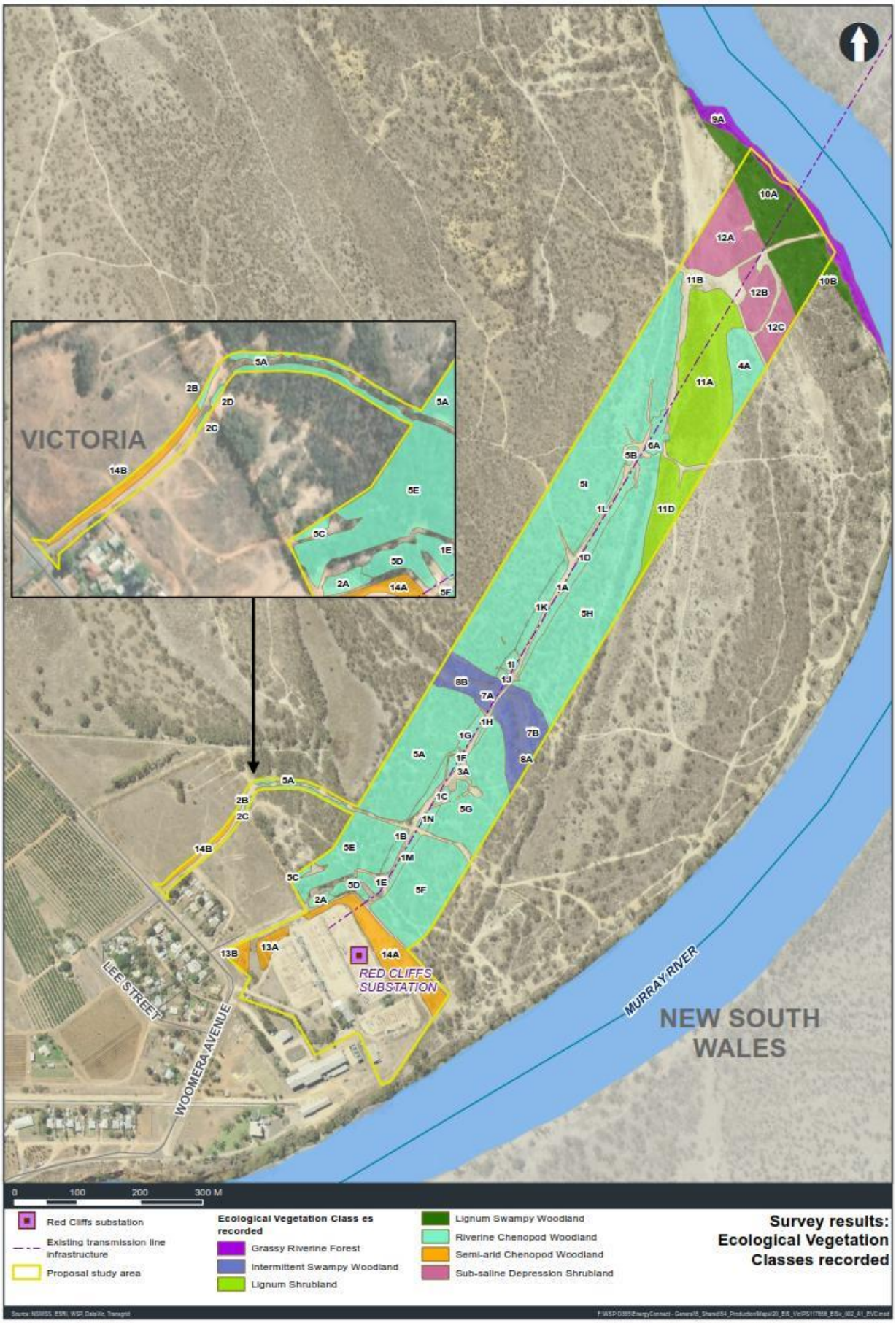


Figure 3.3 Ecological vegetation classes recorded (numbers correspond to habitat zones – see Section 3.2.2.1)

GRASSY RIVERINE FOREST EVC 106

This EVC was mapped along the banks of the Murray River at the northern extent of the proposal study area. It is described in the Robinvale Plains Bioregion EVC benchmarks (DSE 2004a) as:

> *"Occurs on the floodplain of major rivers, in a slightly elevated position where floods are infrequent, on deposited silts and sands, forming fertile alluvial soil. River Red Gum forest to 25 m tall with a ground layer dominated by tussock-forming graminoids. Occasional tall shrubs present."*

One patch of 0.115 ha of this EVC was mapped within the proposal study area in a narrow band along the Murray River. It supported a number of large old River Red Gums in the canopy and an understorey of mixed grasses, sedges and herbs, including *Phragmites australis*, *Cyperus gymnocaulos*, Native Couch *Cynodon dactylon* var. *pulchellus* and *Atriplex semibaccata*. Tangled Lignum *Duma florulenta* was also present, particularly on the boundary with the adjacent EVC: Lignum Swampy Woodland. A high number and cover of introduced grasses and other weeds was recorded in this EVC when compared to other EVCs at the study area, including **Vulpia* spp. and **Hordeum* spp.

Figure 3.4 Narrow band of Grassy Riverine Forest along the Murray River (Photograph July 2020), photograph taken looking west from the existing transmission line

LIGNUM SWAMPY WOODLAND EVC 823

This EVC is to the north of the proposal study area, close to the River but behind the Grassy Riverine Forest. It is described in the benchmarks in the following way:

> *"Understorey dominated by Lignum, typically of robust character and relatively dense (at least in patches), in association with a low Eucalypt and/or Acacia woodland to 15 m tall. The ground layer includes a component of obligate wetland flora that is able to persist even if dormant over dry periods."*

Two patches of this EVC were mapped on site for a total of 1.696 ha. They supported an understorey dominated by Tangled Lignum and other native species with several large, mainly dead hollow emergent trees. The few remaining living trees were mostly Black Box. A number of small native herbs and small shrubs were recorded in the gaps between lignum, including Nitre Goosefoot *Chenopodium nitrariaceum*, Hedge Salt-bush *Rhagodia spinescens*, Nodding Salt-bush *Einadia nutans*, and Peppercress *Lepidium pseudohyssopifolium.* Some weeds were recorded including Cat's Ear *Hypochaeris radicata*, as well as *Vulpia* spp. and *Hordeum* spp.

Figure 3.5 Lignum Swampy Woodland present at the proposal study area (Photograph July 2020)

SUB-SALINE DEPRESSION SHRUBLAND EVC 820

The next EVC inland from those described above is Sub-saline Depression Shrubland, occurring at a point of low elevation within the landscape. It is described in the EVC benchmarks (DSE 2004a) as:

> *A low open shrubland/herbland dominated by chenopods and succulents and occurring on the highest terraces of the former (i.e. pre1750) Murray River floodplain in far North-West Victoria. It occupies semi-saline treeless pans in low-lying areas within Riverine Chenopod Woodland on very heavy and mildly saline clay soils."*

Three patches of this EVC totalling 1.819 ha were mapped within the proposal study area. It was absent of canopy layer and consisted mainly of Streaked Copperburr *Sclerolaena tricuspis*, Prickly Saltwort *Salsola tragus*, Tangled Lignum, and Rounded Noon-flower *Disphyma crassifolium subsp. clavellatum* and other smaller chenopods and succulents.

Figure 3.6 Sub-saline Depression Shrubland at the proposal study area, photograph taken looking south east at the existing transmission line (July 2020)

LIGNUM SHRUBLAND EVC 808

This EVC also occurs on low elevation within the study area, it is described in the benchmarks (DSE 2004a) as:

> *"Relatively open shrubland of species of divaricate growth form. The ground-layer is typically herbaceous or a turf grassland, rich in annual/ephemeral herbs and small chenopods. Characterised the open and even distribution of relatively small Lignum shrubs. Occupies heavy soil plains along Murray River, low-lying areas on higher-level (but still potentially flood-prone) terraces."*

A total of 3.042 ha of this EVC were recorded within the proposal study area. This EVC supported Tangled Lignum, as well as Blackseed Glasswort *Tecticornia pergranulata*, Streaked Copperburr, Prickly Saltwort and several other chenopods and herbs common across the proposal study area.

Figure 3.7 Lignum Shrubland recorded in the study area. Photograph looking east from the existing transmission line (July 2020)

RIVERINE CHENOPOD WOODLAND EVC 103

The next EVC to the south west (inland) and elevated above the swampy floodplain of the previous EVCs is Riverine Chenopod Woodland EVC 103. It is the dominant EVC across the proposal study area with 16.953 ha mapped. It is described in the benchmarks (DSE 2004a) as:

> *"Eucalypt woodland to 15 m tall with a diverse shrubby and grassy understorey occurring on most elevated riverine terraces. Confined to heavy clay soils on higher level terraces within or on the margins of riverine floodplains (or former floodplains), naturally subject to only extremely infrequent incidental shallow flooding from major events if at all flooded."*

It supported a canopy almost entirely dominated by Black Box with a sparse shrubby midstorey and shrubby/chenopod understorey, including species such as Broad-leaf Desert Cassia *Senna artemisioides subsp. coriacea*, Silver Needlewood *Hakea leucoptera subsp. leucoptera*, Old-man Saltbush *Atriplex nummularia*, Sticky Hop-bush *Dodonaea viscosa*, Rounded Noon-flower, Spreading Emu-bush *Eremophila divaricata subsp. divaricata*, and Hedge Saltbush. Harleqluin Mistletoe *Lysiana exocarpi* was also present in the Black Box.

Under the existing transmission line, the canopy has been cleared however the understorey remains in good condition. Very few weeds were observed in this EVC although there was scattered Prickly Pear **Opuntia spp*., Arabian Grass **Schismus barbatus* and Small Ice-plant **Mesembryanthemum nodiflorum* and evidence of impacts by rabbits.

Figure 3.8 Riverine Chenopod Woodland in the proposal study area with remnant overstorey (July 2020).

Figure 3.9 Riverine Chenopod Woodland under the existing transmission line, maintained with cleared canopy (July 2020)

INTERMITTENT SWAMPY WOODLAND EVC 813

This EVC was mapped along a dry creek bed or billabong running through the middle of the proposal study area. It is described in the benchmarks (DSE 2004a) as:

> *"Eucalypt woodland to 15 m tall with a variously shrubby and rhizomatous sedgy - turf grass understorey, at best development dominated by flood stimulated species in association with flora tolerant of inundation. Flooding is unreliable but extensive when it happens. Occupies low elevation areas on river terraces (mostly at the rear of point-bar deposits or adjacent to major floodways) and lacustrine verges (where sometimes localised to narrow transitional bands). Soils often have a shallow sand layer over heavy and frequently slightly brackish soils."*

A total of 1.375 ha of this EVC was mapped within the proposal study area. It supports a canopy of River Red Gums and Black Box. At the time of assessment, the sparse understorey was dominated by Common Blown-grass *Lachnagrostis filiformis s.l* with Nodding Salt-bush and other small shrubs, chenopods and herbs. The River Red Gums in the canopy have largely died back and remain as stags, likely due to lack of water, indicating a change in the flooding regime of the creek line. Small treeless areas in the centre of the dry creek bed were mapped as separate patches/habitat zones of this EVC and scored separately.

Figure 3.10 Intermittent Swampy Woodland on the western side of the proposal study area (July 2020)

SEMI-ARID CHENOPOD WOODLAND EVC 98

This EVC was mapped in the south west of the proposal study area around the substation. It is described in the benchmarks (DSE 2004a) as:

> *"Sparse, low non-eucalypt woodland to 12 m tall of the arid zone with a tall open chenopod shrub-dominated understorey or a treeless, tall chenopod shrubland to 3 m tall. This EVC may occur as either a woodland (typically with a very open structure but tree cover >10%) or a shrubland (tree cover <10%) with trees as an occasional emergent."*

A total of 1.191 ha of this EVC was recorded within the proposal study area, with some patches supporting canopy and the remainder comprised of modified or regenerating understorey only. The patches of this EVC within the fenced substation were assessed from outside the fence only. As such, full lifeform checklists could not be undertaken for the patches of this EVC which supported canopy, as they occurred within the fence only. However, the canopy was predominantly Belah *Casuarina pauper*, with a shrub and chenopod-dominated understorey. The cleared/recolonising Semi-arid Chenopod Woodland to the west of the substation (outside of the study area) was used to indicatively assess the understorey. In this area, understorey species were similar to the cleared Riverine Chenopod Woodland under the existing transmission line, although less diverse and with a higher cover of weeds, indicative of past disturbance.

Figure 3.11 Semi-arid Chenopod Woodland within the substation (July 2020)

Figure 3.12 Semi-arid Chenopod Woodland within the substation fence with previously cleared/recolonising Semi-arid Chenopod Woodland in the foreground (July 2020)

3.2.2.1 HABITAT ZONES AND HABITAT HECTARE SCORES

Patches of native vegetation across the site were mapped according to EVC and condition and VQA/habitat hectare assessments were undertaken for each one. 48 individual patches were mapped in the proposal study area with Site Condition Scores varying from 17 to 55. Landscape context scores varied between 10 and 21, largely due to patch size and location along the alignment. Final habitat hectare scores ranged from 0.32 to 0.76.

For calculation of impacts and offsets, adjacent patches of the same EVC that are very similar in condition score (<15 points difference in site condition score) were amalgamated and scoring adjusted accordingly. However, mapping at this level of detail allows for more detailed impact avoidance and targeting of fauna survey effort.

The full scores for all impacted patches in the proposal study area are provided in Appendix F.

Table 3.2 Site condition scores and habitat zone descriptions for native vegetation within the proposal study area

HABITAT ZONES (FIGURE 4 OF APPENDIX A)	EVC	DESCRIPTION	SITE CONDITION SCORE (VQA)	EXTENT (HA)
1A-1N	Riverine Chenopod Woodland	Cleared canopy but good condition understorey	48	1.495
2A-2D	Riverine Chenopod Woodland	Cleared canopy with degraded understorey	22	0.092
3A	Riverine Chenopod Woodland	Cleared canopy with low diversity understorey but few weeds	31	0.003
4A	Riverine Chenopod Woodland	Canopy present but few large trees	43	0.540

HABITAT ZONES (FIGURE 4 OF APPENDIX A)	EVC	DESCRIPTION	SITE CONDITION SCORE (VQA)	EXTENT (HA)
5A-5I	Riverine Chenopod Woodland	Canopy remaining, good condition	50	14.659
6A	Riverine Chenopod Woodland	Mostly cleared canopy	41	0.164
7A, 7B	Intermittent Swampy Woodland	Canopy remaining but few large trees, good condition	39	1.150
8A, 8B	Intermittent Swampy Woodland	Treeless dry channel	17	0.225
9A	Grassy Riverine Forest	Canopy remaining, large trees along river	55	0.115
10A, 10B	Lignum Swampy Woodland	Sparse canopy present, good condition	50	1.696
11A-11D	Lignum Shrubland	Treeless community in good condition	46	3.042
12A-12C	Sub-saline Depression Shrubland	Treeless community in good condition	49	1.819
13A, 13B	Semi-arid Chenopod Woodland	Canopy remaining, unable to assess in detail	40	0.270
14A, 14B	Semi-arid Chenopod Woodland	Cleared canopy, degraded or regenerating understorey	25	0.921

3.2.3 THREATENED ECOLOGICAL COMMUNITIES

One EPBC Act listed ecological community and seven FFG Act listed ecological communities were considered to have the potential to occur within the proposal study area. Table 3.3 assesses the presence of these communities on site based on the results of the field surveys. As per this assessment it is unlikely that any threatened communities occur in the proposal study area.

Table 3.3 Threatened ecological community assessment results

COMMUNITY NAME	DESCRIPTION	PRESENCE WITHIN PROPOSAL STUDY AREA
EPBC Act		
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Encompasses a number of woodland communities where Buloke *Allocasuraina luehmanii* is the dominant or co-dominant tree species. Found within the Riverina and Murray Darling Depression Bioregions and from north east South Australia, north west and central north Victoria into NSW.	Buloke was not recorded within the study area and therefore this community does not occur.

COMMUNITY NAME	DESCRIPTION	PRESENCE WITHIN PROPOSAL STUDY AREA
FFG Act		
Lowland Riverine Fish Community of the Southern Murray-Darling Basin	Community characterised by a suite of native fish taxa typical of, and largely restricted to the area. Found in the lowland river reaches and associated floodplains of the Murray River tributaries, together with the lowland section and floodplain of the Murray River upstream of the South Australian border.	May occur within the Murray River however this is outside the study area and no impacts on the river habitat have been assumed for this assessment.
Semi-arid Herbaceous Pine Woodland Community	Woodland or open woodland dominated by Slender Cypress-pine *Callitris gracilis*, with occasional Buloke. Shrubs are either absent or few and can include Small Cooba *Acacia ligulata.*	Slender Cypress-pine was recorded within the study area in patches of Riverine Chenopod Woodland however is was not the dominant species and therefore this community is not considered to occur.
Semi-arid Herbaceous Pine-Buloke Woodland Community	Woodland or open woodland dominated by both Slender Cypress-pine and Buloke. Shrubs usually absent with a ground layer consisting largely of herbs.	Slender Cypress-pine was recorded within the study area in patches of Riverine Chenopod Woodland however is was not the dominant species and no Buloke was recorded. This community is not considered to occur.
Semi-arid Northwest Plains Buloke Grassy Woodland Community	Open woodland dominated by Buloke sometimes with Black Box *Eucalyptus larginflorens* and/or Yellow Gum *E. leucoxylon.* Shrub layer present and usually dominated by Gold-dust Wattle *Acacia acinacea*.	Buloke was not recorded within the study area and therefore this community does not occur.
Semi-arid Shrubby Pine-Buloke Woodland Community	Woodland or open woodland dominated by Slender Cypress-pine with varying numbers of Buloke and a characteristic shrub component.	Slender Cypress-pine was recorded within the study area in patches of Riverine Chenopod Woodland however is was not the dominant species and therefore this community is not considered to occur.
Victorian Mallee Bird Community	Community is an assemblage of twenty native bird species and subspecies mainly or totally restricted to habitats dominated by mallee vegetation, and distinctive of the geographical region.	The study area is not dominated by mallee vegetation and therefore this community does not occur, despite the presence/potential presence of some less mallee-exclusive taxa relevant to the community. Specifically, the Brown-headed Honeyeater *Melithreptus brevirostris pallidiceps* which was recorded during survey, and Regent Parrot *Polytelis anthopeplus monarchoides* is assumed likely to periodically occur at the study area although not recorded in the recent surveys or considered likely to breed there. None of the other indicative species are considered likely to occur.

COMMUNITY NAME	DESCRIPTION	PRESENCE WITHIN PROPOSAL STUDY AREA
Victorian Temperate Woodland Bird Community	Community is an assemblage of 24 species mainly associated with drier woodlands on the slopes and plains north of the Great Dividing Range that have declined markedly since records began.	The habitat at the study area generally does not have the grassy groundcover indicated in the community description. Furthermore, the study area is located in a semi-arid region, rather than temperate, and may not be considered located 'on the slopes and plains north of the Great Dividing Range' as state in the community description. Three indicative species: Brown Treecreeper *Climacteris picumnus*, Brown-headed Honeyeater, and Red-capped Robin were recorded in the study area during bird surveys. Two other species, Hooded Robin and Apostlebird, may also occur and have been recently observed in Kings Billabong Park, although were not recorded during the current surveys.
		The community is assumed not to occur due to the semi-arid habitat, despite the bird species present and the presence of Black Box and River Red Gum. This conclusion should be verified by DELWP.

3.2.4 FLORA SPECIES

A total of 146 vascular plant species were recorded in the study area during the field surveys, of which 104 were indigenous (71%), 37 introduced (25%) and five non-indigenous native species.

The significant flora recorded are discussed in Section 3.2.4.1.

3.2.4.1 SIGNIFICANT FLORA SPECIES – WSP TARGETED FLORA SURVEY RESULTS

Species recorded during targeted flora surveys and numbers recorded in the proposal study area are provided in Table 3.4, with a brief description of each species and where it was recorded provided in Table 3.5. The locations of the records are provided on Figure 3.13. The study area supports a high number of significant flora species, with 19 species recorded in the study area, including along the previously cleared corridor under the existing transmission line, and on track edges. Several of these species are common in NSW but rare in Victoria.

Flora species of conservation significance were classified into 'higher significance' and 'lower significance'. These classifications were used to assist with avoidance and minimisation efforts and for maps to illustrate the location of species which are of higher priority for conservation. Significance was based on conservation status and known or observed rarity. Higher significance species are those which are FFG Act listed or Advisory list Vulnerable, or species which were present at the proposal study area in very low numbers only, or species otherwise known to be particularly rare and therefore at greater risk.

Table 3.4 Summary of flora species recorded in the proposal study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	VICTORIAN ADVISORY LIST	APPROX. COUNT IN STUDY AREA	SIGNIFICANCE*
Asperula gemella	Twin-leaf Bedstraw			Rare	1	Lower
Atriplex limbata	Spreading Saltbush		Listed	Vulnerable	551	Higher
Atriplex rhagodioides	Silver Saltbush		Listed	Vulnerable	1	Higher
Calotis cuneifolia	Blue Burr-daisy			Rare	84	Lower
Cynodon dactylon var. pulchellus	Native Couch			Poorly known	7	Lower
Dianella porracea	Riverine Flax-lily			Vulnerable	31	Lower
Eragrostis lacunaria	Purple Love-grass			Vulnerable	7	Higher
Eragrostis setifolia	Bristly Love-grass			Vulnerable	19	Higher
Eremophila divaricata subsp. divaricata	Spreading Emu-bush			Rare	317	Lower
Eremophila maculata subsp. maculata	Spotted Emu-bush		Listed	Rare	1	Higher
Lepidium pseudohyssopifolium	Native Peppercress			Poorly known	292	Lower
Malacocera tricornis	Goat Head			Rare	50	Lower
Minuria cunninghamii	Bush Minuria			Rare	1	Higher
Minuria integerrima	Smooth Minuria			Rare	8	Lower
Roepera angustifolia	Scrambling Twinleaf			Rare	5	Higher
Roepera similis	White Twinleaf			Rare	401	Lower
Sarcozona praecox	Sarcozona			Rare	133,081**	Lower
Swainsona microphylla	Small-leaf Swainson-pea			Rare	15	Lower
Tetragonia moorei	Annual Spinach			Poorly known	1309	Lower

*Significance used for avoidance and minimisation and based on status and known or observed rarity, as described in the text before the table.

** Due to the high number of Sarcozona within the proposal study area, the total number was estimated by counting the number within four 10 x 10 m quadrats which were spaced along the study area in Riverine Chenopod Woodland EVC (the EVC which supported this species). The average number per m^2 was calculated from the quadrats and multiplied across the area of Riverine Chenopod Woodland EVC in the study area. GPS points were only taken at 41 points for the species to show indicative coverage, these are displayed on Figure 3.13.

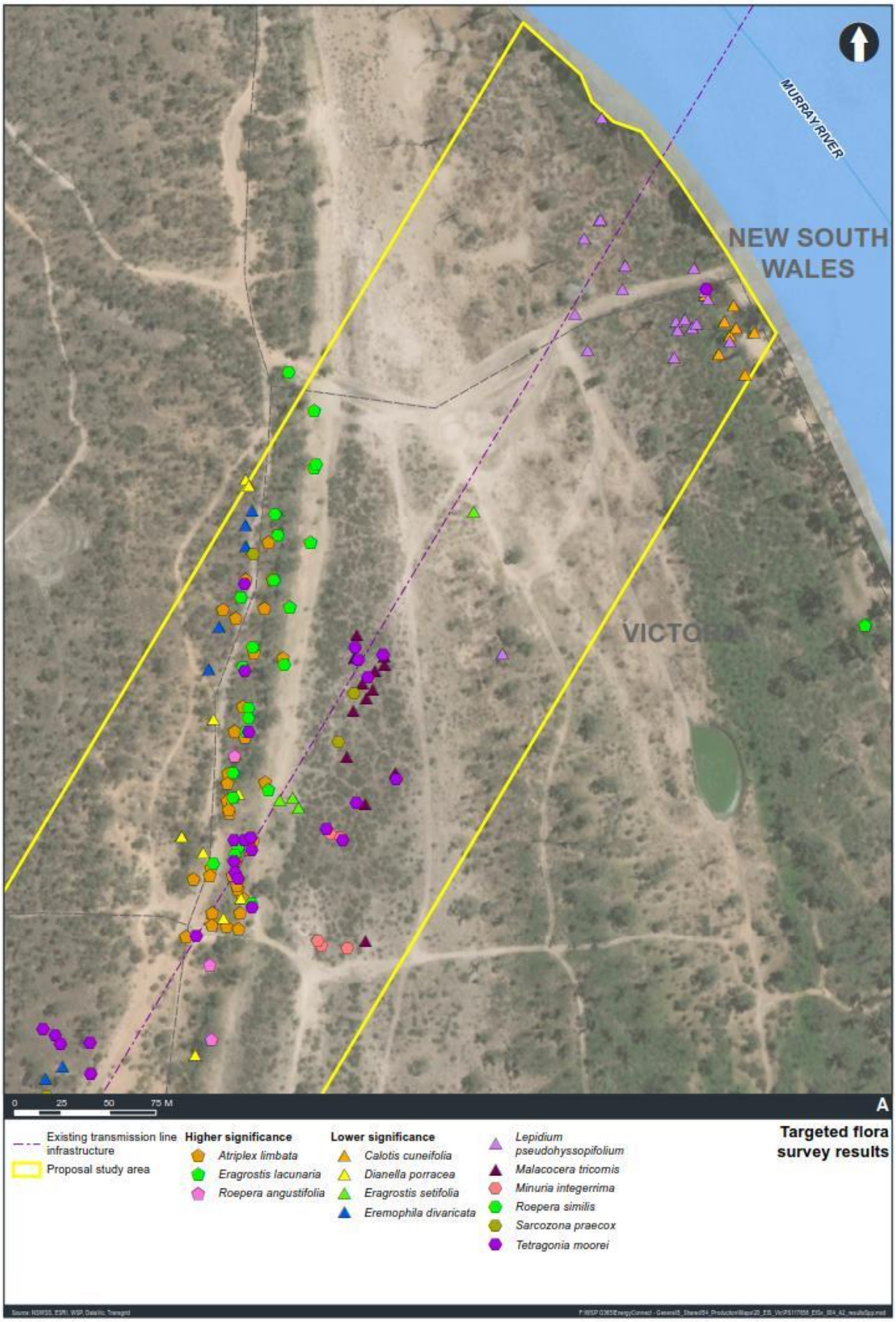


Figure 3.13 Targeted flora survey results

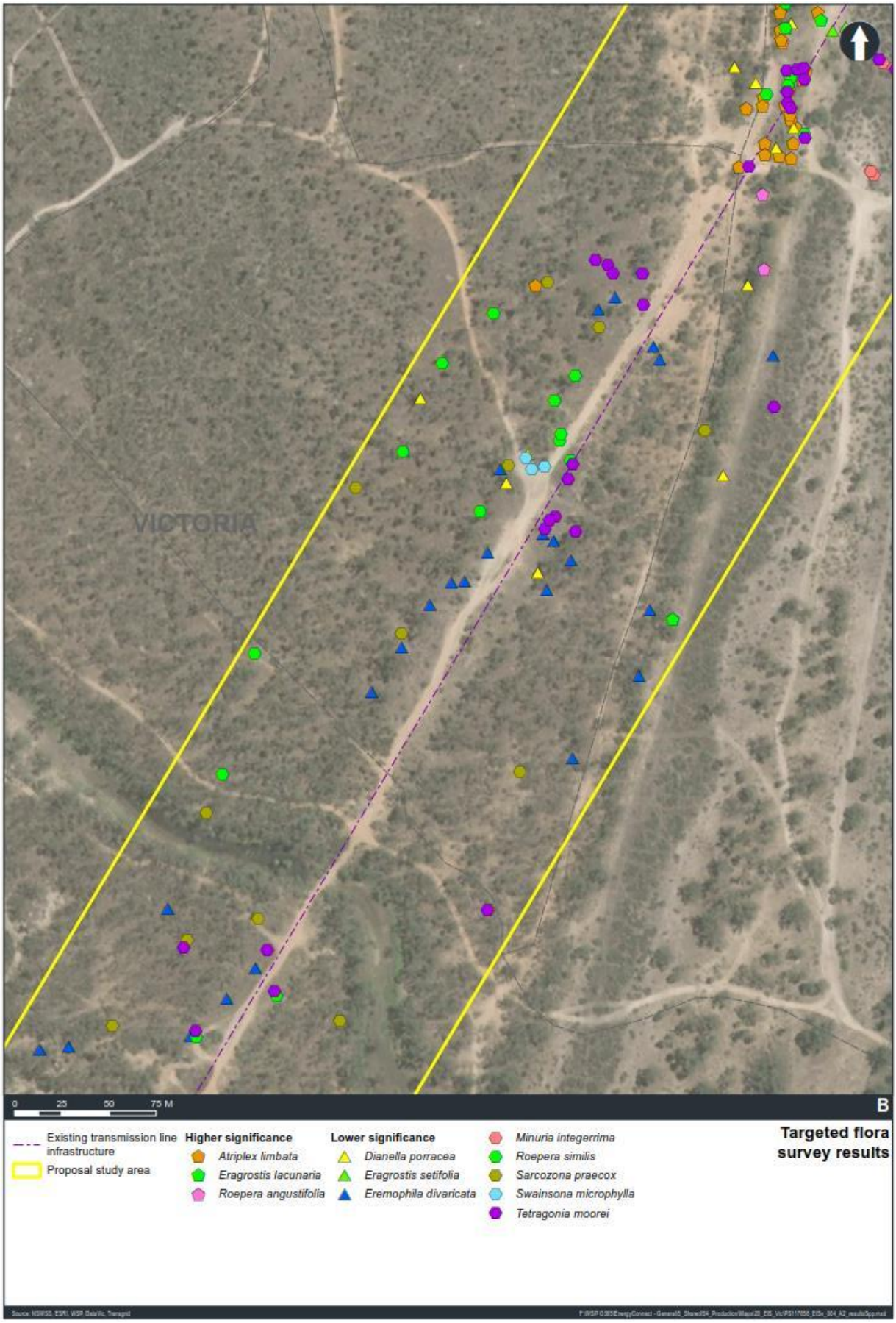


Figure 3.13 Targeted flora survey results

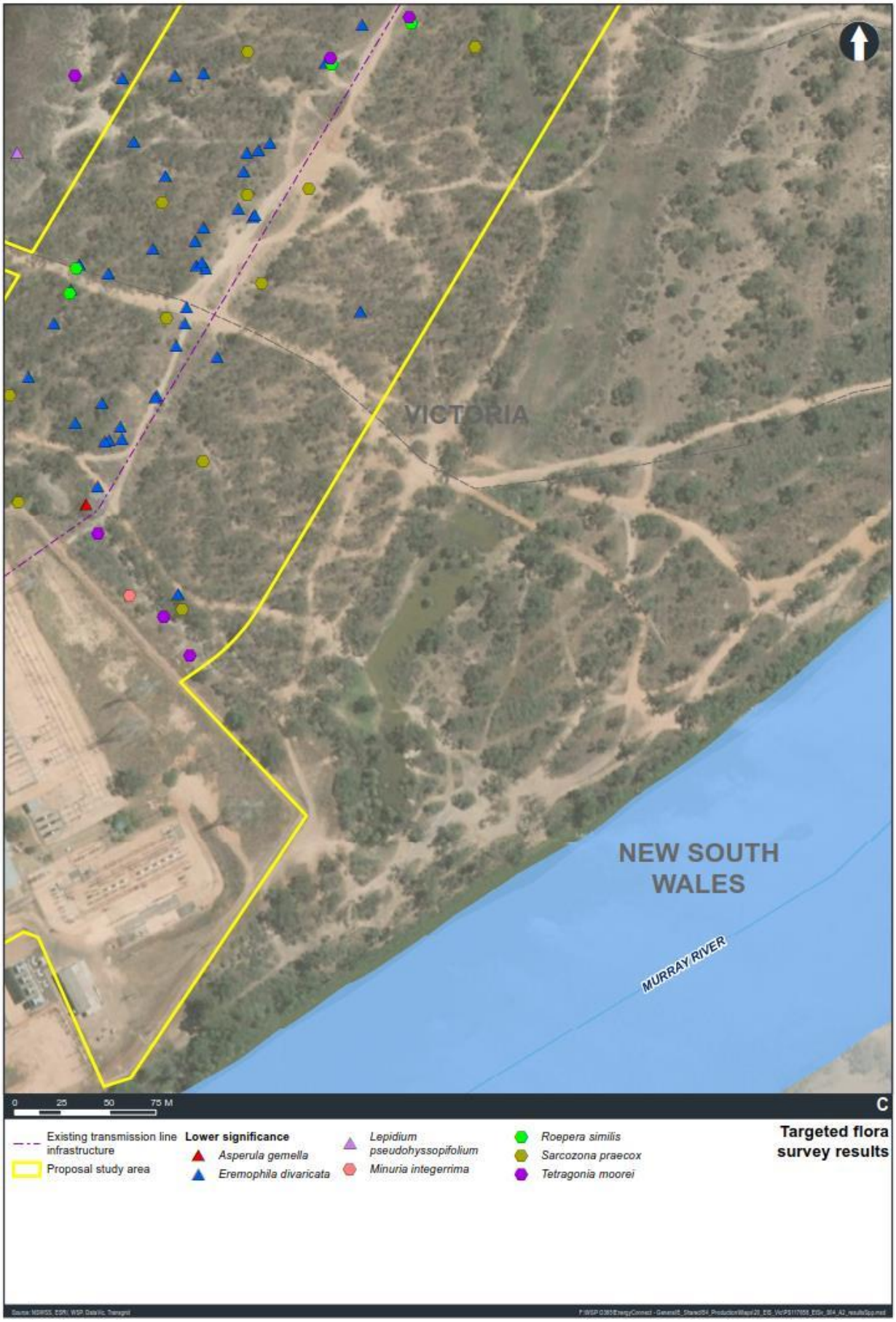


Figure 3.13 Targeted flora survey results

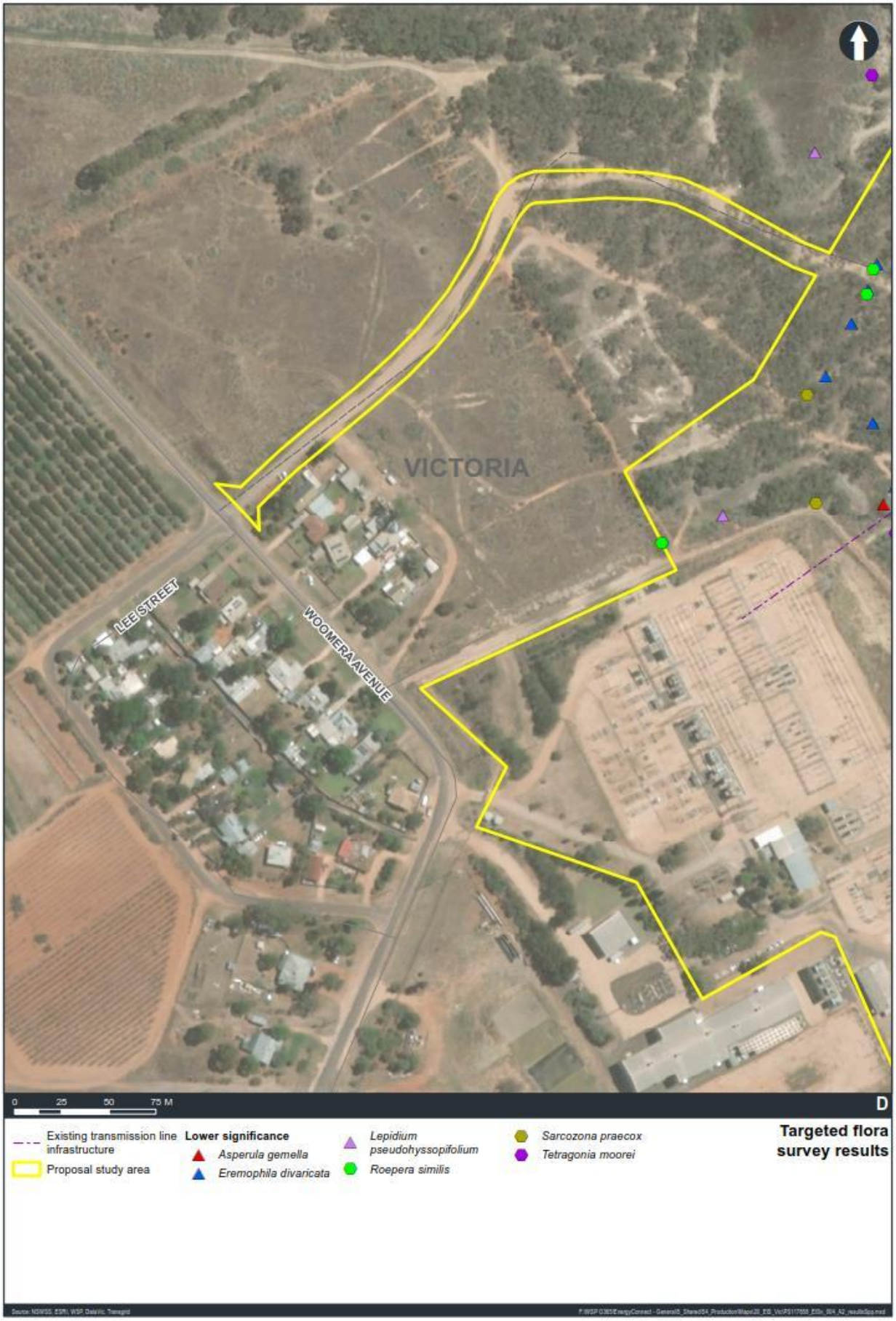
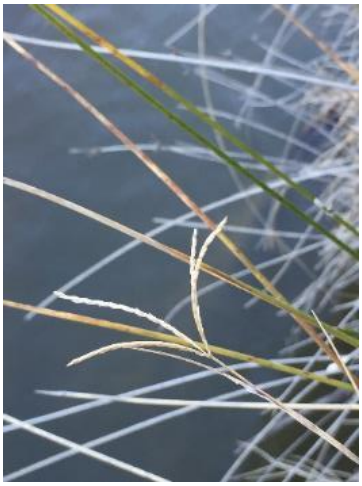


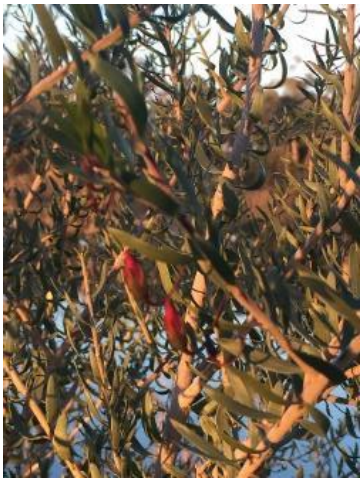
Figure 3.13 Targeted flora survey results

Table 3.5 Description of significant flora species recorded in the proposal study area

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
Twin-leaf Bedstraw Twin-leaf Bedstraw *Asperula gemella* is a scrambling or climbing perennial plant which grows to approximately 1 m high. This is rare in Victoria but locally abundant where it occurs. One location of Twin-leaf Bedstraw was found in the study area underneath the southernmost electrical tower close to the substation.		
Spreading Saltbush Spreading Saltbush *Atriplex limbata* is a spreading herb or subshrub growing to 40 cm high. In Victoria, this is confined to furthest north-west area however is more widespread in western NSW. Found in sand on the upper terrace areas of the study area, close to where the topography drops down to the floodplain. Approximately 550 plants were recorded in Black Box dominated Riverine Chenopod Woodland, of which some occur under the existing transmission lines. Probably more significant than a number of the other species given the lower number of records in Kings Billabong Park and in Victoria in general.		
Silver Saltbush Silver Saltbush *Atriplex rhagodioides* is a rounded shrub growing to 2.5 m high. In Victoria apparently confined to the Murray River floodplain in the far north-west and recorded only from the Natya area, Red Cliffs and Cowra. One plant was found in the study area near the substation. This species closely resembles Old-man Saltbush *Atriplex nummularia* but is shorter in stature, different shaped leaves and has thickened bracteoles all over. Given the similarity, a specimen was sent to the National Herbarium of Victoria for confirmation of the identification.		

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
Blue Burr-daisy Blue Burr-daisy *Calotis cuneifolia* is a perennial erect or prostrate herb growing to 60 cm high, with blue or purple ray floret. In Victoria, it is confined to northern and central regions however it is more widespread in western NSW. In the study area, this plant was found growing close to the Murray River in alluvial loam and grey clay soils in EVCs Grassy Riverine Forest and Lignum Swampy Woodland.		
Native Couch Native Couch *Cynodon dactylon var. pulchellus* is a rhizomatous and/or stoloniferous mat-forming perennial grass growing to 30cm high. This is apparently indigenous couch, rare in Victoria, confined to the north-western reaches of the Murray floodplain. In the study area, this plant was found growing in silty soils on the bank of the Murray River in River Red Gum dominated Grassy Riverine Forest. Occasional other locations were found in grey clay soils in an area close to the substation.		
Riverine Flax-lily Riverine Flax-lily *Dianella porracea* is a perennial herb, solitary fleshy tuft growing to 1.2m high. This is rare in Victoria, mostly confined to the north-western reaches of the Murray floodplain. Found mostly on sandy soils in Black Box dominated Riverine Chenopod Woodland in the upper terrace areas of the study area.		

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
Purple Love-grass Purple Love-grass *Eragrostis lacunaria* is a tufted perennial grass growing to 50 cm high. Species is confined to sandy or alluvial soils fringing lakes and seasonally flooded areas in the far north-west of Victoria, with some isolated records from near Dimboola and Warracknabeal. Found in low numbers in the study area in the upper terrace areas of the study area in Riverine Chenopod Woodland.		
Bristly Love-grass Bristly Love-grass *Eragrostis setifolia* is a robust long-lived tussock grass. It Victoria it occurs on clay soils of areas which are seasonally flooded and is restricted to the far north-west of the state. At the study area, the species was recorded in the northern part of the site, in Riverine Chenopod Woodland toward the interface with Lignum Shrubland and the floodplain. Only seven plants were recorded.	No photo available	No photo available
Spreading Emu-bush Spreading Emu-bush *Eremophila divaricata subsp. Divaricate* is a tangled shrub growing to 1.5 m high. In Victoria, it is confined to woodland communities along the floodplain of the Murray River system, north-west from Kerang. In the study area, it is abundant throughout Riverine Chenopod Woodland, particularly in the southern part where hundreds of plants occur. Not all individuals could be recorded due to the number present, however the locations shown on the map capture the indicative distribution.		

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
Spotted Emu-bush Spotted Emu-bush *Eremophila maculata subsp. Maculate* is a rounded shrub growing to 2.5 m high. In Victoria, it is confined to the north-west of the state, mainly in Black Box forests or woodlands where they grow on heavy clay soils. In the study area, one plant was found growing in silty-sandy soil along the bank of the Murray River under River Red Gums.		
Native Peppercress Native Peppercress *Lepidium pseudohyssopifolium* is an annual or perennial herb growing to 60 cm high. It is uncommon in Victoria with the most recent records occurring near Ararat on heavy soils of the Murray River floodplain and the Yarra River banks in Melbourne. Abundant in the study area in a confined area growing close to the Murray River in alluvial loam and grey clay soils in EVCs Grassy Riverine Forest and Lignum Swampy Woodland.		
Goat Head Goat Head *Malacocera tricornis* is an erect hairy annual or short-lived perennial plant to 80 cm high. In Victoria confined to the north-west where it occasionally occurs on clay pans and heavy alluvial flats along the Murray River floodplain from Boundary Bend downstream to the South Australian border. A number of plants scattered throughout clay soils in Lignum Swamp in the northern part of the study area.		

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
Bush Minuria Bush Minuria *Minuria cunninghamii* is a straggling to erect subshrub usually found in the north-west growing on slightly to strongly saline ground in sand, clay or gypseous soils. One plant was found in the study area along the upper edge of a terrace in Riverine Chenopod Woodland.		
Smooth Minuria Smooth Minuria *Minuria integerrima* is an erect glabrous herb to 60 cm high. In Victoria, the species is confined to heavy clay and alluvial silt soils on floodplains of the Murray River. Known from the Barmah district to the South Australian border (Strathmerton, Kerang, Kings Billabong, Lake Wallawalla). Only recorded in clay soils in Lignum Swamp in the northern part of the study area.		
Scrambling Twinleaf Scrambling Twinleaf *Roepera angustifolia* is a weak ascending perennial subshrub growing 30-60 cm high. In Victoria, it is confined to the far north-west of the state where it mainly occurs on calcareous soils in mallee scrubland and herbfield environments. Found in low numbers in the study area where the topography gains elevation in Riverine Chenopod Woodland.		

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
White Twinleaf White Twinleaf *Roepera similis* is an erect or ascending branched annual herb growing 10-30cm high. In Victoria, it is confined to the far north-west where it mainly occurs on sand or heavy clay soils. Abundant throughout the study area, mostly in Riverine Chenopod Woodland. Not all individuals could be recorded due to the number present, however the locations shown on the map capture the indicative distribution (refer to Figure 3.13).		
Sarcozona Sarcozona *Sarcozona praecox* is a prostrate to shrubby perennial succulent herb growing to 1 m diameter. Found occasionally in mallee and Callitris-Casuarina woodlands of the north-west, usually on loamier soils. Abundant throughout the study area, mostly in Riverine Chenopod Woodland. Not all individuals could be recorded due to the high numbers present, however the locations shown on the map capture the indicative distribution (refer to Figure 3.13).		
Small-leaf Swainson-pea Small-leaf Swainson-pea *Swainsona microphylla* is a prostrate perennial herb growing to 60 cm tall. Species mostly grows in light soils on sand-hills and sandplains. It is mainly confined to the far north-west of the State but also occurs near Echuca and on the upper Snowy River near Willis. Scattered occurrences in the study area in Riverine Chenopod Woodland.		

DESCRIPTION	PHOTOGRAPHS FROM THE PROPOSAL STUDY AREA	
Annual Spinach Annual Spinach *Tetragonia moorei* is a succulent annual herb with branches to 50 cm long. Occurs in floodplains of the Murray River in the far north-west of Victoria, mainly growing in River Red Gum and Black Box woodlands on grey clay. Widespread throughout study area in Riverine Chenopod Woodland, Lignum Swamp and Lignum Swampy Woodland.		

3.2.4.2 SIGNIFICANT FLORA SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT

As well as the 19 significant species recorded (Table 3.5), an additional 23 significant flora species are considered to still have a moderate or high likelihood of occurring within the proposal study area post-survey. These species are listed in Table 3.6. Although not recorded during the surveys, these species may be cryptic or rely on specific conditions to be visible. The full likelihood of occurrence assessment is provided in Appendix C.

Table 3.6 Species with a moderate or high likelihood of occurring in the proposal study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	VIC ADV LIST	COUNT OF SIGHTINGS (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE (POST-SURVEY)
Abutilon malvifolium	Mallow-leaf Lantern-flower		L	e	13	17/01/2008	Moderate - Study area likely supports suitable habitat and the species is known to occur in the Red Cliffs area.
Asperula wimmerana	Wimmera Woodruff			r	8	26/08/2004	Moderate - Study area may support suitable habitat and, despite a lack of recent records, this species has previously been recorded in Kings Billabong Wildlife Reserve.
Atriplex lindleyi subsp. lindleyi	Flat-top Saltbush			k	5	14/05/2018	Moderate - Study area likely supports suitable habitat and the species is known to occur in the Red Cliffs area.
Atriplex papillata	Coral Saltbush			r	21	9/02/2001	Moderate - Study area may contain suitable habitat to support this species.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	VIC ADV LIST	COUNT OF SIGHTINGS (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE (POST-SURVEY)
Brachyscome gracilis subsp. robusta	Billabong Daisy		L	v	9	9/10/1991	Moderate - Known to occur in the Red Cliff area but old records.
Cardamine moirensis	Riverina Bitter-cress			r	1	26/08/2004	High - Known to occur in the Red Cliff area but old records. A Cardamine was identified during the field surveys but could not be identified to species level due to inadequate material.
Chenopodium desertorum subsp. desertorum	Frosted Goosefoot			r	2	15/05/2018	Moderate - Study area supports potential habitat and, despite a low number of records, there are previous records in close proximity to the study area.
Cullen cinereum	Hoary Scurf-pea		L	e	6	17/03/1993	Moderate - Study area may contain suitable habitat to support this species.
Cullen pallidum	Woolly Scurf-pea		L	e	21	29/08/2011	High - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Cullen tenax	Tough Scurf-pea		L	e	12	29/08/2011	High - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Cyperus rigidellus	Curly Flat-sedge		L	e	2	13/01/1982	Moderate - Whilst there are few records, this species may occur near the study area.
Dactyloctenium radulans	Finger Grass			r #	16	4/03/2007	Moderate - Study area may contain suitable habitat to support this species.
Duma horrida subsp. horrida	Spiny Lignum			r	22	24/11/2011	Moderate - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	VIC ADV LIST	COUNT OF SIGHTINGS (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE (POST-SURVEY)
Eragrostis australasica	Cane Grass			v	17	30/09/2009	Moderate- Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Eremophila oppositifolia subsp. oppositifolia	Twin-leaf Emu-bush			r	17	1/12/2011	Moderate - Study area may contain suitable habitat to support this species.
Ethuliopsis cunninghamii	Tall Nut-heads			v	9	26/08/2004	Moderate - Study area may support suitable habitat and, despite a lack of recent records, this species has previously been recorded in Kings Billabong Wildlife Reserve.
Leiocarpa tomentosa	Woolly Plover-daisy			e	7	8/10/2014	Moderate - Study area likely supports suitable habitat and the species is known to occur in the Red Cliffs area, with recent records located < 1.5 km in the Red Cliffs Scenic Reserve.
Lepidium papillosum	Warty Peppercress			k	38	14/09/2008	Moderate - Despite a lack of recent records, the study area likely contains suitable soil types and habitat to support this species.
Maireana sedifolia	Pearl Bluebush			r	4	1/08/2018	Moderate - Study area may support suitable habitat and the species is known to occur in the Red Cliffs area.
Sida fibulifera	Pin Sida			v	33	4/06/2013	Moderate - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Sida intricata	Twiggy Sida			v	19	1/12/2011	Moderate - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	FFG ACT	VIC ADV LIST	COUNT OF SIGHTINGS (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE (POST-SURVEY)
Sida spodochroma	Limestone Sida		L	v	11	7/05/2012	Moderate - Study area may contain suitable habitat to support this species.
Swainsona sericea	Silky Swainson-pea		L	v	7	29/08/2011	High - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.

Key to 'status':

Status under the Flora and Fauna Guarantee Act 1988: *L = listed as threatened*

Conservation Status in Victoria (Victorian Advisory List): *e = endangered, v = vulnerable, , r = rare, k = poorly known, # = native but some strands may be alien*

3.2.4.3 WEEDS

The site supported relatively few weeds, likely due to the semi-arid environment and heavy soils. Four *Catchment and Land Protection Act 1994* (CaLP Act) listed weeds were found within the proposal study area, with three also listed as Weeds of National Significance by the Commonwealth of Australia. These are listed in Table 3.7 with their classification within the Mallee CMA and a description of their distribution.

More dominant weed species found across the proposal study area included Small Ice-plant *Mesembryanthemum nodiflorum,* Arabian Grass *Schismus barbatus,* Cape Weed *Arctotheca calendula,* Hastate Orache *Atriplex prostrata* and Red Brome *Bromus rubens.*

Table 3.7 Significant weeds in the proposal study area

SCIENTIFIC NAME	COMMON NAME	CALP ACT STATUS	WONS*	PRESENCE ACROSS STUDY AREA
Asparagus asparagoides	Bridal Creeper	Restricted	Yes	Only 2 records at the southern end of the study area
Juncus acutus subsp. acutus	Spiny Rush	Restricted	No	Small patch around the base of southern most tower.
Lycium ferocissimum	African Box-thorn	Regionally Controlled	Yes	Four records within Riverine Chenopod Shrubland EVC toward the southern part of the study area.
Opuntia spp.	Prickly Pear	Restricted or controlled depending on species, more than one species recorded including *Opuntia robusta* (Regionally controlled)	Yes	Scattered throughout Riverine Chenopod Woodland EVC, currently small infestations only

3.2.5 LARGE TREES AND HABITAT TREES

Trees are considered large trees when the DBH meets the large tree benchmark for the relevant EVC. Habitat trees were recorded as trees of any size with hollows and/or stick nests or other signs of use for roosting or nesting. The large tree benchmarks for the EVCs recorded within the proposal study area, and the numbers of trees recorded are in Table 3.8. However, we note that trees were only assessed within approximately 15-20 m of the impact area, so these numbers do not represent the total numbers of trees in the proposal study area. Additionally, some large or habitat trees occurred outside of the proposal study area (e.g. along the Murray River) but were included to account for potential TPZ or pruning impacts. These trees are shown on Figure 3.14.

Table 3.8 Large tree benchmark

EVC NUMBER	ECOLOGICAL VEGETATION CLASS	LARGE TREE BENCHMARK	LARGE TREES	HABITAT TREES
106	Grassy Riverine Forest	*Eucalyptus* spp. 90 cm	3	5 (2 nest only)
813	Intermittent Swampy Woodland	*Eucalyptus camaldulensis* 70 cm *Eucalyptus largiflorens* 50 cm	2	5
808	Lignum Shrubland	NA		
823	Lignum Swampy Woodland	*Eucalyptus largiflorens* 50cm *Eucalyptus camaldulensis* 70cm	7	8
103	Riverine Chenopod Woodland	*Eucalyptus largiflorens* 40 cm	26	124 (7 nest only)
98	Semi-arid Chenopod Woodland	*Casuarina pauper* 40 cm *Allocasuarina luehmannii* 40 cm *Callitris gracilis* 40 cm *Myoporum platycarpum* 35 cm	1	
820	Sub-saline Depression Shrubland	NA		3 (1 nest only)

Figure 3.14 Large trees and habitat trees recorded near the construction footprint

3.2.6 FAUNA

3.2.6.1 HABITAT

The proposal study area supports various types of habitat resources that provide fauna with shelter, foraging, dispersal and/or breeding habitat. The habitat resources available for fauna in the proposal study area are described in Table 3.9.

Table 3.9 Habitat descriptions

HABITAT FEATURE	DESCRIPTION	VALUES
Lignum and Sub-saline depression shrubland (saltmarsh)	Lignum-dominated shrubland and the low shrubby saline community in the north of the study area on a clay pan.	Lignum areas provide foraging habitat and shelter for various species. Although regular flooding of this area does not appear to be occurring, some native wetland birds such as Egrets may periodically visit to forage. Species observed foraging and moving amongst lignum include Brown Treecreeper and Chestnut-crowned Babbler. Spotted Marsh Frogs *Limnodynastes tasmaniensis* were heard calling from ponds which had formed in this habitat after rain in old tyre ruts. The value of the shorter saltmarsh vegetation to native avian fauna, mammals or reptiles is likely to be more limited, although this habitat may still provide nesting and foraging resources.
Murray River Corridor	Murray River and associated fringing vegetation. In the study area, the river bank is somewhat steep with minimal fringing wetland vegetation.	The river corridor provides connectivity for fauna in the landscape, as well as high quality nesting and foraging habitat. The river and fringing vegetation provides habitat for a range of fauna including wetland birds, turtles, frogs, fish and invertebrates. In the study area, the river bank is moderately steep with minimal fringing wetland vegetation, limiting the value of this habitat for ducks and other fauna which require this vegetation for nesting.
Ephemeral drainage lines and wetlands	One ephemeral creekline is present in the centre of the study area. From the dead River Red Gums present in the creekbed, it is likely that the flooding pattern has been changed and is no longer regularly inundated. There is no wetland habitat within the study area and nearby modelled wetland EVCs were dry at the time of the assessment, including the nearby component of the 'important wetland' Kings Billabong.	Ephemeral drainage lines may provide periodic habitat for wetland invertebrates, birds and frogs. Bats may also use them as flyways. Spotted Marsh Frogs *Limnodynastes tasmaniensis* were heard calling from small pools in tyre tracks in the Sub-saline Depression Shrubland after rain during fauna surveys in October. There is no likely habitat for the EPBC Act listed Growling Grass Frog *Litoria raniformis* on site. Substantial weather events would be required to make the low-lying parts of the study area of any potential value to this species for dispersal, and it is highly unlikely that the species would breed within them due to the lack of waterbodies.

HABITAT FEATURE	DESCRIPTION	VALUES
Trees / canopy	Mostly Black Box, with some River Red Gums along the Murray River edge. A large number of hollow-bearing trees are present, although most of the larger high-quality hollows are in the large trees near the river. Clearing/harvesting has led to a paucity of larger hollows in the Riverine Chenopod Woodland, although this EVC naturally supports smaller trees.	Red-rumped Parrots *Psephotus haematonotus*, Tree Martins *Petrochelidon nigricans*, Australian Ringnecks *Barnardius zonarius* and other birds were observed nesting in hollows in trees in the study area, mostly in River Red Gums near the Murray River. Insectivorous bats and Lace Monitors are also likely to use hollows, with larger hollows being particularly important as maternity roosts and shelter for adult monitors. Chestnut-crowned Babblers were observed nesting in Acacias and eucalypts within and just outside of the study area and several other nests belonging to other small and medium bird species were observed in the study area.
Woodland understorey and fallen timber/debris	Fallen timber is generally scarce throughout the Riverine Chenopod Woodland and more common west of the alignment (away from tracks) in the Grassy Riverine Forest. Understorey is structurally diverse with high species richness, with leaf litter and burrows evident.	Leaf litter, fallen timber and shrubs provide shelter and foraging opportunities for numerous fauna species from birds to reptiles. The diversity of structure and species can be particularly valuable for small woodland birds. Small terrestrial mammals may shelter in burrows or under timber.

3.2.6.2 HABITAT CONNECTIVITY

There is direct connectivity of habitat within the proposal study area to similar habitat across Kings Billabong Park, with no apparent impediments to movement for any fauna groups.

There is limited direct connectivity between Kings Billabong Park and other natural habitat along the Murray River, although some connectivity, particularly for more mobile species such as birds, across the river to habitat in Trentham Cliffs / Monak. Based on field assessments conducted by WSP for the NSW – Western section component of EnergyConnect, the habitat on the other side of the river is generally in poor condition.

3.2.6.3 SURVEY RESULTS

Fauna surveys were undertaken across September and October 2020 and included a range of methods as detailed in Section 2.5. Three significant species were recorded during surveys: Lace Monitor, Brown Treecreeper, and Yellow-faced Whip Snake *Demansia psammophis* (Figure 3.15 - Figure 3.17 below). A total of 79 fauna species were recorded during surveys, of which 75 (95%) are native and 4 (5%) are exotic. The full fauna species list from all surveys is provided in Appendix B.

Based on the results of habitat assessment and targeted survey, the likelihood of several significant fauna species occurring within the study area was reduced to low. Refer to Section 3.2.6.4.

Detailed results summaries are provided below for each survey type.

Figure 3.15 Left: Lace Monitor recorded during camera surveys. Right: One of two Lace Monitor tracks recorded in the proposal study area on an existing vehicle track

Figure 3.16 Brown Treecreeper recorded during camera surveys

Figure 3.17 Yellow-faced Whip-snake recorded during ant survey

TILE SURVEY AND ACTIVE SEARCHES FOR REPTILES

Two species were recorded during tile survey: Boulenger's Skink *Morethia boulengeri* and Common Dwarf Skink *Menetia greyii*. Neither species are of conservation significance. The full results are provided as Appendix D1.

BAT DETECTOR SURVEY AND DUSKWATCHING FOR MICROBATS

The results of the bat detector survey are summarised below, with full analysed results provided as Appendix D2. Five taxa were recorded from the active bat detectors, and 13 were recorded from the passive detectors. This includes some species complexes where calls could not be allocated to species.

No fishing bats were observed during duskwatching with active anabats. Two Rakali *Hydromys chrysogaster* were observed on the river.

Table 3.10 Summary of results from bat detectors

SPECIES NAME	COMMON NAME	ACTIVE	PASSIVE
Austronomus australis	White-striped Freetail Bat	X	X
Chalinolobus gouldi	Gould's Wattled Bat	X	X
Chalinolobus morio	Chocolate Wattled Bat	X	X
Mormopterus petersi	Inland Freetail Bat		X
Mormopterus planiceps	Southern Freetail bat	X	X
Mormopterus planiceps & petersi	*Mormopterus* sp.	X	X
Nyctophilus sp	Long-eared Bat		X
Scoterepens balstoni	Inland Broadnosed Bat		X
Scoterepens balstoni / Scoterepens greyii	*Scotorepens* sp.		X
Scoterepens greyii	Little Broad-nosed Bat		X
Vespadelus baverstocki / V. regulus	Forest Bat sp.		X
Vespadelus vulturnus	Little Forest Bat	X	X

One Long-eared Bat *Nyctophilus* sp. call was identified on 20 October 2020 from one of the three passive bat detectors (detector 575458 deployment 2), located approximately middle of the proposal study area on the eastern side of the existing power lines). Although one of the target species for the bat detector surveys was Corben's Long-eared Bat, this single call is more likely to be the more common Lesser Long-eared Bat N. *geoffroyi*. This is based on advice provided by EcoAerial (who provided bat data analysis), supported by several subject matter experts, which indicates that Corben's Long-eared Bat is not normally associated with riverine environments and has a strong preference for mallee and bulloke-dominated habitat (EcoAerial 2015). Corben's Long-eared Bat was recorded during surveys for the NSW component of the project near Wentworth NSW and in Balranald NSW, in Mallee approximately 15 km north of the Murray River.

Based on this, the species' likelihood of occurrence has been revised to low and further targeted surveys (i.e. using trapping) are not warranted. Given only a single call of a *Nyctophilus* species was recorded, the study area is unlikely to be important for either species. If a *Nyctophilus* roost site was present in the study area, a higher number of calls would be expected.

No other target species were recorded or are considered likely to occur. Based on the results of the survey, the likelihood of Southern Myotis and Yellow-bellied Sheathtail Bat occurring in the study area was also reduced to low.

TRAPPING AND CAMERAS FOR MAMMALS

Remote cameras and Elliott traps were used to survey for terrestrial and arboreal mammals at the study area.

Traps were installed on 19 October 2020 and cleared each morning for three days. Traps were reopened and re-baited (where required) in the late afternoon. Only two animals, both the introduced House Mouse *Mus musculus* were recorded in traps, one on 20 October and another on 22 October. These animals were checked carefully to ensure they were not Bolem's Mouse, a target species. However, based on smell and the presence of notched incisors, House Mouse was confirmed.

A number of fauna species were recorded on Cameras, with several species observed on cameras that were not seen during other surveys. The only species of conservation significance which were recorded were Lace Monitors and Brown Treecreepers. Several introduced Red Foxes, including cubs, were recorded. The full results are provided as Appendix D4.

OBSERVATIONAL BIRD SURVEY

A total of 52 bird species were recorded during bird surveys conducted in the study area, from 381 bird observations. Three 20 minute 2 ha survey points were surveyed three times each, with the remaining observations coming from incidental observations during other flora and fauna survey.

One species of conservation significance was recorded: Brown Treecreeper (Vic Advisory List Near Threatened). This species was observed reliably at survey point KB1 on the Murray River and is likely to be breeding in hollows in River Red Gums on the river edge. The full results are provided as Appendix D3.

CALL PLAYBACK AND SPOTLIGHTING FOR NOCTURNAL FAUNA

As well as the terrestrial and arboreal remote cameras, spotlighting and call-playback was undertaken for key species of nocturnal fauna which may occur. Specific target species of these methods were Barking Owl and Masked Owl (call-playback and spotlighting) and Beaked Gecko (spotlighting only). Other nocturnal fauna targeted with spotlighting are arboreal mammals such as Western Pygmy Possum and nocturnal reptiles such as Bandy Bandy as well as the sugar ant, *Camponotus terebrans*, the ant species on which the Mildura Ogyris Butterfly relies.

No species of conservation significance were recorded during call-playback or spotlighting surveys. Results are provided in Table 3.11.

Table 3.11 Call-playback and spotlighting survey results

SURVEY	DATE	TIME	OVERNIGHT MINIMUM TEMP.*	RESULTS
Call-playback	22/09/2020	19:04 start	11 C	Australasian Darter White-plumed Honeyeater
Call-playback	23/09/2020	19:30 start	8	No fauna heard/seen
Call-playback	19/10/2020	20:50 start	6	No fauna heard/seen
Spotlighting	19/10/2020	Approx. 21:30-23:30		Microbat
Call-playback	20/10/2020	20:39 start	7	No fauna heard/seen
Spotlighting	20/10/2020	Approx. 21:30-23:30		Eastern Grey Kangaroo European Rabbit Unknown roosting bird

*Mildura airport (Bureau of Meteorology)

SURVEY FOR INVERTEBRATES

No nests of *Camponotus terebrans*, the Sugar Ant species on which the Mildura Ogyris Butterfly relies, were recorded during the targeted surveys. One unidentified ant species' nest was found against a Senna shrub (see Figure 3.18) however no *Camponotus terebrans* ants were seen. As the Mildura Ogyris Butterfly appears to rely on dense populations of this ant, where there is a high concentration of nest holes, the presence of this species within the study area is highly unlikely.

Three reptiles were recorded incidentally during *Camponotus* surveys: one Shingleback Lizard *Tiliqua rugosa*, one Yellow-faced Whip-Snake and one Boulenger's Skink *Morethia boulengeri*.

Figure 3.18 Ant nest against shrub in the proposal study area, photograph: Geoffrey Allen

3.2.6.4 SIGNIFICANT FAUNA SPECIES LIKELIHOOD OF OCCURRENCE

Based on habitat assessments, database searches, and the results of surveys, 37 significant fauna species are considered to have a moderate or higher likelihood of occurrence in the study area (Table 3.12). This includes three species which were recorded during recent surveys: Lace Monitor, Brown Treecreeper, and Yellow-faced Whip Snake. The full likelihood of occurrence assessment is provided in Appendix C.

Note: this assessment does not include purely aquatic species which may occur in the Murray River as this area is not part of the proposal study area and no impacts on aquatic habitat are anticipated.

Table 3.12 Summary of fauna species with a moderate or higher likelihood of occurrence at the proposal study area

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Birds					
Apus pacificus	Fork-tailed Swift	M - -	*	*	High - There is a recent record of this species at Kings Billabong Wetlands (eBird) The species may fly over and forage at the study area.
Ardea alba	Great Egret	- L vu	78	28/04/2018	High - Parts of the study area may provide suitable habitat for this species and there are a high number of records in the surrounding area.
Ardea intermedia plumifera	Plumed Egret	- L en	46	15/06/2019	High - Parts of the study area may provide suitable habitat for this species and there are a high number of records in the surrounding area.
Aythya australis	Hardhead	- - vu	31	9/10/2018	Moderate - There are a high number of records in the surrounding area but no high quality deep water wetland habitat with suitable aquatic vegetation in the study area itself, although some potential for the species to occasionally utilise the edge of the Murray River.
Biziura lobata	Musk Duck	- - vu	20	5/12/2011	Moderate - There are a high number of records in the surrounding area but no high quality deep water wetland habitat with suitable aquatic vegetation in the study area itself, although some potential for the species to occasionally utilise the edge of the Murray River.
Calidris acuminata	Sharp-tailed Sandpiper	M - -	*	*	Moderate - Although there is no high quality mudflat habitat at the study area, the species may occur should the saltmarsh habitat be periodically inundated. There are nearby observations of this species such as at Lake Hawthorn and Lake Ranfurly at Mildura (eBird).

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Chlidonias hybrida	Whiskered Tern	- - nt	30	15/05/2019	Moderate - This species has recently been recorded within Kings Billabong Wildlife Reserve and may periodically utilise habitat within the study area, although it is suboptimal. It is likely to fly over the study area.
Cinclosoma castanotum	Chestnut Quail-thrush	- - nt	2	17/02/2011	Moderate - Despite only a few records in the area, the study area may provide habitat for this species. The species was not recorded during targeted bird surveys or incidentally. As such the study area itself is unlikely to support permanent resident birds.
Circus assimilis	Spotted Harrier	- - nt	6	2/07/2019	Moderate - The study area is likely to provide suitable habitat for this species and there are records in the surrounding area. However, the species was not recorded during targeted bird surveys. As such, the study area is unlikely to regularly support foraging or breeding for this species.
Climacteris affinis	White-browed Treecreeper	- L vu	11	29/12/2008	Moderate - The species was not recorded during recent targeted surveys and the study area does not support preferred habitat. However there is a record from within the study area in 1993 so the species may move through or utilise the study area. As there are no recent records from Kings Billabong Park in eBird, if present, the potential habitat is unlikely to support a high density population.
Climacteris picumnus	Brown Treecreeper	- - nt	174	25/07/2019	Recorded - The species was recorded within the study area, almost exclusively near the Murray River in Grassy Riverine Forest and adjacent Lignum Swampy Woodland. Several individuals were observed numerous times and breeding is likely to be occurring within the study area.

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Coracina maxima	Ground Cuckoo-shrike	- L vu	6	7/10/2017	Moderate - Although records in the area are infrequent, the species (which is nomadic) may periodically occur as the study area is likely to support suitable habitat features. The species was not recorded during targeted surveys.
Egretta garzetta	Little Egret	- L en	3	3/06/2018	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species may utilise the Murray River edge of visit flooded saltmarsh.
Falco subniger	Black Falcon	- L vu	3	11/07/2018	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. However, the species was not recorded during recent targeted bird surveys, and is therefore unlikely to be currently breeding at the study area or utilising the study area regularly for foraging.
Geopelia cuneata	Diamond Dove	- L nt	4	22/04/2019	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.
Haliaeetus leucogaster	White-bellied Sea-Eagle	- L vu	11	15/06/2019	High - Parts of the study area may provide suitable habitat for this species and there is a high number of records in the surrounding area, including observations from Kings Billabong Park in eBird. As the species was not recorded in the study area during recent targeted surveys or opportunistically, it is considered unlikely to be currently breeding within or regularly utilising the study area.

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Lophochroa leadbeateri	Major Mitchell's Cockatoo	- L vu	11	11/08/2010	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.
Lophoictinia isura	Square-tailed Kite	- L vu	4	27/07/2019	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.
Melanodryas cucullata	Hooded Robin	- L nt	56	16/06/2019	High - The study area is likely to provide suitable habitat and the species has recently been recorded within Kings Billabong Wildlife Reserve. The species was not recorded during recent targeted surveys and is therefore unlikely to regularly utilise the study area itself.
Nycticorax caledonicus	Nankeen Night-Heron	- - nt	16	23/10/2017	High - Parts of the study area may provide suitable habitat for this species and there is a high number of records in the surrounding area. Although the species was not detected during recent surveys, presence should be assumed.
Oxyura australis	Blue-billed Duck	- L en	9	3/12/2006	Moderate - There are some recent records and the study area supports some potential low quality habitat near the Murray River. The species is also likely to fly over the study area.
Phalacrocorax varius	Pied Cormorant	- - nt	85	25/07/2019	High - The study area is likely to provide suitable habitat, particularly along the Murray River and the species has recently been recorded within Kings Billabong Wildlife Reserve.

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Platalea regia	Royal Spoonbill	- - nt	7	15/10/2017	Moderate - There are some recent records although the study area is unlikely to regularly support habitat. After high rainfall or flood, lowing-lying parts of the study area may provide foraging habitat.
Plegadis falcinellus	Glossy Ibis	- - nt	6	7/10/2017	Moderate - There are some recent records in the area. Although the study area does not support freshwater marsh habitat, the species may periodically occur in low-lying areas after rain, or forage in the saltmarsh habitat in the study area.
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)	VU L vu	19	10/09/2018	High - The study area is likely to provide suitable habitat and the species has recently been recorded within Kings Billabong Wildlife Reserve. For surveys conducted for the broader project in NSW, the species was recorded on the other side of the Murray River within the NSW project area (directly opposite the current Victorian study area). However, the species was not recorded during recent targeted surveys, and the habitat in the study area is therefore unlikely to be frequently utilised or currently used for breeding.
Struthidea cinerea	Apostlebird	- L -	22	5/12/2011	High - There are recent records, including from Kings Billabong Park (eBird). However the species was not recorded during targeted surveys so may not be a regular resident of the study area itself.
Todiramphus pyrrhopygius	Red-backed Kingfisher	- - nt	10	17/02/2011	Moderate - There are some records in the area and the study area may support some of the species' preferred habitat features. There are no observations of this species from Kings Billabong Park in eBird. Species was not recorded during targeted surveys but has the potential to periodically occur.

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Reptiles					
Chelodina expansa	Broad-shelled Turtle	- L en	3	27/10/2015	Moderate - There are some recent records and the study area supports some of the species' preferred habitat features along the Murray River.
Chelodina longicollis	Eastern Snake-necked Turtle	- - dd	5	4/06/1996	High - Although there are no recent records, potential habitat is present along the Murray River and the species may roam between waterbodies.
Demansia psammophis	Yellow-faced Whip Snake	- - nt	6	12/02/2016	Recorded – One individual was recorded during surveys for this proposal. The species is likely to occur throughout the study area.
Emydura macquarii	Murray River Turtle	- - vu	2	1/01/1965	Moderate - Whilst the nearby wetlands and river could provide suitable habitat for this species, there is a lack of recent records in the area. However, the species may persist.
Lerista timida	Dwarf Burrowing Skink	- L en	17	14/02/2005	Moderate - There are recent records and the study area supports some of the species' preferred habitat features. However past disturbance and high rabbit density in the study area may have affected habitat quality in the study area. The species was not recorded during targeted surveys (tile survey).
Varanus varius	Lace Monitor	- - en	2	2/11/2007	Recorded - Species was recorded using remote terrestrial and arboreal cameras, and Lace Monitor tracks were observed across vehicle access tracks under the existing powerlines. No termite mounds were observed in the study area although potential shelter for the species in the form of burrows, some rare hollow logs and some large hollows near the Murray River are present. The species is likely to occur throughout the study area.

SCIENTIFIC NAME	COMMON NAME	STATUS	SIGHTINGS IN 10 KM (VBA)	LAST RECORD (VBA)	LIKELIHOOD OF OCCURRENCE
Invertebrates					
Temognatha tricolorata	Jewel Beetle	- - vu			Moderate - this species has been recorded nearby the study area and may occur in the River Red Gums along the Murray River. It was not recorded in scats or deceased during surveys but may still occur.

Key to 'status':

Conservation Status in Australia (EPBC Act) *VU = Vulnerable, M = Migratory*

Status under the Flora and Fauna Guarantee Act 1988 *L = listed as threatened*

Conservation Status in Victoria (Victorian Advisory List) *en = endangered, vu = vulnerable, nt = near threatened, dd = data deficient*

* migratory species which does not come up in a VBA search for threatened fauna. Separate search will be run.

4 IMPACT ASSESSMENT

4.1 PROPOSAL FOOTPRINT

The proposal footprint is intended to provide a realistic indication of likely impacts however it is noted that contractor review may result in a revised footprint with slight changes in impacts. The proposal footprint impact area used for this assessment is described in Section 1.3.2. It covers 7.79 hectares and constitutes 2.91 hectares requiring complete clearing and 4.88 hectares of transmission line corridor within which only pruning of vegetation with growth height above four metres would be required. Some of the complete clearing area will be able to be rehabilitated post-works to allow regeneration of groundcover and midstorey (which have growth height of < 4 metres) – this equates to an area approximately 1.3166 ha. As the proposal footprint overlaps with tracks and other areas which are already cleared, the actual native vegetation impact has been calculated and is provided in Section 4.5.

4.2 POTENTIAL IMPACTS ON MNES

The proposal has been assessed as having the potential to impact threatened species. Specifically, the following EPBC Act listed values have been assessed as present (or likely to be present):

- Regent Parrot
- Fork-tailed Swift
- Sharp-tailed Sandpiper

The potential impacts on these values based on the currently proposed impact area are detailed below.

4.2.1 REGENT PARROT

Regent Parrot is listed as vulnerable under the EPBC Act, is listed under the FFG Act and is vulnerable on the Advisory list of threatened fauna.

The proposal study area is likely to provide suitable habitat and there is a recent public observation of the species within Kings Billabong Park (early 2020, eBird), although records are infrequent in the area. For surveys conducted for EnergyConnect in NSW, the species was recorded on the other side of the Murray River within the NSW Western Section EnergyConnect project area (directly opposite the current Victorian study area).

Surveys targeted the large hollow-bearing trees along the Murray River where the species is considered most likely to breed, as well as potential foraging habitat in the woodland elsewhere in the proposal study area. The species was not recorded during recent targeted surveys, and the habitat in the proposal study area is considered unlikely to be frequently utilised or currently used for breeding.

A significant impact assessment has been completed and is provided in Appendix E. Based on this assessment, the proposal is unlikely to significantly impact this species with or without mitigation. Precautionary mitigation is recommended and has been included in the mitigation section of this report. This includes:

- avoidance of night works, where practicable
- minimise use of heavy machinery and mitigate noise where possible
- avoid clearing during the spring breeding season (approximately August-November inclusive), where possible
- controls to prevent introduction of disease including *Phytophthora cinnamoni* hygiene protocols, washdown of all equipment, vehicles and footwear prior to coming on site, and use of only certified Phytophthora free materials in construction.

4.2.2 FORK-TAILED SWIFT

Fork-tailed Swift is listed as migratory under the EPBC Act. There is a recent public observation of this species at Kings Billabong Wetlands (December 2019, eBird) and the species may fly over and forage over the proposal study area. However, the proposal study area provides potential foraging habitat only for this predominantly aerial species. As such, the habitat in the proposal study area is unlikely to be of high significance to the species, significant impact on this species is considered highly unlikely and detailed impact assessment is not warranted.

4.2.3 SHARP-TAILED SANDPIPER

Sharp-tailed Sandpiper is listed as migratory under the EPBC Act. There are nearby past observations of this species such as at Lake Hawthorn and Lake Ranfurly at Mildura (eBird). The species usually requires mudflat wetland habitat which is not present at the proposal study area but there is the potential for it to occur in the saltmarsh area of the proposal study area should it be inundated (i.e. the Sub-saline Depression Shrubland EVC). As this marginal quality and intermittent potential habitat is largely being avoided by the proposal and is unlikely to be of significance to the species, a significant impact is considered highly unlikely and detailed impact assessment is not warranted.

4.3 POTENTIAL IMPACTS ON FFG ACT LISTED SPECIES AND COMMUNITIES

No FFG Act listed communities have been assessed as occurring within the proposal study area and having the potential to be impacted by the proposal. The flora and fauna with the potential to occur and be impacted are addressed in the following sections. This excludes MNES which have an FFG Act status as they are addressed in the previous section.

4.3.1 FLORA

Thirteen FFG listed flora species were recorded within the proposal footprint. This includes the new additions to the FFG Act Threatened List, further detail in Section 6.2.3.1. The numbers of each species likely to be impacted are provided in Table 4.1. The species most at risk from the project is Spreading Saltbush, which, whilst it is common over the border in NSW, has a very restricted distribution in Victoria. Although few plants are located in the areas to be fully cleared, many more are present within the transmission line corridor, where selective clearing of vegetation with a growth potential over 4 m will occur. Measures to minimise the likelihood of impact on this species have been included in the mitigation for the proposal and include restrictions on access, clearing methods, and ground disturbance in the transmission line corridor. Weed control and rehabilitation of disturbed areas is also proposed. These measures will reduce impacts on the species such that very few (if any) plants in the partial clearance areas are expected to be affected and ensure that the habitat is retained. With the proposed methods, a significant impact on this species (or any other FFG Act flora species) is considered unlikely.

Six additional FFG Act listed species are considered moderately to highly likely to occur but were not detected during field survey. If present, these species would be in low numbers to have not been detected during the survey, particularly within the proposal footprint impact area which was surveyed extensively. It is therefore unlikely that there would be material impacts to any populations of these species from the proposal.

Table 4.1 Impact assessment for FFG Act listed flora recorded in the proposal study area

SCIENTIFIC NAME	COMMON NAME	PREVIOUS FFG ACT	NEW FFG ACT STATUS	APPROX. TOTAL COUNT IN STUDY AREA	APPROX COUNT IN AREA TO BE FULLY CLEARED	APPROX COUNT IN AREA TO BE PARTIALLY CLEARED*
Asperula gemella	Twin-leaf Bedstraw	NA	Endangered	1	1	0
Atriplex limbata	Spreading Saltbush	Listed	Endangered	551	15	201
Atriplex rhagodioides	Silver Saltbush	Listed	Endangered	1	0	1
Calotis cuneifolia	Blue Burr-daisy	NA	Endangered	85	1	0
Eragrostis lacunaria	Purple Love-grass	NA	Endangered	7	1	0
Eragrostis setifolia	Bristly Love-grass	NA	Endangered	19	0	5
Dianella porracea	Riverine Flax-lily	NA	Critically Endangered	31	3	9
Eremophila maculata subsp. *maculata*	Spotted Emu-bush	Listed	Critically Endangered	1	0	0
Malacocera tricornis	Goat Head	NA	Vulnerable	80	0	12
Minuria integerrima	Smooth Minuria	NA	Vulnerable	8	0	2
Roepera angustifolia	Scrambling Twinleaf	NA	Endangered	5	2	1
Sarcozona praecox	Sarcozona	NA	Endangered	133,081**	11,477**	21,399**
Swainsona microphylla	Small-leaf Swainson-pea	NA	Endangered	15	1	0

*cleared of vegetation with a growth potential of >4 m only, using hand-held equipment only to minimise impact to the understorey (refer Section 5 which details proposed restrictions on clearing methods). Note the FFG species in this column do not exceed 4m in height and therefore would not require clearing for maintenance purposes.

**Estimated based on average number counted in four 10 x 10 m quadrats and extrapolated across the area of the EVC, and area of Riverine Chenopod Woodland EVC to be impacted in each impact category.

4.3.2 FAUNA

An assessment of the potential for impacts on fauna listed under the FFG Act (not including Regent Parrot which is assessed in Section 4.2) is provided in Table 4.2. Based on this assessment, mitigation is recommended for five fauna species. This has been incorporated into the mitigation section (Section 5). With the proposed mitigation, significant impact on any of the fauna species in the table is considered highly unlikely.

Table 4.2 Assessment of the potential impacts on FFG Act listed fauna

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Ardea alba	Great Egret	- L vu	High - Parts of the study area may provide suitable habitat for this species and there are a high number of records in the surrounding area.	Minor impacts only through disturbance during construction.
Ardea intermedia plumifera	Plumed Egret	- L en	High - Parts of the study area may provide suitable habitat for this species and there are a high number of records in the surrounding area.	Minor impacts only through disturbance during construction.
Climacteris affinis	White-browed Treecreeper	- L vu	Moderate - The species was not recorded during recent targeted surveys and the study area does not support preferred habitat. However, there is a record from within the study area in 1993 so the species may move through or periodically utilise the study area. As there are no recent records from Kings Billabong Park in eBird, if present, the potential habitat is unlikely to support a high-density population.	Minor impacts only as the potential habitat present is unlikely to be of significance to the species based on the low number of records. **Mitigation recommended: pre-clearing survey, two stage clearing**
Coracina maxima	Ground Cuckoo-shrike	- L vu	Moderate - Although records in the area are infrequent, the species (which is nomadic) may periodically occur as the study area supports suitable habitat features. The species was not recorded during targeted surveys.	Minor impacts only as the potential habitat present is unlikely to be of significance to the species based on the low number of records.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Egretta garzetta	Little Egret	- L en	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species may utilise the Murray River edge or visit flooded saltmarsh.	Minor impacts only through disturbance during construction.
Falco subniger	Black Falcon	- L vu	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. However, the species was not recorded during recent targeted bird surveys, and is therefore unlikely to be currently breeding at the study area or utilising the study area regularly for foraging.	Minor impacts only through disturbance of potential habitat during construction.
Geopelia cuneata	Diamond Dove	- L nt	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.	Minor impacts only, including temporary disturbance during construction and removal of some potential habitat trees. **Mitigation recommended: pre-clearing survey, two stage clearing**
Haliaeetus leucogaster	White-bellied Sea-Eagle	- L vu	High - Parts of the study area may provide suitable habitat for this species and there is a high number of records in the surrounding area, including observations from Kings Billabong Park in eBird. As the species was not recorded in the study area during recent targeted surveys or opportunistically, it is considered unlikely to be currently breeding within or regularly utilising the study area.	Loss of some potential breeding habitat, although the lack of recent records or breeding observations indicate that this is unlikely to materially impact the species.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Lophochroa leadbeateri	Major Mitchell's Cockatoo	- L vu	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.	Loss of some potential breeding habitat (large trees along the Murray River) however very few potential breeding trees are proposed to be removed and this is considered unlikely to materially impact the species.
Lophoictinia isura	Square-tailed Kite	- L vu	Moderate - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.	Loss of some potential breeding habitat, although the lack of recent records or breeding observations indicate that this is unlikely to materially impact the species.
Melanodryas cucullata	Hooded Robin	- L nt	High - The study area is likely to provide suitable habitat and the species has recently been recorded within Kings Billabong Wildlife Reserve. The species was not recorded during recent targeted surveys and is therefore unlikely to regularly utilise the study area itself.	Loss of some potential breeding habitat and impacts on foraging habitat through removal of canopy. **Mitigation recommended if possible: retain hollow trees in corridor as 4 m high stags/stumps** **Mitigation recommended: pre-clearing survey, two stage clearing**
Oxyura australis	Blue-billed Duck	- L en	Moderate - There are some recent records and the study area supports some potential low quality habitat near the Murray River. The species is also likely to fly over the study area.	Minor indirect temporary impacts through noise or disturbance only.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Struthidea cinerea	Apostlebird	- L -	High - There are recent records, including from Kings Billabong Park (eBird). However, the species was not recorded during targeted surveys so may not be a regular resident of the study area itself.	Minor indirect temporary impacts through noise or disturbance, loss of potential foraging and breeding habitat unlikely to impact the species based on the lack of regular records or observations during recent surveys in the breeding season. **Mitigation recommended: pre-clearing survey, two stage clearing**
Reptiles				
Chelodina expansa	Broad-shelled Turtle	- L en	Moderate - There are some recent records and the study area supports some of the species' preferred habitat features along the Murray River.	Minor temporary impacts on potential habitat for the species however no impact on the river edge is proposed.
Lerista timida	Dwarf Burrowing Skink	- L en	Moderate - There are recent records and the study area supports some of the species' preferred habitat features. However past disturbance and high rabbit density in the study area may have affected habitat quality in the study area. The species was not recorded during targeted surveys (tile survey).	Minor impacts on habitat for the species, with most of the impact area (partial clearing areas) to remain potential habitat post-works. **Mitigation recommended: pre-clearing survey**

4.4 POTENTIAL IMPACTS ON DELWP ADVISORY LIST SPECIES

4.4.1 FLORA

Sixteen flora species listed on the *Victorian advisory list of rare and threatened flora* (DEPI 2014) (not including the three species which also have an FFG Act status, assessed in Section 4.3.1) were recorded within the proposal study area and are listed in Table 4.3 with the approximate number of individual plants likely to be impacted.

An additional 15 species with a status on the DELWP Advisory List but not listed under the FFG Act are considered moderately to highly likely to occur but were not detected during field survey. If present, these species would be in low numbers to have not been detected during the survey, particularly within the proposal footprint impact area which was surveyed extensively. It is therefore unlikely that there would be material impacts to any populations of these species from the proposal.

Table 4.3 Impact assessment for Advisory List flora species recorded in the proposal study area

SCIENTIFIC NAME	COMMON NAME	VICTORIAN ADVISORY LIST	APPROX. COUNT IN STUDY AREA	APPROX COUNT IN AREA TO BE FULLY CLEARED	APPROX COUNT IN AREA TO BE PARTIALLY CLEARED*
Asperula gemella	Twin-leaf Bedstraw	Rare	1	1	0
Calotis cuneifolia	Blue Burr-daisy	Rare	85	1	0
Cynodon dactylon var. pulchellus	Native Couch	Poorly known	7	0	0
Dianella porracea	Riverine Flax-lily	Vulnerable	31	3	9
Eragrostis lacunaria	Purple Love-grass	Vulnerable	7	1	0
Eragrostis setifolia	Bristly Love-grass	Vulnerable	19	0	14
Eremophila divaricata subsp. divaricata	Spreading Emu-bush	Rare	317	20	13
Lepidium pseudohyssopifoliu	Native Peppercress	Poorly known	292	14	41
Malacocera tricornis	Goat Head	Rare	50	0	46
Minuria cunninghamii	Bush Minuria	Rare	1	0	0
Minuria integerrima	Smooth Minuria	Rare	8	0	2
Roepera angustifolia	Scrambling Twinleaf	Rare	5	3	1
Roepera similis	White Twinleaf	Rare	401	1	4
Sarcozona praecox	Sarcozona	Rare	133,081**	11,477**	21,399**
Swainsona microphylla	Small-leaf Swainson-pea	Rare	15	5	0
Tetragonia moorei	Annual Spinach	Poorly known	1309	115	555

*cleared of vegetation with a growth potential of >4 m only, using hand-held equipment only to minimise impact to the understorey.

**Estimated based on average number counted in four 10 x 10 m quadrats and extrapolated across the area of the EVC, and area of Riverine Chenopod Woodland EVC to be impacted in each impact category.

4.4.2 FAUNA

An assessment of the potential for impacts on fauna listed only on the DELWP Advisory List is provided in Table 4.4 Based on this assessment, mitigation is recommended for five Advisory List fauna species. This has been incorporated into the mitigation section (Section 5). With the proposed mitigation, significant impact on any fauna species of conservation significance is considered highly unlikely.

Table 4.4 Impact assessment for Advisory List fauna

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Aythya australis	Hardhead	- - vu	Moderate - There are a high number of records in the surrounding area but no high-quality deep-water wetland habitat with suitable aquatic vegetation in the study area itself, although some potential for the species to occasionally utilise the edge of the Murray River.	Minor indirect temporary impacts through noise or disturbance only.
Biziura lobata	Musk Duck	- - vu	Moderate - There are a high number of records in the surrounding area but no high quality deep water wetland habitat with suitable aquatic vegetation in the study area itself, although some potential for the species to occasionally utilise the edge of the Murray River.	Minor indirect temporary impacts through noise or disturbance only.
Chlidonias hybrida	Whiskered Tern	- - nt	Moderate - This species has recently been recorded within Kings Billabong Wildlife Reserve and may periodically utilise habitat within the study area, although it is suboptimal. It is likely to fly over the study area.	Material impacts not anticipated.
Cinclosoma castanotum	Chestnut Quail-thrush	- - nt	Moderate - Despite only a few records in the area, the study area may provide habitat for this species. The species was not recorded during targeted bird surveys or incidentally. As such the study area itself is unlikely to support permanent resident birds.	Minor impacts only, if present. Works are unlikely to substantially reduce available habitat for this species.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Circus assimilis	Spotted Harrier	- - nt	Moderate - The study area is likely to provide suitable habitat for this species and there are records in the surrounding area. However, the species was not recorded during targeted bird surveys. As such, the study area is unlikely to regularly support foraging or breeding for this species.	Material impacts not anticipated.
Climacteris picumnus	Brown Treecreeper	- - nt	Recorded - The species was recorded within the study area, almost exclusively near the Murray River in Grassy Riverine Forest and adjacent Lignum Swampy Woodland. Several individuals were observed numerous times and breeding is likely to be occurring within the study area.	Loss of trees with hollows which may be used for nesting, particularly the large trees near the Murray River, and some direct impact on foraging habitat. Impacts from noise/disturbance may also occur. **Minimisation and mitigation recommended where practicable: retain hollows where possible, consider hollow replacement.**
Nycticorax caledonicus	Nankeen Night-Heron	- - nt	High - Parts of the study area may provide suitable habitat for this species and there is a high number of records in the surrounding area. Although the species was not detected during recent surveys, presence should be assumed.	Loss of trees with hollows which may be used for nesting, particularly the large trees near the Murray River, and some direct impact on foraging habitat. **Minimisation and mitigation recommended where practicable: retain hollows where possible, consider hollow replacement.**
Phalacrocorax varius	Pied Cormorant	- - nt	High - The study area is likely to provide suitable habitat, particularly along the Murray River and the species has recently been recorded within Kings Billabong Wildlife Reserve.	Minor indirect temporary impacts through noise or disturbance only.
Platalea regia	Royal Spoonbill	- - nt	Moderate - There are some recent records although the study area is unlikely to regularly support habitat. After high rainfall or flood, lowing-lying parts of the study area may provide foraging habitat.	Minor indirect temporary impacts through noise or disturbance and temporary impacts to a small amount of potential low-quality foraging habitat.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Plegadis falcinellus	Glossy Ibis	- - nt	Moderate - There are some recent records in the area. Although the study area does not support freshwater marsh habitat, the species may periodically occur in low-lying areas after rain, or forage in the saltmarsh habitat in the study area.	Minor indirect temporary impacts through noise or disturbance and temporary impacts to a small amount of potential low-quality foraging habitat.
Todiramphus pyrrhopygius	Red-backed Kingfisher	- - nt	Moderate - There are some records in the area and the study area may support some of the species' preferred habitat features. There are no observations of this species from Kings Billabong Park in eBird. Species was not recorded during targeted surveys but has the potential to periodically occur.	Minor impacts if present. Based on the paucity of records, the study area does not appear to be important habitat. Works are unlikely to lead to loss of breeding habitat as the species usually nests in burrows in riverbanks.
Reptiles				
Chelodina longicollis	Eastern Snake-necked Turtle	- - dd	High - Although there are no recent records, potential habitat is present along the Murray River and the species may roam between waterbodies.	Minor temporary impacts on potential habitat for the species. **Measures to maximise connectivity across the study area during works are recommended.**
Demansia psammophis	Yellow-faced Whip Snake	- - nt	Recorded – One individual was recorded during surveys for this proposal. The species is likely to occur throughout the study area.	Minor impacts on habitat for the species, with most of the impact area (partial clearing areas) to remain potential habitat post-works. **Mitigation recommended: pre-clearing survey**
Emydura macquarii	Murray River Turtle	- - vu	Moderate - Whilst the nearby wetlands and river could provide suitable habitat for this species, there is a lack of recent records in the area. However, the species may persist.	Minor temporary impacts on potential habitat for the species however no impact on the river edge is proposed.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE	LIKELY/POTENTIAL IMPACT
Varanus varius	Lace Monitor	- - en	Recorded - Species was recorded using remote terrestrial and arboreal cameras, and Lace Monitor tracks were observed across vehicle access tracks under the existing powerlines. No termite mounds were observed in the study area although potential shelter for the species in the form of burrows, some rare hollow logs and some large hollows near the Murray River are present. The species is likely to occur throughout the study area.	Impact to this species will include loss of hollow-bearing trees and potential for temporary disturbance. **Mitigation recommended: retain hollows where possible (e.g. through leaving hollow stumps) and maintain connectivity across the corridor durng construction.**
Invertebrates				
Temognatha tricolorata	Jewel Beetle	- - vu	Moderate - this species has been recorded nearby the study area and may occur in the River Red Gums along the Murray River. It was not recorded in scats or deceased during surveys but may still occur.	Impact within Victoria is unlikely as very few River Red Gums are proposed to be impacted.

4.5 VEGETATION CLEARING

4.5.1 VEGETATION PATCHES

The native vegetation clearing required for the proposal is provided in Table 4.5, split by EVC. A total of 5.419 ha of native vegetation will be impacted, including 2.042 ha cleared to the ground for construction, and 3.377 ha with vegetation with a growth height potential of >4 m removed only. These calculations take into account the project's no-go zones (refer Section 5.1.3), as well as TPZ impacts.

Vegetation impacts are shown in Appendix A2.

Calculation of impacts for offsets is discussed in Section 6.2.4.2.

Table 4.5 Quantification of native vegetation clearance

EVC #	ECOLOGICAL VEGETATION CLASS	CONSERVATION STATUS FOR ROBINSON PLAIN BIOREGION	TOTAL AREA MAPPED IN STUDY AREA (HA)	AREA CLEARED TO GROUND (HA)	AREA PARTIALLY CLEARED (HA)*	TOTAL IMPACTED AREA (HA)
106	Grassy Riverine Forest	Depleted	0.115	0	0.009	0.009
813	Intermittent Swampy Woodland	Depleted	1.375	0.016	0.314	0.330
803	Lignum Shrubland	Least Concern	3.042	0.046	0.001	0.047
823	Lignum Swampy Woodland	Depleted	1.696	0.220	0.295	0.514

EVC #	ECOLOGICAL VEGETATION CLASS	CONSERVATION STATUS FOR ROBINSON PLAIN BIOREGION	TOTAL AREA MAPPED IN STUDY AREA (HA)	AREA CLEARED TO GROUND (HA)	AREA PARTIALLY CLEARED (HA)*	TOTAL IMPACTED AREA (HA)
103	Riverine Chenopod Woodland	Depleted	16.952	1.475	2.758	4.234
98	Semi-arid Chenopod Woodland	Vulnerable	1.191	0.002	0	0.002
820	Sub-saline Depression Shrubland	Depleted	1.819	0.282	0	0.282
Totals			**26.190**	**2.042**	**3.377**	**5.419**

* Removal of vegetation with a growth height potential of >4 m only

4.5.2 SIGNIFICANT TREES

No Scattered Trees are present in the proposal study area however 18 large trees in patches are located within the proposal footprint impact area and are proposed to be impacted through clearance for construction or removal/pruning for the transmission line corridor. A total of 52 habitat trees (mostly hollow-bearing trees) are also proposed to be removed/impacted, 15 of which are also large as per the EVC benchmark. This amounts to a total of approximately 134 hollows, most of which are small or medium sized. A breakdown of hollow sizes for each of the 52 trees is provided in Table 4.7 below.

All of the significant trees within the impact footprint are Black Boxes or stags (dead trees); none are living River Red Gums. However, we note that there are three large River Red Gums along the Murray River which occur just across the NSW/Vic boundary, but on the Victorian side of the river. These trees are likely to require pruning to 2 m for the proposal as they are along the alignment. These we be accounted for in the NSW Western Section project approvals as they are within the NSW jurisdictional boundary.

Trees which are just outside the proposal footprint but may be affected due to TPZ impacts (where >10% of the TPZ is being encroached upon by a full clearance area) have been included in the impacts. This is only required for full clearance areas, as partial clearance will not involve TPZ impacts. A breakdown of trees impacted vs totals in the proposal study area is provided in Table 4.6. See Figure in Appendix A2 for locations of impacted large trees.

Table 4.6 Tree impacts

	HABITAT TREE	HABITAT TREE AND LARGE TREE	LARGE TREE	GRAND TOTAL
Total recorded (15-20 m buffer of the construction footprint)	118	32	7	157
Total impacted	**37**	**15**	**3**	**55**

Table 4.7 A breakdown of hollow size for habitat trees and large trees that will be removed/impacted

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	HABITAT TREE OR LARGE TREE ^	HOLLOW SIZE								NOTES
					<5cm trunk	<5cm limb	6-15cm trunk	6-15 cm limb	16-25cm trunk	16-25cm limb	>25cm trunk	>25cm limb	
3	Dead		93	HBT & LT	1	0	0	1	0	1	1	0	
11	Dead		219	HBT & LT	1	4	1	7	0	0	3	0	
13	Dead		160	HBT & LT	0	0	0	1	2	0	2	1	
15	Dead		72	HBT	0	0	0	0	0	2	1	0	
30	Black Box	*Eucalyptus larginflorens*	36	HBT	0	0	0	0	2	0	0	0	
35	Black Box	*Eucalyptus larginflorens*	41	HBT & LT	0	0	0	0	0	0	0	0	
36	Black Box	*Eucalyptus larginflorens*	33	HBT	0	0	0	0	0	0	0	0	
37	Black Box	*Eucalyptus larginflorens*	39	HBT	0	0	0	0	0	0	0	0	Stick nest is tiny
38	Black Box	*Eucalyptus larginflorens*	19	HBT	0	0	0	0	0	0	1	0	One big hollow near base of trunk plus some smaller entrances to same hollow.
39	Dead		17	HBT	2	0	0	0	0	0	0	0	Loose bark
40	Black Box	*Eucalyptus larginflorens*	55	HBT & LT	1	1	0	1	0	0	0	0	Loose bark - potential for bats
45	Black Box	*Eucalyptus larginflorens*	30	HBT	1	0	1	0	0	0	0	0	Loose bark

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	HABITAT TREE OR LARGE TREE ^	HOLLOW SIZE								NOTES
					<5cm trunk	<5cm limb	6-15cm trunk	6-15 cm limb	16-25cm trunk	16-25cm limb	>25cm trunk	>25cm limb	
49	Black Box	*Eucalyptus larginflorens*	21	HBT	0	0	1	0	0	0	0	0	Hollow is low down in trunk
53	Black Box	*Eucalyptus larginflorens*	4	HBT & LT	1	0	0	0	1	0	0	0	Recently dead. Top fallen/cut off. Gaps in bark and hollow at end of cut tree
56	Black Box	*Eucalyptus larginflorens*	17	HBT	0	0	0	1	0	0	0	0	
61	Black Box	*Eucalyptus larginflorens*	31	HBT	0	1	0	0	1	0	0	0	
71	Black Box	*Eucalyptus larginflorens*	14	HBT	0	1	0	1	0	0	0	0	
72	Black Box	*Eucalyptus larginflorens*	13	HBT	1	0	1	0	0	0	0	0	Low hollow may not be used
73	Black Box	*Eucalyptus larginflorens*	16	HBT	0	0	1	0	0	0	0	0	
74	Black Box	*Eucalyptus larginflorens*	48	HBT & LT	1	0	0	0	0	0	0	0	
75	Black Box	*Eucalyptus larginflorens*	38	HBT	2	1	0	2	0	0	0	0	
78	Dead		7	HBT	1	0	0	0	0	0	0	0	Loose bark

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	HABITAT TREE OR LARGE TREE ^	HOLLOW SIZE								NOTES
					<5cm trunk	<5cm limb	6-15cm trunk	6-15 cm limb	16-25cm trunk	16-25cm limb	>25cm trunk	>25cm limb	
86	Black Box	*Eucalyptus larginflorens*	31	HBT	0	1	0	1	0	0	0	0	
98	Black Box	*Eucalyptus larginflorens*	40	HBT & LT	0	1	0	1	1	0	0	0	
99	Black Box	*Eucalyptus larginflorens*	22	HBT	0	0	0	1	0	0	0	0	
101	Black Box	*Eucalyptus larginflorens*	17	HBT	1	1	0	1	0	0	0	0	
102	Dead		35	HBT	0	6	0	2	0	0	0	0	
104	Dead		30	HBT	0	0	0	0	3	0	0	0	
105	Black Box	*Eucalyptus larginflorens*	33	HBT	0	3	0	0	0	0	0	0	
106	Black Box	*Eucalyptus larginflorens*	19	HBT	1	1	0	0	0	0	0	0	
107	Black Box	*Eucalyptus larginflorens*	20	HBT	0	1	0	0	0	0	0	0	
108	Black Box	*Eucalyptus larginflorens*	14	HBT	1	0	0	0	0	0	0	0	Crack
109	Black Box	*Eucalyptus larginflorens*	25	HBT	0	2	1	1	0	0	0	0	
110	Black Box	*Eucalyptus larginflorens*	41	HBT & LT	0	0	2	0	0	0	0	0	

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	HABITAT TREE OR LARGE TREE ^	HOLLOW SIZE								NOTES
					<5cm trunk	<5cm limb	6-15cm trunk	6-15 cm limb	16-25cm trunk	16-25cm limb	>25cm trunk	>25cm limb	
111	Black Box	*Eucalyptus larginflorens*	30	HBT	0	1	0	2	0	0	0	0	
113	Black Box	*Eucalyptus larginflorens*	38	HBT	0	2	0	0	0	0	0	0	
115	Black Box	*Eucalyptus larginflorens*	42	HBT & LT	0	0	0	3	0	0	0	0	
116	Dead		32	HBT	0	0	2	0	0	0	0	0	
117	Black Box	*Eucalyptus larginflorens*	19	HBT	1	0	0	1	0	0	0	0	
121	Black Box	*Eucalyptus larginflorens*	38	HBT	2	0	0	0	0	0	0	0	
123	Black Box	*Eucalyptus larginflorens*	27	HBT	0	2	0	1	0	0	0	0	
124	Dead		72	HBT & LT	0	0	0	0	0	0	0	0	Likely River Red Gum. Lots of flaking bark - potential bat habitat
125	Black Box	*Eucalyptus larginflorens*	53	HBT & LT	0	3	0	3	0	0	0	0	
127	Black Box	*Eucalyptus larginflorens*	30	HBT	1	0	0	0	0	0	0	0	Some flaky bark and crevices but no obvious hollows

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	HABITAT TREE OR LARGE TREE ^	HOLLOW SIZE								NOTES
					<5cm trunk	<5cm limb	6-15cm trunk	6-15 cm limb	16-25cm trunk	16-25cm limb	>25cm trunk	>25cm limb	
128	Black Box	*Eucalyptus larginflorens*	45	HBT & LT	0	1	0	1	0	0	0	0	Small half-finished or old stick nest
131	Black Box	*Eucalyptus larginflorens*	27	HBT	3	0	0	0	0	0	0	0	
135	Black Box	*Eucalyptus larginflorens*	41	HBT & LT	0	2	0	1	0	0	0	0	
136	Stag		32	HBT	0	2	0	0	0	0	0	0	
137	Black Box	*Eucalyptus larginflorens*	28	HBT	0	0	0	1	0	0	0	0	
138	Black Box	*Eucalyptus larginflorens*	42	HBT & LT	0	2	1	1	0	0	0	0	
139	Black Box	*Eucalyptus larginflorens*	35	HBT	1	0	0	1	0	0	0	0	
140	Black Box	*Eucalyptus larginflorens*	33	HBT	2	1	0	0	0	0	0	0	

^ HBT = Habitat Tree, LT = Large Tree

5 MITIGATION

5.1 AVOIDANCE AND MINIMISATION OF IMPACTS ON NATIVE VEGETATION

The Guidelines 2017 (DELWP 2017c) require that all efforts must be made to avoid and minimise impacts to native vegetation and associated biodiversity values before resorting to offsets. Avoidance and minimisation has been considered for the proposal to date where possible, as per the Assessors' Handbook (DELWP 2017a). 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 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.

It requires that efforts are focussed on areas of native vegetation that have the most value. The way in which the proposal has avoided and minimised impacts to date are described below.

5.1.1 STRATEGIC LEVEL PLANNING

The avoidance and minimisation of impacts to native vegetation were accounted for at the strategic level of planning by the consideration of likely offset requirements including whether specific offsets were likely to be triggered. Due to the scale of the project, when considered as part of the broader project in NSW, it was known that offset obligations would be considerable, but the impacts and offset obligations would be justified by the values and benefits of the project. At the early stages of the broader project in NSW, multiple alignment options and infrastructure arrangements were investigated. An overview of these options and key considerations is provided below.

5.1.1.1 EXISTING INFRASTRUCTURE AS A CONSIDERATION

The existing transmission line in the Kings Billabong Park would be replaced by the proposed new line with increased operational capacity. Due to the requirement to maintain a continuity of electrical supply in the network, it was not considered feasible to demolish the existing line and rebuild in the exact location. That method would result in the need to cease electrical supply for the full duration of construction which the network is not able to accommodate. As a result, a new line is required to be constructed in a new location and commissioned before the existing transmission line is able to be decommissioned.

The consideration of the location for the new transmission line included:

- The existence and location of the existing transmission line:
    - a new line adjacent to the existing line would allow the proposal to minimise impacts on existing land use, visual impacts and to a large extent, potential ecological and heritage impacts. Once the existing line is decommissioned and removed, a single transmission line in this location would remain, resulting in minimal resultant changes to the land use and visual impacts to that which currently occur

  - a new transmission line adjacent to the existing infrastructure would not require a full, new transmission line corridor to be established. The development of a new transmission line adjacent to, and in close proximity to, the existing line could utilise some of the existing transmission line's corridor width which currently already has some existing vegetation disturbance. This would have less impact when compated to establishing a new and separate corridor which would require its own operational vegetation clearing requirements in a previously undisturbed area.
  - acknowledging that the existing transmission line would need to be decommissioned and therefore there would be a need for construction vehicles and activities to occur in this area to enable the removal of the existing towers and components. By locating the new transmission line infrastructure in an area close to the existing line would allow for co-locating of construction vehicle activity locations (noting the timing of these activities would be staggered) and minimising the need for separate access tracks, thereby reducing the extent of disturbance works in different locations in the park for these two required activities.

- The location of the connecting Red Cliffs substation. The new transmission line route needs to approach the substation at a point where connection options are currently available based on existing line connections and operational arrangements. The provision of the new transmission line immediately adjacent to the existing line on the western side would allow this to occur.
- The ease of constructability in relation to access and the desire to minimise clearing associated with new access tracks. Locating the new transmission line in close proximity to the existing line would allow for some existing access tracks within the area to be used during construction and operational phases (with minor upgrades at some points). This would assist in providing the required construction access while minimising additional disturbance.

5.1.1.2 CONSTRUCTION METHODOLOGY CONSIDERATIONS

Options in relation to the potential undergrounding of the transmission line were also reviewed for the project. Key considerations from the project team in relation to this method are outlined below:

- Undergrounding a proposed double circuit transmission line would not be able to be achieved through construction only utilising an under bore technique to limit surface and vegetation clearing impacts. This construction option would have required an open trenched methodology for the full section of the new transmission line. The open trench method would have required a corridor around 16 metres in width for the full length and would not be able to be constructed wholly within the existing corridor. This methodology would result in vegetation impacts in both the immediate area of proposed trenching as well as potential additional impacts to adjacent vegetation (such as where root damage within the trench would result in increased vegetation impacts outside the immediate area of impact). This method would also have significantly increased risk to heritage values in the area which an above ground transmission line installation would be able to minimise disturbance risk to.
- There would also be significant complexity associated with providing an underground transmission line under the Murray River. There would also be need for vegetation to be cleared to establish bore entry and exit pits on either side of river. These pits would require substantial earthworks in the riparian zone and potentially in areas of higher heritage value. Generally, the construction methodology for underboing a river is very difficult and would significantly increase the project delivery cost and create maintenance risk/network integrity risk due to reduced access to the asset if faults were to occur.
- Undergrounding the asset would still require the use of the access tracks which have been included in the base project scope of works. These tracks would be required to allow construction equipment to access the sites required for under boring under the river, for trenching the cable in and for dismantling the existing transmission towers which need to be removed as part of the project.
- The immediate surface area over the undergrounded transmission line asset would not allow for trees to remain as the roots would pose risk to the asset.

- Undergrounding power cables have been demonstrated to have higher costs, lower capacity and lower reliability than overhead transmission lines.

Based on the above considerations the undergrounding option was identified as not being preferred due to the high level risk it posed for project delivery (complexity, cost, program), increased maintenance risk and the inability for the method to substantially reduce ecological and heritage impacts compared to an aboveground option.

5.1.1.3 SUMMARY

At the strategic level, the following aspects were determined to be preferred for the project and adopted for application at the site area planning phase:

- a route option which was:
    - adjacent to, and in close proximity to, the existing transmission line to minimise additional land and environmental disturbances
    - close to existing disturbed access track areas
    - able to be easily connected into the existing Red Cliffs substation facility and its available connection points.
- an asset which was an above ground transmission line option to minimise construction disturbance impacts and operational risks.

5.1.2 SITE /STUDY AREA LEVEL PLANNING

Once the field surveys had been undertaken, mapping of key ecological values was compared with preliminary design and proposal footprint information. This process enabled the impact footprint to be adjusted to minimise impacts, particularly on large and hollow-bearing trees and on rare and threatened flora. This was a detailed, iterative process with TransGrid and their preferred contractor which had a number of solutions worked through to avoid and minimise impacts wherever possible.

Specific steps to avoid and minimise impacts in the current design have been addressed through the following:

- locating the new transmission line close to the existing transmission line to minimise additional clearing
- locating the new transmission line poles near the current transmission line structures to minimise additional midline clearing
- locating the new transmission line poles closest to the Murray River further back from the river to minimise clearing of riverside habitat trees and to minimise ground disturbance near the waterway (and therefore sedimentation)
- using existing access tracks for construction and maintenance where possible (even where this makes construction more difficult) to minimise the need to clear vegetation for access
- limiting the areas of full clearance to the pole removal and new pole locations only, with all understorey to be maintained where only clearing of vegetation with a growth potential of >4 m in the transmission line corridor is required.

Areas of full clearing at each of the existing and new pole locations has been designed in a way to enable assembly and machinery access, therefore it was not deemed possible at the current desing phase to further limit impacts on trees, particularly some which occur on the eastern side or periphery of the clearence areas. Additionally, the partial clearance areas were minimised as much as possible at the current design phase whilst allowing some flexibility to the contractors. This includes impacts to the eastern side of the clearance areas where there are a number of hollow-bearing and/or large trees. However, the section below outlines a number of measures to further avoid and minimise impacts during a more detailed design phase as well as construction.

5.1.3 FURTHER AVOIDANCE AND MINIMISATION OF DIRECT IMPACTS

Due to the need to allow some flexibility for the contractor during detailed design and construction, the impact footprint cannot be further constrained at this stage. However, it is anticipated that there will be further opportunities for the

construction contractor and project team to minimise impacts during clearing and construction and reduce the overall loss of native vegetation calculated in this assessment. Some of these have been agreed upon, others will need to be assessed during detailed design. The construction environmental management plan (CEMP) will need to demonstrate the ways in which the contractor will construct the proposal to minimise impacts which should include these measures where possible.

These include the following:

- Developing no-go zones for the project. Confirmed no-go zones are shown in Figure 5.1. Three types of no-go zone have been proposed and are detailed below in Section 5.3.1.2.
- For any higher value trees with a growth potential of > 4 m height, these should be cut as high as possible (i.e. not to the ground). If necessary, they should be poisoned to prevent regrowth whilst keeping the hollows. Many trees supported hollows low down in the trunk or in low branches (below 4 m) and maintaining these hollows is highly recommended. Dead trees (stags) should be cut to 4 m at minimum wherever possible. Where higher value trees (large and/or hollow trees, particularly the large stags near the Murray River) are far enough from the lines that they are unlikely to present a hazard, they should be pruned to above 4 m if possible. This should be further examined during detailed design and planning of works, with arborist advice where required.
- Fencing off and avoiding clearing of specific vegetation within the pole removal and installation areas where possible (e.g. to avoid threatened flora)
- Reducing the overall size of the pole removal and installation areas where possible to minimise clearing (noting that these areas have already been reduced from early designs)
- Arborist assessment of trees outside of the pole removal and installation areas which will have their TPZ impacted by >10%. Any tree just outside the footprint may be able to be retained based on the outcome of an arborist assessment. This should be prioritised for large and/or hollow-bearing trees. The have been assumed lost in this assessment for calculation of offsets.

Arborist assessment of trees outside the proposal footprint can also be considered for any tree lopping required along access tracks or other trees outside of the proposal footprint which may by impacted by pruning. This should be prioritised for large and/or hollow-bearing trees. It is currently assumed that no trees along access tracks or outside of the impact area will need to be pruned by more than 1/3 of their canopy and as such they are assumed to be retained (not counted toward offset losses).

With the exception of the further considerations noted above, no other feasible opportunities are considered to exist at this stage to further avoid and minimise impacts on native vegetation without undermining the key objectives of the project.

5.2 STANDARD CONTROLS AND PROCEDURES

During and after construction, the mitigation process is typically managed through a 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.

Contractors are required to undertake monitoring and audits for construction activities, including works undertaken by subcontractors employed on their behalf, to verify compliance with the contract Specification and their EMP. The contractors will develop a CEMP that will include standard flora and fauna mitigation measures.

It is highly recommended that all construction personnel attend a project-specific induction prior to commencing site work. The inductions should include relevant information about the ecological sensitivities of the proposal footprint, the surrounding Kings Billabong Park, the Murray River, and the appropriate management measures to be implemented. Adequate briefing and induction of construction crews will help to ensure that environmental values are given due consideration during construction.

5.3 GENERAL MITIGATION MEASURES

The following sections outline strategies to mitigate ecological impacts during and after proposed works, and which should be incorporated into the CEMP. Further and more specific prescriptions and details for these activities should be included in the CEMP.

5.3.1 MINIMISING LOSS OF VEGETATION, HABITAT AND CONNECTIVITY

5.3.1.1 MINIMISING DAMAGE TO TREES

To prevent detrimental impacts on trees, the Australian Standard for protection of trees on development sites (AS4970-2009) (Standards Australia 2009) and the Australian Standard for pruning of amenity trees (AS4373-2007) (Standards Australia 2007) should be followed during construction.

Trenching and drilling works within TPZs of trees which have been assessed as retained should be avoided, however an encroachment of up to 10% of the TPZ without the need for an arborist assessment of the tree's future viability is permitted, as per *Defining an acceptable distance for tree retention during construction works* (DSE 2011). If the works are to impact more than 10% of a TPZ and/or are within the Structural Root Zone (SRZ) of a tree, an arborist can conduct a root investigation to determine if the tree will remain viable. Otherwise the tree will be considered 'lost' for purposes of the *Guidelines 2017* (DELWP 2017c; DEPI 2013) and will likely need to be offset. Should an arborist assessment be undertaken, some of these trees may be able to be retained.

Re-use of felled timber should be prioritised as per the timber re-use guidelines in Section 5.3.5.1.

Also refer to further measures to minimise tree and habitat loss in Section 5.1.3.

5.3.1.2 VEGETATION RETENTION AND PROTECTION (NO-GO ZONE MANAGEMENT)

Construction areas should be clearly demarcated to avoid any inadvertent or unapproved clearing or damage to areas identified as no-go zones or TPZs. Vegetation to be retained surrounding the construction areas should be clearly defined and protected on site via the following steps below. An important part of the vegetation retention management will be through implementation of no-go zones. See categories described in Table 5.1.

Table 5.1 No-Go Zone and work area categories for all ecological values

NO-GO ZONES AND WORK AREA	DESCRIPTION	MINIMUM REQUIREMENTS
Type 1	— Vegetation and fauna habitat is of high retention value outside work area — Vegetation and fauna habitat must be retained. — This vegetation and fauna habitat has not been offset, and clearance of vegetation and fauna habitat is not covered by permits.	— No unauthorised access. — Trees, shrubs, ground storey vegetation and fauna habitat must all be retained within these areas. — Fencing is to remain in place for the duration of the construction period. — No-Go Zone Type 1 signage is required on the fencing. — No-Go Zones are to be marked on all site maps and construction drawings. — Bunting or ‘flag on a rope’ strung between star pickets to be used as the temporary fence — Where adjacent to forested park areas, a temporary fence on the 'contact face' area (i.e. not a complete enclosed fence) will be sufficient.
Type 2	— Vegetation and fauna habitat is of high retention value outside work area — Vegetation and fauna habitat must be retained, except for vegetation with growth height greater than 4 metres. — Partial clearence of this vegetation and fauna habitat has been offset.	— Access to be supervised by a suitably-qualified ecologist or environmental advisor permitted for limited works only (e.g. clearing of vegetation with growth height greater than 4 metres and protection of vegetation during stringing). — Trees, shrubs, ground storey vegetation and fauna habitat must all be retained within these areas, except for vegetation with growth height greater than 4 metres. — Fencing is to remain in place for the duration of the construction period to delineate this area. — No-Go Zone Type 2 signage is required on the fencing. — No-Go Zones are to be marked on all site maps and construction drawings. — Bunting or ‘flag on a rope’ strung between star pickets to be used as temporary fence — Where adjacent to forested park areas, a temporary fence on the 'contact face' area (i.e. not a complete enclosed fence) will be sufficient.
Work area or go zone	Full clearance allowed in this area Vegetation and fauna habitat has been offset, and clearance of vegetation and fauna habitat is covered by permits.	— Access by general contractor staff — General access for vegetation removal — This zone will not need no-go zone fencing as all areas to be retained in no-go zones 1 and 2 above will have fencing

More descriptions of no-go zones are described below:

- Mark no-go zones on all site maps and construction drawings as per no-go zone maps in Appendix A.
- Install temporary fencing to protect vegetation that is to be retained (no-go zones) as required, to ensure they are well-defined visually in the field. Fencing and signage for all no-go zones should be erected before any works with potential to impact vegetation commence. For no-go zones adjacent to forested park, a temporary fence on the 'contact face' area (i.e. not a complete enclosed fence) will be sufficient. Fencing should remain in place for the duration of the construction period, unless TransGrid authorises that fencing can be removed, but only after construction activities in the vicinity have been completed.
- When fencing the no-go zones, ensure that fencing includes the TPZs of trees to be retained where applicable. The TPZ is defined for standing trees and stags (dead but upright trees) as follows:
    - Live trees: an area around the trunk of the tree which has a radius of 12 x the diameter at breast height (to a maximum of 15 m but no less than 2 m in diameter) and/or an area sufficient to protect the Structural Root Zone as identified in consultation with an arborist.
    - Dead (stag) trees: an area around the trunk of the tree which has a radius of 15 metres from the base (DELWP 2015).
- Clearly mark TPZ fencing around any isolated trees to be retained to ensure they are not damaged during construction.
- Brief contractors regarding the protection of vegetation, the location of no-go zones and their applicable restrictions, and the purpose of avoidance and minimisation of impacts.
- Attach temporary signage to the fencing identifying areas as environmentally sensitive stating. The signage should include the type of no-go zone and the applicable access restrictions. For no-go zone type 1, no access is permitted. For no-go zone type 2, access which is supervised by a suitably-qualified ecologist or environmental advisor would be permitted for limited works only (e.g. protection of vegetation during re-stringing).
- Consider any other recommendations to avoid impacts on retained vegetation, outlined by the consultant arborist.

These recommendations should be included in a CEMP, developed prior to construction taking place.

5.3.2 MINIMISING FAUNA INJURY AND MORTALITY

The following guidelines should be followed to minimise harm to fauna during construction:

- Clearing should occur outside of the spring breeding season for most woodland birds (if possible). The period which should be avoided if possible is August to November inclusive. Future vegetation maintenance of the transmission line corridor should occur outside of this period.
- A two-staged clearing process should be implemented for the proposal, whereby non-hollow bearing or nest trees and other vegetation are cleared first, with habitat trees cleared the following day. Trees with hollows/nests with dependant young should be left until the young fledge, where possible.
- If possible, pits and trenches should be well-covered or filled in each day to prevent reptiles, mammals and frogs being trapped with a ramp placed in trench to allow escape. If left overnight, trenches should be checked in the morning prior to the start of works to identify trapped animals. Trapped animals should be removed before works commence through the placement of a ramp to allow animals to escape by themselves, or removed by a qualified wildlife ecologist.

- A suitably qualified and licenced wildlife ecologist should be engaged to:
    - confirm mapping of and mark habitat trees and inspect for fauna in hollows or nests prior to removal using binoculars and a pole-mounted camera.
    - supervise clearing of (at minimum) habitat tree/shrub (stage 2) removal
    - salvage and relocate any animals disturbed during the works to nearby habitat outside of the proposal footprint
    - take any injured fauna identified during staged clearing to a vet or wildlife carer.

These recommendations should be further developed prior to construction taking place and detailed in the CEMP.

5.3.3 MINIMISING HABITAT DEGRADATION FROM DISTURBANCE

Standard controls should be implemented to minimise disturbance to wildlife during construction. This will include limiting night works and construction lighting as much as practicable. Where lighting is required, it should be directed away from native vegetation, particularly habitat trees, where possible. Vehicles, plant and personnel should keep to the proposal footprint and outside of no-go zones.

5.3.4 MINIMISING PHYSICAL HABITAT DEGRADATION

5.3.4.1 WEED AND DISEASE MANAGEMENT

To ensure weeds and diseases are not brought onto work sites, or existing weeds and diseases are not spread to other sites, a contractor environmental hygiene manual should be prepared outlining the necessary actions required to minimise 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
- Locating wash-down areas off-site
- Specifications for any fill or movement of earth
- Minimise areas of disturbed ground which could be colonised by weeds, particularly near riparian zones (note: use of a cover crop is not recommended at the study area although seeding with species from the appropriate EVC may be beneficial)
- Conduct follow-up weed control within and adjacent to the proposal footprint following completion of construction works.

The environmental hygiene measures should be included in a CEMP, developed prior to construction taking place. The CEMP should include monitoring and reporting on weed and disease management measures as well as follow-up survey and control of weeds (should control be required).

Contractors or other workers undertaking transmission corridor maintenance should also follow hygiene guidelines, which should include ensuring that all machinery and vehicles are free of weed propagules and/or material carrying potential diseases prior to commencement of maintenance work. Maintenance work should also minimise ground disturbance and any off-track access of vegetation by vehicles or machinery.

5.3.4.2 SEDIMENTATION PREVENTION

Indirect impacts to habitat degradation can also occur from sediment-laden run-off and other pollutants entering nearby waterways during the clearing and construction phase of the proposal. Avoiding this is crucial due to the proximity of the Murray River and the Kings Billabong Wetlands. This assessment report has assumed that no impacts on the Murray River will occur, including from sedimentation.

Clause 42 of the State Environment Protection Policy (SEPP) (Waters) requires that construction works be managed to minimise the risks to beneficial uses including risks from dewatering, land disturbance, soil erosion or the discharge of sediments and other pollutants to waters. While vegetation provides the most effective form of erosion control, interim

measures may be required throughout the study area. These should be in line with the Victoria EPA Principals of Best Practice Guidelines, such as Environmental Guidelines for Major Construction Sites (Environmental Protection Agency 1996) and Construction Techniques for Sediment Pollution Control (Environmental Protection Agency 1991). These Best Practice Guidelines include, but are not limited to, the following measures:

- limiting machinery and earthworks to construction areas only
- limiting the exposure of disturbed soil for the shortest possible time
- diverting water away from exposed soil or loose material
- applying rock armouring on access tracks to prevent sediment loss
- applying temporary silt trapping techniques
- retaining the natural drainage lines of the site as much as possible.

These recommendations should be included in a CEMP, developed prior to construction taking place. Avoiding works in proximity to the Murray River will be essential. This should include use of tracks along the river edge for vehicles and construction machinery.

5.3.4.3 MINIMISING LITTER

Impacts to the ecological value of an environment from litter can be minimised through the implementation of a waste management plan. This should include providing waste and recycling bins at all construction sites and break areas as well as minimising waste from construction materials. All waste management plans should be included in the proposal CEMP.

5.3.5 REHABILITATION

It is recommended that rehabilitation of areas temporarily disturbed/impacted during construction is undertaken using with local native (indigenous) species only. If required in higher risk areas for sedimentation/erosion, a sterile cover crop could be used for temporary risk reduction. Where possible, natural regeneration should be permitted to occur, with follow-up weed control where required.

As access tracks for construction are proposed to be graded and improved, there are likely to be additional 4WD tracks that are no longer needed. The closure and revegetation/rehabilitation of these redundant tracks within the proposal footprint or wider proposal study area should be considered to benefit threatened flora and native vegetation.

5.3.5.1 TIMBER RE-USE

A ‘Better Best Practice Note’ by Loci Environment and Place (Loci Environment 2017) outlines a hierarchy of re-use for timber that is felled for development projects. Once it has been determined that a tree must be removed, the re-use hierarchy is:

1. habitat logs [refer below]
2. milling
3. commercial woodchip [refer below]
4. arborist woodchip [refer below]
5. sawdust.

With regard to habitat logs, both arboreal and terrestrial use should be considered. For trees being removed that contain hollows, the section of the tree containing the hollow can be removed and reinstalled in trees outside the proposal footprint to increase the habitat value of another patch of vegetation. Due to past clearing of large trees in the area, hollows are extremely valuable, particularly medium to large-sized hollows, and a hollow replacement strategy is recommended to re-use hollows felled on site. A ratio of hollow replacement should be considered (e.g. 1:1 replacement of installed hollows to hollows being removed, or two hollows replaced per hollow-bearing tree removed).

Similarly, due to past removal of fallen timber for firewood etc, logs, particularly large logs, are rare in the landscape. Careful distribution of habitat logs should occur. This should be prioritised away from tracks or behind bollards and

fencing to minimise theft risk, and be conducted in a way that minimises disturbance of understorey vegetation such as using light vehicles and not dragging logs for long distances.

Woodchips should not be spread outside of the construction footprint or within no-go zones. The native vegetation and significant flora present may be smothered by woodchips, and they may benefit weeds which prefer higher organic material in soils. The exception to this is where there are compacted or cleared areas such as old tracks where spreading of woodchips may assist rehabilitation and would not smother any native flora.

5.4 MITIGATION SUMMARY

Table 5.2 provides a summary of the mitigation recommendations in this assessment, and provides the ecological values targeted by each measure.

Table 5.2 Summary of mitigation measures

PROJECT PHASE	ECOLOGICAL VALUE/S	MITIGATION MEASURE	FURTHER DETAIL
Pre-construction	All, including threatened flora, fauna habitat, and native vegetation	Incorporate the project no-go zones into the CEMP and detail clear restrictions on access for each type. No-go zones are described and shown in 5.3.1.2.	5.1.3
Pre-construction	Fauna habitat and native vegetation	Arborist assessment where required, at minimum assessing significant trees on the edge of the proposal footprint.	5.1.3
Pre-construction	Threatened flora, native vegetation and threatened fauna	Investigate measures to further minimise impacts including maintaining some hollow trees within the transmission line corridor as tall as possible, no-go zones within full clearance areas significant flora, and further reduction of full-clearance areas.	5.1.3
Clearing/construction	All ecological values	Project-specific induction for ecological values.	5.2
Clearing/construction	Threatened flora, native vegetation	Fence and sign no-go zones as required and include in briefings. Ensure no accidental damage, access, parking etc in these areas. Suitably-qualified ecologist or environmental advisor to supervise access in type 2 no-go zones.	5.3.1.2 5.1.3
Clearing/construction	Threatened fauna including Lace Monitor, non-listed fauna such as Eastern Grey Kangaroo	Ensure construction and no-go zone fencing allows for movement of fauna across the site.	5.3.1.2

PROJECT PHASE	ECOLOGICAL VALUE/S	MITIGATION MEASURE	FURTHER DETAIL
Clearing/construction	Threatened fauna	Re-use of timber as per the re-use hierarchy including use of timber for habitat, consider a hollow replacement strategy, avoid spreading woodchips in any retained native vegetation, take care when placing habitat logs to minimise ground disturbance and theft risk.	5.3.5.1
Clearing/construction	Threatened fauna and non-listed fauna	Avoid clearing during the spring breeding season for most woodland birds (August-November inclusive) if possible.	5.3.2
Maintenance	Threatened fauna and non-listed fauna	Where practical, avoid future vegetation maintenance works for the transmission line corridor within the spring breeding season for most woodland birds (August-November inclusive).	5.3.2
Clearing/construction	Threatened fauna and non-listed fauna	Two-stage clearing	5.3.2
Clearing/construction	Threatened fauna and non-listed fauna	Trench management to minimise entrapment and injury/death	5.3.2
Clearing/construction	Threatened fauna and non-listed fauna	Qualified and licenced ecologist to conduct pre-clearing survey, supervise clearing of habitat and relocate/salvage fauna	5.3.2
Clearing/construction	Threatened fauna and non-listed fauna	Minimise construction lighting and direct away from native vegetation where possible, particularly habitat trees.	5.3.3
Clearing/construction and rehabilitation	Threatened flora, native vegetation	Prepare and follow a hygiene procedure to minimise weed and disease incursion and spread, to include measures in 5.2.4.1.	5.3.4.1
Maintenance	Threatened flora, native vegetation	Ensure future maintenance is completed in accordance with hygiene guidelines, including ensuring cleanliness of machinery and vehicles and minimising ground disturbance.	5.3.4.1

PROJECT PHASE	ECOLOGICAL VALUE/S	MITIGATION MEASURE	FURTHER DETAIL
Clearing/construction	Threatened fauna	Management of sediment-laden run off and other pollutants to avoid impacts on the Murray River and the Kings Billabong Wetlands, as well as other native vegetation	5.3.4.2
Clearing/construction	General vegetation and habitat quality	Waste management plan to minimise litter	5.3.4.3
Rehabilitation	Threatened flora	Rehabilitation undertaken using with local native (indigenous) species only, or if required in higher risk areas for erosion/sedimentation, a sterile cover crop could be used. Allow natural regeneration/recolonisation where possible.	5.3.5
Rehabilitation	Threatened flora	Consider the closure and revegetation of redundant tracks within the proposal footprint or wider study area.	5.3.5

6 LEGISLATION AND POLICY

This section addresses any permits, approvals, management plans and offset requirements that may be required for the proposal under federal, State and local government environmental legislation.

6.1 COMMONWEALTH

6.1.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (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' (Department of the Environment 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 the Environment and Energy (DAWE). This 'referral' is then released to the public for comment.

Two MNES are relevant to the proposal: 'listed threatened species and ecological communities' and 'migratory species'.

6.1.1.1 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE SUMMARY

Based on the likelihood of occurrence and significant impact assessments summarised in Table 6.1 below, it is considered unlikely that the proposal (Victorian component alone) would have a 'significant impact' on any MNES. This table includes species and communities which were preliminarily (prior to field survey) considered to have the potential to occur in the proposal study area.

Table 6.1 Summary of assessment for MNES

MATTER OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)	SUMMARY OF PREFERRED HABITAT	LIKELIHOOD OF OCCURRENCE AND IMPACT
Ecological Communities		
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Encompasses a number of woodland communities where Buloke *Allocasuraina luehmanii* is the dominant or co-dominant tree species. Found within the Riverina and Murray Darling Depression Bioregions and from north east South Australia, north west and central north Victoria into NSW.	Does not occur within study area as no Buloke was recorded.
Flora		
-	-	No EPBC Act listed flora species were recorded or are considered to have a moderate or higher likelihood of occurring within the study area.
Fauna		
Litoria raniformis Growling Grass Frog	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.	10 records within 10 km of the study area, most recently in 1999. The study area does not currently support suitable habitat for this species. There is no wetland habitat and nearby modelled wetland EVCs are dry. Further, recent records are lacking in the area and the site is at the northern extent of the species' distribution. Unless the area has substantial rain events, the species is not likely to occur or move through the study area. **Low likelihood of occurrence** **Significant impact unlikely, detailed assessment not required**

MATTER OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)	SUMMARY OF PREFERRED HABITAT	LIKELIHOOD OF OCCURRENCE AND IMPACT
Nyctophilus corbeni Corben's Long-eared Bat	In Victoria, species occurs in the north -west, within the Murray Darling Basin. It occupies a range of inland woodland vegetation types including box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee.	A single *Nyctophilus* call was identified during targeted surveys, however this is more likely to be the more common *N. geoffroyi*. Further research and advice from experts has indicated that the species prefers mallee and bulloke-dominated vegetation and unlikely to occur in Black Box woodland along the Murray River. As such, the likelihood of this species occurring has been revised to low. **Low likelihood of occurrence** **Detailed assessment not required**
Polytelis anthopeplus monarchoides Regent Parrot (eastern subspecies)	Primarily inhabits riparian or littoral River Red Gum forests or woodlands and adjacent Black Box woodlands. Nearby open Mallee woodland or shrubland, usually with a ground cover of spinifex or other grasses, supporting various eucalypts, as well as Belah, Buloke or Slender Cypress Pine also provide important habitat for this species. They often occur in farmland, especially if the farmland supports remnant patches of woodland along roadsides or in paddocks. It seldom occurs in more extensively cleared areas.	Species not recorded during surveys and considered unlikely to breed within study area. Loss of some potential foraging habitat only. **Significant impact assessment provided in Appendix E. Significant impact unlikely.**
Apus pacificus Fork-tailed Swift	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.	Mostly aerial species which is unlikely to be affected by the proposal. **Detailed impact assessment not warranted, significant impact unlikely**

MATTER OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)	SUMMARY OF PREFERRED HABITAT	LIKELIHOOD OF OCCURRENCE AND IMPACT
Calidris acuminata Sharp-tailed Sandpiper	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland.	May periodically occur if saltmarsh areas are inundated however this marginal habitat is unlikely to be of significance to the species and minor impacts in this area are proposed only. **Detailed impact assessment not warranted, significant impact unlikely**

6.2 STATE

6.2.1 NATIONAL PARKS ACT 1975

The proposal study area is located within Kings Billabong Park which is managed by Parks Victoria under Schedule Three ('other parks') of the *National Parks Act 1975*. Among other things, this requires Parks Victoria to preserve, protect and re-establish indigenous flora and fauna in the park.

Under the Act, the Minister can make management agreement with various authorities within a Schedule Three park, including electricity companies. TransGrid will be required to seek an amendment to the existing agreement for the use of land within Kings Billabong Park to the extent required by the proposal. According to the Act, the agreement must contain provisions with respect to the protection and conservation of the land subject to the agreement.

6.2.2 ENVIRONMENT EFFECTS ACT 1978

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 6.2 (individual criteria – one triggers referral of the project) and Table 6.3 (combined criteria – two or more triggers referral of the project).

Due to the level of native vegetation clearance (6.576 ha), and level of impacts on recorded or likely present threatened species or communities, it is unlikely an Environment Effects Statement would be required as a result of proposed biodiversity-related impacts. An Environment Effects Statement referral is not currently recommended for the proposal based on ecological triggers.

Table 6.2 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.	**Criteria not met** Although the proposed clearing is not authorised under an approved Forest Management Plan or Fire Protection Plan, there are no endangered EVCs proposed for removal, as shown in Table 4.5. Based on the current estimates, 6.576 ha are proposed for removal, of which these EVCs are comprised of mostly 'least concern' or 'depleted' Bioregional Conservation Status (BCS) with one 'vulnerable' BCS EVCs. The rating of 'very high conservation significance' is from the previous native vegetation policy Victoria's Native Vegetation Management Framework ('the Framework') which ceased in 2013. Based on the definition of 'very high conservation significance' in the Framework, it is possible that part of the study area would be classified as such, due to it supporting the 'best 50% of habitat for a threatened species in a Victorian Bioregion'. The only species for which this is considered likely is Spreading Saltbush *Atriplex limbata* which covers approximately 1.5 ha of the study area and approximately 0.2 ha of the impact area. None of the other attributes for 'very high conservation significance' vegetation would be triggered. As such, the clearing of vegetation of 'very high conservation significance' defined in accordance with the framework would be well below 10 ha.

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.	**Criteria not met** Targeted surveys identified the presence of a number of threatened and rare flora in the study area. The only areas requiring groundcover/understorey clearance during construction are the tower removal locations, laydown areas/crane pads, and the tower construction locations, and all but the pole construction locations and tracks will be restored and allowed to recolonise post-works. Residual impacts on threatened flora are expected to be minor with regard to the remaining habitat for these species in Victoria. Although there are several listed fauna species likely to occur in the proposal study area, loss of a significant proportion of habitat for any species is not proposed. For *Atriplex limbata*, the species of arguably highest concern at the study area, of the 551 plants recorded in the study area, 335 are located outside of the impact area and will not be impacted, 201 are located in the partial clearing areas, and 15 are located within the full clearing areas. With the proposed clearing methods in the partial clearing areas, the 201 plants are expected to persist with minimal if any impacts and habitat is expected to remain long term for this species. Based on these proposed impacts this species is considered unlikely to be significantly impacted by the proposal or suffer a 'long term loss of a significant proportion of available remaining habitat in Victoria'. No other rare or threatened species are considered likely to be significantly impacted or suffer substantial habitat loss which might trigger the requirement for an EES referral.
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'.	**Criteria not met** Hattah-Kulkyne Lakes is the closest Ramsar wetland at around 50 kms to the SE of the proposal. However, Kings Billabong Wetlands is listed as a nationally important wetland on the Directory of Important Wetlands in Australia. Although part of this wetland occurs close to the proposal study area (refer to map in Appendix A3), impacts on this wetland will be avoided. The access track to the site technically crosses part of the wetland, however in this location the mapping of the wetland is not correct – this area is Riverine Chenopod Woodland EVC. No direct impacts on the wetland will occur and indirect impact will be minor and temporary, primarily associated with increased noise from the increased use of the access track.
Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.	**Criteria not met** The proposal is unlikely to have substantial long-term aquatic impacts as all works will occur on land. Any works near waterways will have standard construction controls to minimise any impacts such as sediment-laden run-off. Ground disturbance will be minimised near the Murray River.

INDIVIDUAL CRITERIA	RATIONALE
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 applicable**
Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.	**Not applicable**

Table 6.3 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.	**Criteria not met** Clearing of 2.010 ha and partial clearing (vegetation with growth potential of over 4 m only) of 4.566 ha of native vegetation is proposed, giving a total of 6.576 ha. Minor changes to this total are possible as the footprint is refined and TPZ impacts are calculated, however the proposal is highly unlikely to meet this trigger.
Matters listed under the Flora and Fauna Guarantee Act 1988 (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 significant effects on habitat values of a wetland supporting migratory bird species.	**Criteria not met** No FFG Act listed ecological communities occur within the study area. Although there are several flora species listed under the FFG Act found within the study area, impacts are being minimised such that the only areas requiring groundcover/understorey clearance during construction are the tower removal locations and the pole construction locations. A large proportion of these areas will be restored and allowed to recolonise post-works. Loss of a genetically important population of any listed species is preliminarily not anticipated as most of these species are widespread in the area. Although there are several listed fauna species likely to occur in the proposal study area, given the scale of works and proposed clearing and construction methods, the proposal is highly unlikely to result in loss of a genetically important population of a listed species. There is no critical habitat determined in Victoria under the FFG Act within the study area or at all in Victoria. There will be no loss of, or impacts to, wetland habitat or migratory birds. Although there is a nearby listed Important Wetland within Kings Billabong Park, the major works will occur at a sufficient distance that no direct or indirect effects are anticipated, with only access occurring on an existing track near the mapped wetland. No impacts on migratory bird flight are anticipated. Wetland birds were only observed flying well above the existing tower heights during survey.

COMBINED CRITERIA	RATIONALE
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 applicable** Covered by land reserved under the *National Parks Act 1975* however landscape values are not included in the assessment of ecological values.
Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term.	**Not applicable**
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 applicable**
Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities.	**Not applicable**
Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development.	**Not applicable**
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 applicable**
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 applicable**
Potential extensive or major effects on Aboriginal cultural heritage.	**Refer to cultural heritage report**
Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.	**Refer to cultural heritage report**

6.2.3 FLORA AND FAUNA GUARANTEE ACT 1988

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. 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.

Under the FFG Act, a permit from DELWP is also required to 'take' (to kill, injure, disturb or collect) listed 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.

6.2.3.1 THE FLORA AND FAUNA GUARANTEE AMENDMENT ACT 2019

In August 2019, the Victorian Parliament passed changes to amend the FFG Act to provide for a modern and strengthened framework for the protection of Victoria's biodiversity. The amendments took effect on 1 June 2020, with further changes under the Act yet to be enacted. Key changes to the Act relevant to the project include changes to the Protected Flora list and the Threatened List and 'public authority duty'.

There is now an obligation on public authorities to consider potential biodiversity impacts when exercising their functions (set out in new section 4B). The types of potential impacts on biodiversity that should be considered are also specified, these include: long and short term impacts, detrimental and beneficial impacts, direct and indirect impacts, cumulative impacts and potentially threatening processes. Potential impacts have been addressed in Section 4 of this report. Transgrid will be seeking public authority status prior to construction.

The changes to the Protected Flora list and the Threatened List includes the Conservation Status Assessment Project. This project has been underway for over a decade and will be enacted through the FFG Act reforms. The aim of this project is "to deliver a Single Operational List of threatened species in accordance with the Common Assessment Method (CAM) Memorandum of Understanding". Previoulsy there were three lists (EPBC Act, FFG Act and Victorian Advisory Lists) with many inconsistencies. The assessment process is based on International Union for Conservation of Nature (IUCN) guidelines which uses five criteria to evaluate if a taxon belongs in a threatened category (e.g. Endangered, Vulnerable etc). The new FFG Act Threatened List was gazetted in late May 2021 and updated on the DELWP website on 16 July 2021.

A permit under the FFG Act will be required for the following FFG Act listed and/or protected species:

Protected Flora (non-threatened):

- Willow Wattle *Acacia salicina*
- Flannel Cudweed *Actinobole uliginosum*
- Variable Daisy *Brachyscome ciliaris*
- Hard-head Daisy *Brachyscome lineariloba*
- Tangled Burr-daisy *Calotis erinacea*
- Hairy Burr-daisy *Calotis hispidula*
- Common Sneezeweed *Centipeda cunninghamii*
- Common Cotula *Cotula australis*
- Pimelea Daisy-bush *Olearia pimeleoides*
- Musk Sunray *Rhodanthe moschata*
- Slender Groundsel *Senecio glossanthus s.l.*
- Variable Groundsel *Senecio pinnatifolius*
- Tall Fireweed *Senecio runciinifolius*
- Fuzzy New Holland Daisy *Vittadinia cuneata var. cuneata*
- Woolly New Holland Daisy *Vittadinia gracilis*
- New Holland Daisy *Vittadinia spp.*

Protected Flora (Threatened List – includes previous and newly listed species):

- Twin-leaf Bedstraw *Asperula gemella*
- Spreading Saltbush *Atriplex limbata*

- Silver Saltbush *Atriplex rhagodioides*
- Blue Burr-daisy *Calotis cuneifolia*
- Purple Love-grass *Eragrostis lacunaria*
- Bristly Love-grass *Eragrostis setifolia*
- Spotted Emu-bush *Eremophila maculata* subsp. *maculata*
- Goat Head *Malacocera tricornis*
- Smooth Minuria *Minuria integerrima*
- Scrambling Twinleaf *Roepera angustifolia*
- Sarcozona *Sarcozona praecox*
- Small-leaf Swainson-pea *Swainsona microphylla*

6.2.4 PLANNING AND ENVIRONMENT ACT 1987 AND THE GUIDELINES FOR THE REMOVAL, DESTRUCTION OR LOPPING OF NATIVE VEGETATION

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

6.2.4.1 ASSESSMENT PATHWAY AND PERMIT REQUIREMENTS

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 for a planning permit 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 6.4. As the proposal will require clearance of over 0.5 ha of native vegetation and is within Location 3, the Detailed assessment pathway is applicable to this proposal.

Table 6.4 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).

Table 6.5 Permit application requirements

REQUIREMENT	ADDRESSED
All assessment pathways	
The assessment pathway and reason for the assessment pathway. This includes the location category of the native vegetation to be removed.	Addressed in text above table (Section 6.2.4.1).
A description of the native vegetation to be removed, accounted for as per the Guidelines.	Detailed descriptions of the native vegetation present (including the vegetation proposed to be removed, are provided in Sections 3.2.2 and 3.2.2.1
Maps showing the native vegetation and property in context and vegetation to be removed as accounted for by the Guidelines.	Appendix A
The offset requirement, determined in accordance with the Guidelines.	Provided after this table (Section 6.2.4.2)
Topographic and land information relating to the native vegetation to be removed	Section 3.2.1
Recent, dated photographs of the native vegetation to be removed.	Section 3.2.2
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
An avoid and minimise statement. The statement describes any efforts to avoid the removal of, and minimise the impacts on, the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	This is addressed in Section 5.1.
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	Section 6.2.4.4

REQUIREMENT	ADDRESSED
Detailed assessment pathway only	
A habitat hectare assessment is required for detailed pathway applications where site assessed site-condition scores are used to account for vegetation losses, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status.	Appendix F1
The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches	Appendix A2 & Appendix F2
The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	N/A No Scattered Trees are present in the study area.
Information regarding habitat for and impacts on rare and threatened species is also required where species offsets are triggered or impact areas intersect with habitat importance mapping.	Impacts on rare and threatened species known to occur in the study area are assessed in Section 4. Species unlikely to occur but for which offsets have been triggered have been assessed under an Alternative Arrangement and a request has been sent to DELWP's Native Vegetation Support Team on 1/03/2021.

6.2.4.2 NATIVE VEGETATION REMOVAL REPORT AND OFFSET REQUIREMENTS

A Native Vegetation Removal (NVR) report has been sourced from DELWP using the current proposal footprint to inform potential offset requirements. The impact calculations include TPZ impacts and canopies of trees on the edge of the impact footprint. It is currently assumed that no trees along access tracks or outside of the impact area will need to be pruned by more than 1/3 of their canopy and, as such, they are assumed to be retained (not counted toward offset losses). Arborist advice should be sought for any changes or alterations to this assumption. The NVR report results are presented in Table 6.6 below and the full NVR report is attached as Appendix G.

Table 6.6 Summarised vegetation clearance calculations and offset requirements

VEGETATION CLEARANCE	
Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	5.419 ha
Extent of past removal	0 ha
Extent of proposed removal	5.419 ha
No. Large trees proposed to be removed	18
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.

OFFSET REQUIREMENTS (IF PERMIT WAS GRANTED)	
General offset amount	0.044 general habitat units
Vicinity	Mallee Catchment Management Authority (CMA) or Mildura Rural City Council
Minimum strategic biodiversity value score	0.602
Large trees[^]	18 large trees
Species offset units	2.882 species units of habitat for Slender Love-grass, *Eragrostis exigua* 4.891 species units of habitat for Spotted Bowerbird, *Ptilonorhynchus maculatus* – no longer required – see Section 6.2.4.3 below. 2.735 species units of habitat for Low Hibiscus, *Hibiscus brachysiphonius* 4.443 species units of habitat for Lagoon Nightshade, *Solanum lacunarium* 4.442 species units of habitat for Native Madder, *Synaptantha tillaeacea* var. *tillaeacea*

[^] The total number of large trees that the offset must protect is 18 large trees to be protected in either the general, species or combination across all habitat units protected - Source: NVR report dated 14/02/21

6.2.4.3 ALTERNATIVE ARRANGEMENT FOR OFFSET REQUIREMENTS

On 1 March 2021, WSP wrote to DELWP requesting an Alternative Arrangement for the project's offset requirements in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) and *Assessors Handbook - Applications to remove, destroy or lop native vegetation* (DELWP 2018). The request sought permission to remove the modelled habitat (either in partial or full) of five threatened species from consideration in the assessment due to lack of suitable habitat and previous records at the project site, thus also removing their offset obligations.

DELWP reviewed the request and provided a response on 16 March 2021. The NVR team did not support the proposed exclusion of modelled habitat for Slender Love-grass, Low Hibiscus, Lagoon Nightshade or Native Madder because habitat characteristics at the project site were not deemed to be clearly inconsistent with the habitat requirements of the species. However, the NVR team did support the proposed exclusion of modelled habitat for Spotted Bowerbird because the species is considered regionally extinct. The Secretary of DELWP formally approved exclusion of Spotted Bowerbird modelled habitat for this project on 20 May 2021.

6.2.4.4 OFFSET STATEMENT

The state offset targets will be purchased from a third-party offset credit supplier registered on the DELWP Native Vegetation Credit Register and transferred to the project with an Allocated Credit Extract secured to the Planning Permit. Offsets are to be secured *prior* to the clearance of any native vegetation on site.

In early December 2020, WSP sent requests to all registered offset brokers on the DELWP Native Vegetation Credit Register. Three brokers had potential sites which were investigated in further detail. WSP are currently working with an offset provider who has a site in Cowra with more than adequate amount of all remaining required offset credits. A Memorandum of Understanding (MoU) is currently underway to secure the potential offset site whilst the site undergoes assessment and registration with DELWP's Native Vegetation Credit Register as a new offset site.

6.2.5 WILDLIFE ACT 1975

The *Wildlife Act 1975* is the primary legislation in Victoria for the protection of wildlife. The Act requires that wildlife research (i.e. fauna salvage and relocation) is regulated through a permit system, which is managed by DELWP.

Authorisation for fauna removal/relocation must be obtained under the *Wildlife Act 1975* through a licence granted by DELWP. 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*. Due to the large number of hollows present at the site and the anticipated clearance of approximately 50 hollow-bearing trees, fauna salvage will be required.

6.2.6 CATCHMENT AND LAND PROTECTION ACT 1994

6.2.6.1 DECLARED NOXIOUS WEEDS

The study area supports a number of weeds that are declared noxious under the *Catchment and Land Protection Act 1994* (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 CaLP Act weeds recorded in the proposal study area are listed in Section 3.2.4.3. The landholder must take all reasonable measures to prevent their spread and control these weed species. In their stead, the contractor should do this both during and after construction.

6.3 LOCAL – MILDURA PLANNING SCHEME

6.3.1 MILDURA PLANNING SCHEME

The *Planning and Environment Act 1987* provides the legal framework for the operation of Victoria's planning system which is commonly referred to as *the Planning Scheme*. Sections of the Mildura Planning Scheme of relevance to ecological matters are discussed below.

6.3.1.1 ZONING

The proposal study area is mostly zoned as Public Conservation and Resource Zone (PCRZ). The proposal footprint is located within this are. At the southern end on the substation land (i.e. not within Kings Billabong Park, although this includes some areas outside the substation fence) the land is zoned Special Use Zone - Schedule 5 (SUZ5).

Most of the study area is subject an Environmental Significance overlay (ESO1), discussed below.

For more information, refer to the planning report for the proposal (WSP 2021).

6.3.1.2 ENVIRONMENTAL SIGNIFICANCE OVERLAY

Schedule 1 to the Environmental Significance Overlay (ESO1) applies to most of the study area, except for the existing developed section of the substation. This overlay is to protect the Murray River Corridor and affects the land subject to the Land Subject to Inundation Overlay (LSIO) or 100 metres from the Murray River, whichever is the greater extent.

Within the ESO1, a permit to remove native vegetation is not required for public works including roads and water authority works. This is assumed not to apply to the proposal, being developed by a private entity.

The ESO requires a number of factors to be considered by Council when assessing permit applications and drafting conditions, including (but not limited to):

- Whether access to the river will be obstructed
- Whether the riverbank will be disturbed
- Whether buildings are set back a sufficient distance from the river (100 m)
- Whether earthworks will obstruct natural water flow or drainage lines
- Whether development is designed so as to protect and enhance historic and archaeological sites and the natural and cultural heritage values
- The views of traditional owners
- Potential for planting of indigenous species to lessen visual impact
- Measures to improve the quality of water in the Murray River and reduce the prospects of pollution caused by salts, nutrients chemicals, sediments, wastes and other pollutants from entering the Murray River
- If wetlands are affected by a proposal, whether conditions to maintain the hydrological regime, conserve flora and fauna, provide vegetated buffers, and maintain water quality are appropriate.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

A desktop assessment and series of field surveys were undertaken within the proposal study area for the proposal.

The assessment found that the proposal study area supports native vegetation which is in good condition, comprising seven EVCs with a total area of 26.190 ha. No scattered trees were recorded although a number of large trees and trees with hollows were mapped. No EPBC Act or FFG Act listed communities were recorded within the proposal study area.

Nineteen advisory list flora species were recorded during surveys, three of which are also FFG Act listed: Spreading Saltbush, Silver Saltbush and Spotted Emu-bush. There are a number of other significant flora species that were not recorded, but may still occur in the proposal study area. Three fauna species of conservation significance were recorded: Brown Treecreeper, Lace Monitor, and Yellow-faced Whip-snake. Additional significant fauna species may occur, at least periodically, although were not recorded during current surveys.

Based on the current proposal footprint, the proposal would impact 5.416 ha of native vegetation including 18 large trees and 52 trees with hollows or nests (some trees being both large and with hollows/nests). Impacts on 11 flora species of conservation significance will occur and some habitat for fauna species of conservation significance will also be impacted. Impacts on flora and fauna species are not anticipated to be significant. Measures are proposed to minimise impacts as far as possible and include no-go zones and restricted clearing methods.

A permit to remove native vegetation will be required for the proposal, with state offsets in accordance with the Guidelines 2017. The state offset targets will be purchased from a third-party offset credit supplier registered on the DELWP Native Vegetation Credit Register and transferred to the project with an Allocated Credit Extract secured to the Planning Permit.

Two MNES are relevant to the proposal, comprising three fauna species which may occur periodically at the proposal study area. It is considered highly unlikely that the proposal will significantly impact any MNES and a referral to DAWE is not recommended.

A permit under the FFG Act will be required for the removal of 16 species listed as Protected Flora (non-threatened) and 12 flora species on the previous and new Threatened List.

8 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (*WSP*) for TransGrid (*Client*) in response to specific instructions from the Client and in accordance with WSP's proposal dated September 2019 and Variation 013 Scope dated 24 April 2020 and agreement with the Client dated 31 October 2019 and 04 May 2020 (*Agreement*).

8.1 PERMITTED PURPOSE

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

8.2 QUALIFICATIONS AND ASSUMPTIONS

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

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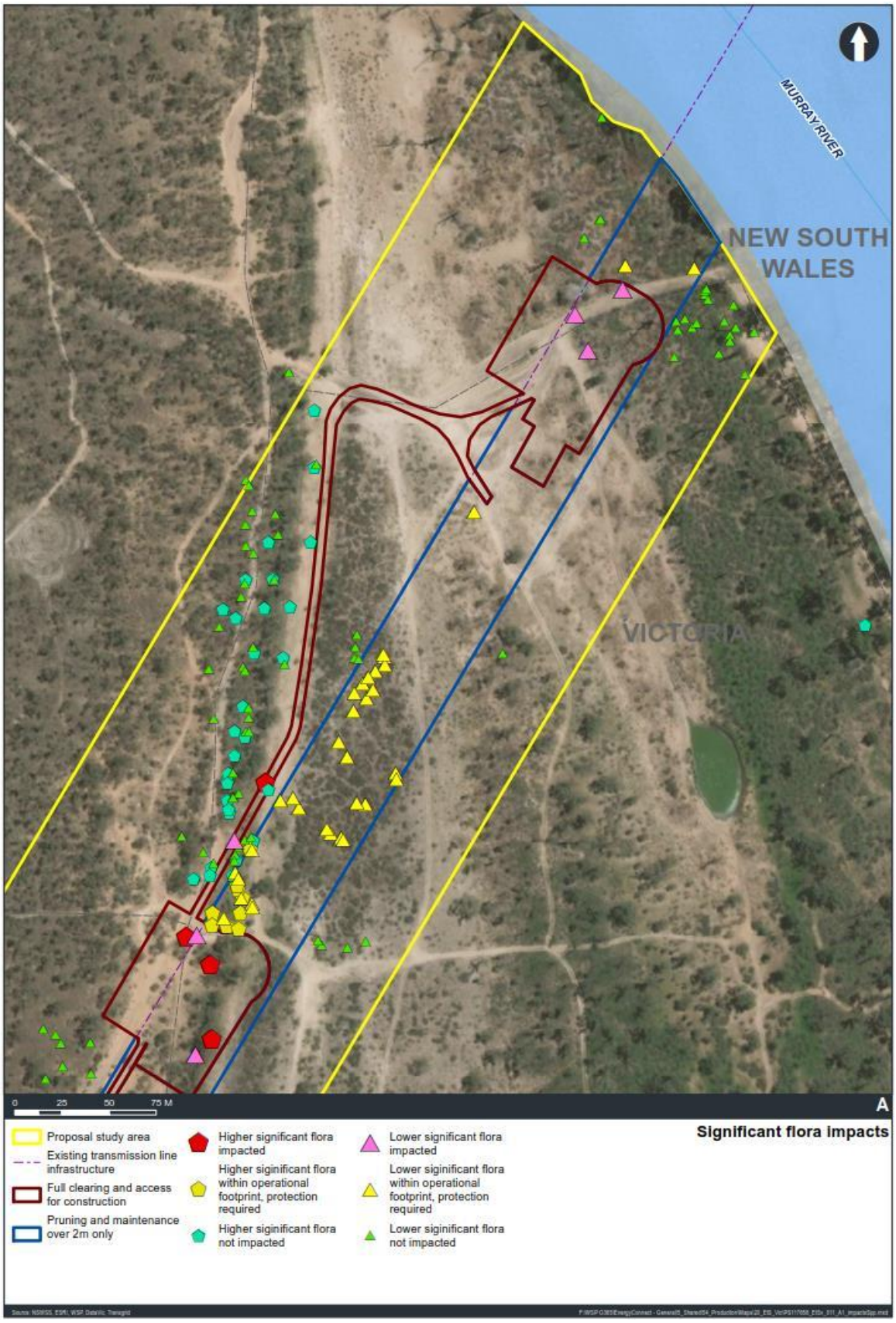
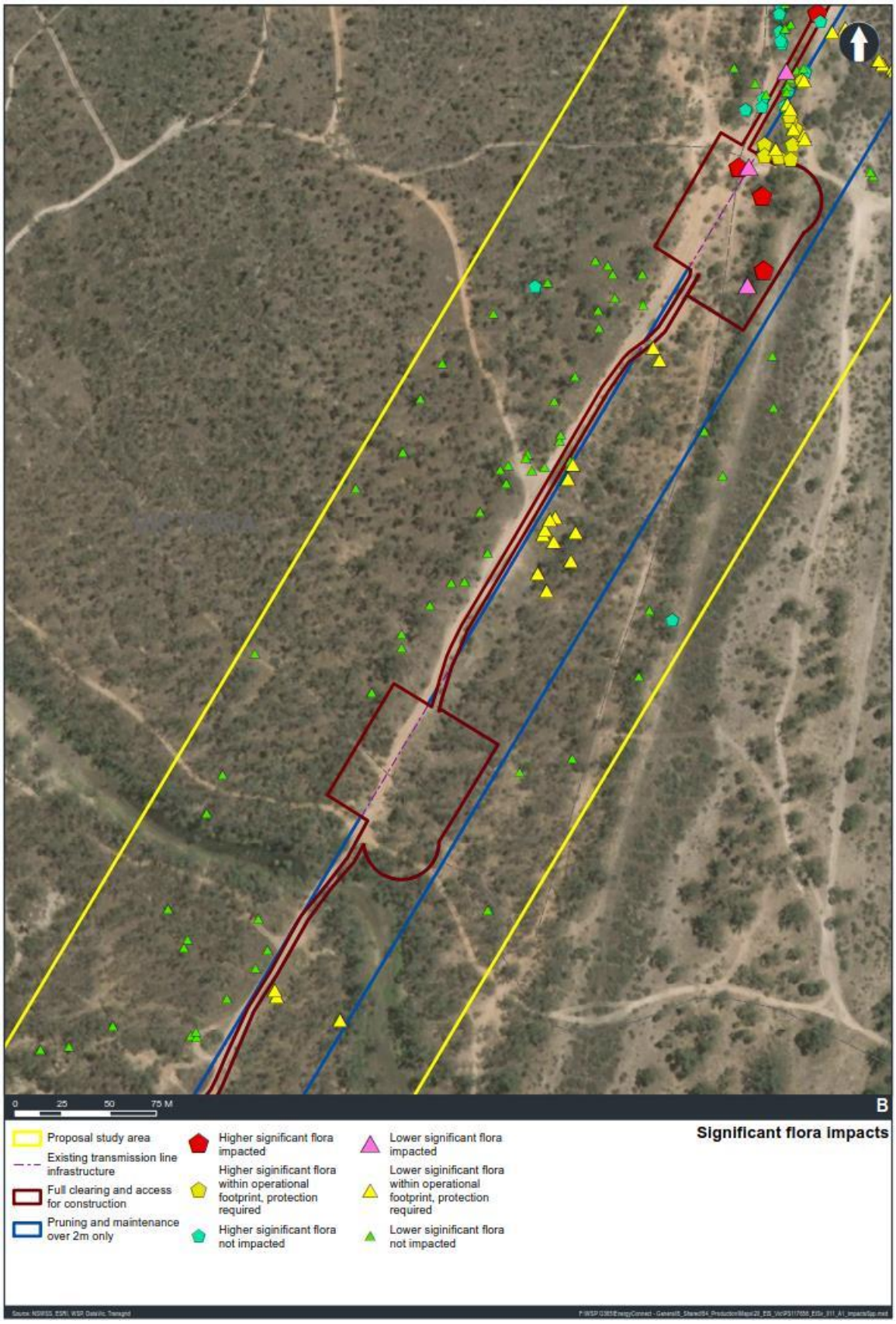
APPENDIX A

SUPPLEMENTARY FIGURES

A1 FLORA IMPACTS

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Proposal study area
Existing transmission line infrastructure
Full clearing and access for construction
Pruning and maintenance over 2m only
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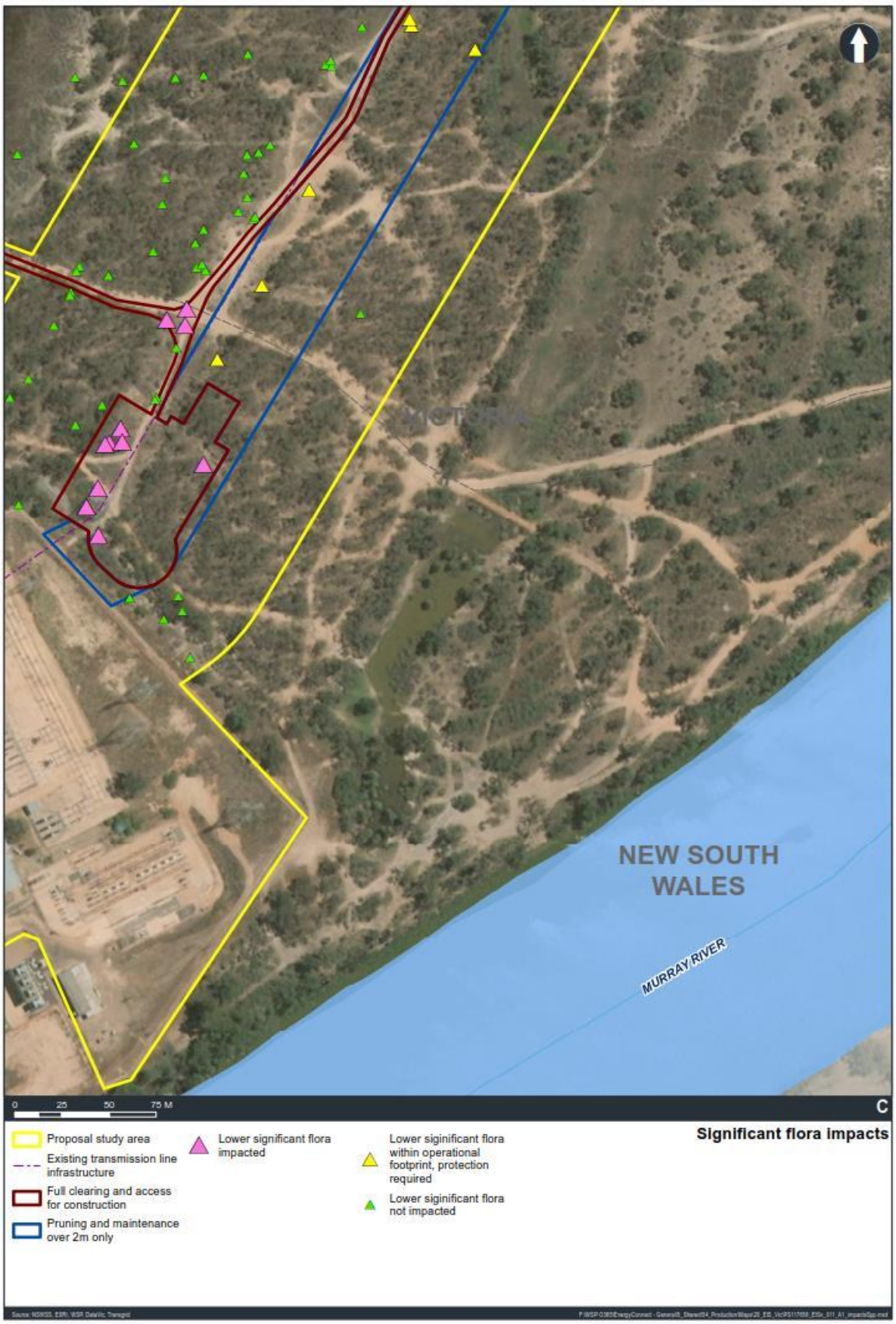
Higher siginificant flora not impacted
Lower significant flora impacted
Lower siginificant flora within operational footprint, protection required
Lower siginificant flora not impacted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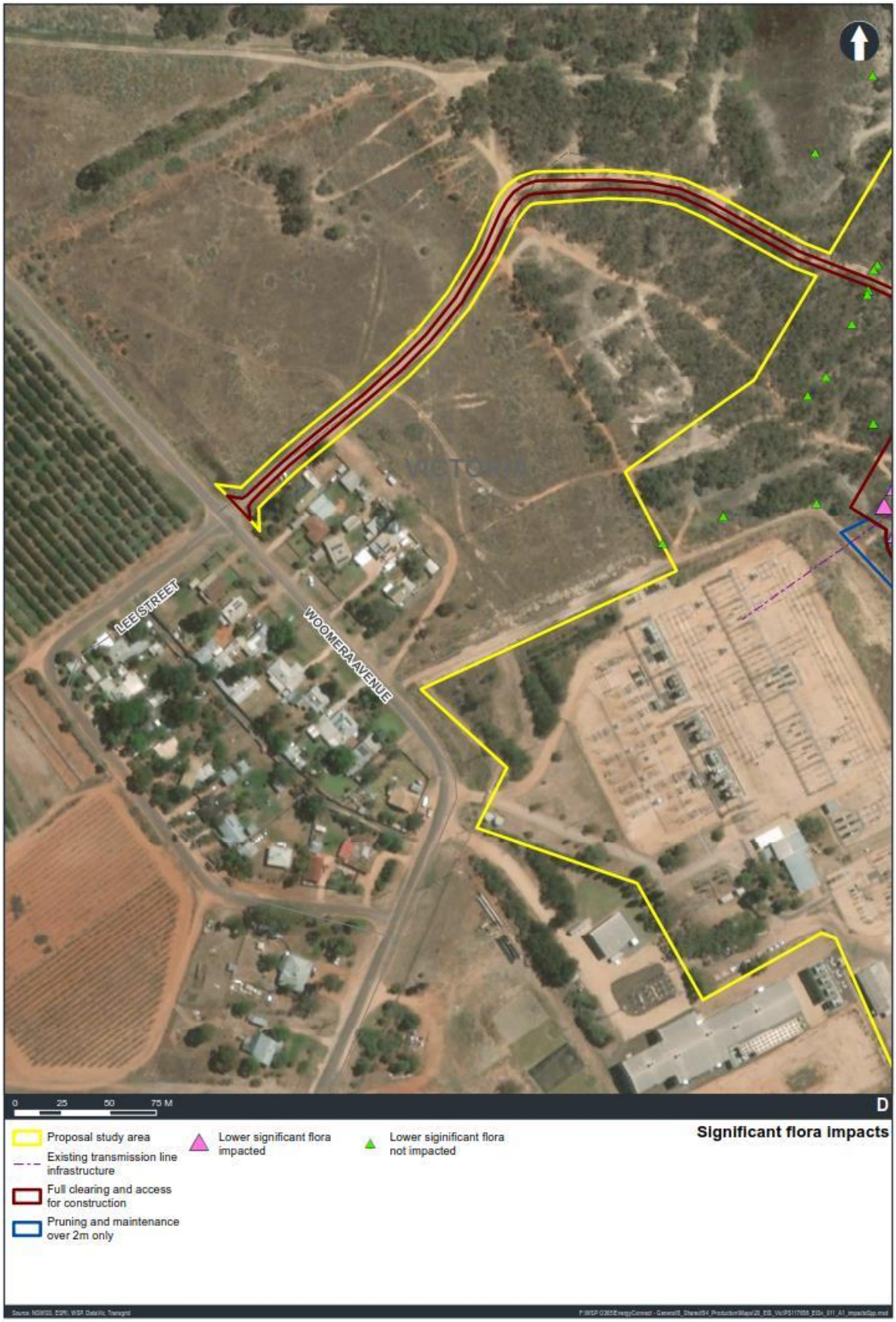
Significant flora impacts
Proposal study area
Existing transmission line infrastructure
Full clearing and access for construction
Pruning and maintenance over 2m only
Lower significant flora impacted
Lower siginificant flora within operational footprint, protection required
Lower siginificant flora not impacted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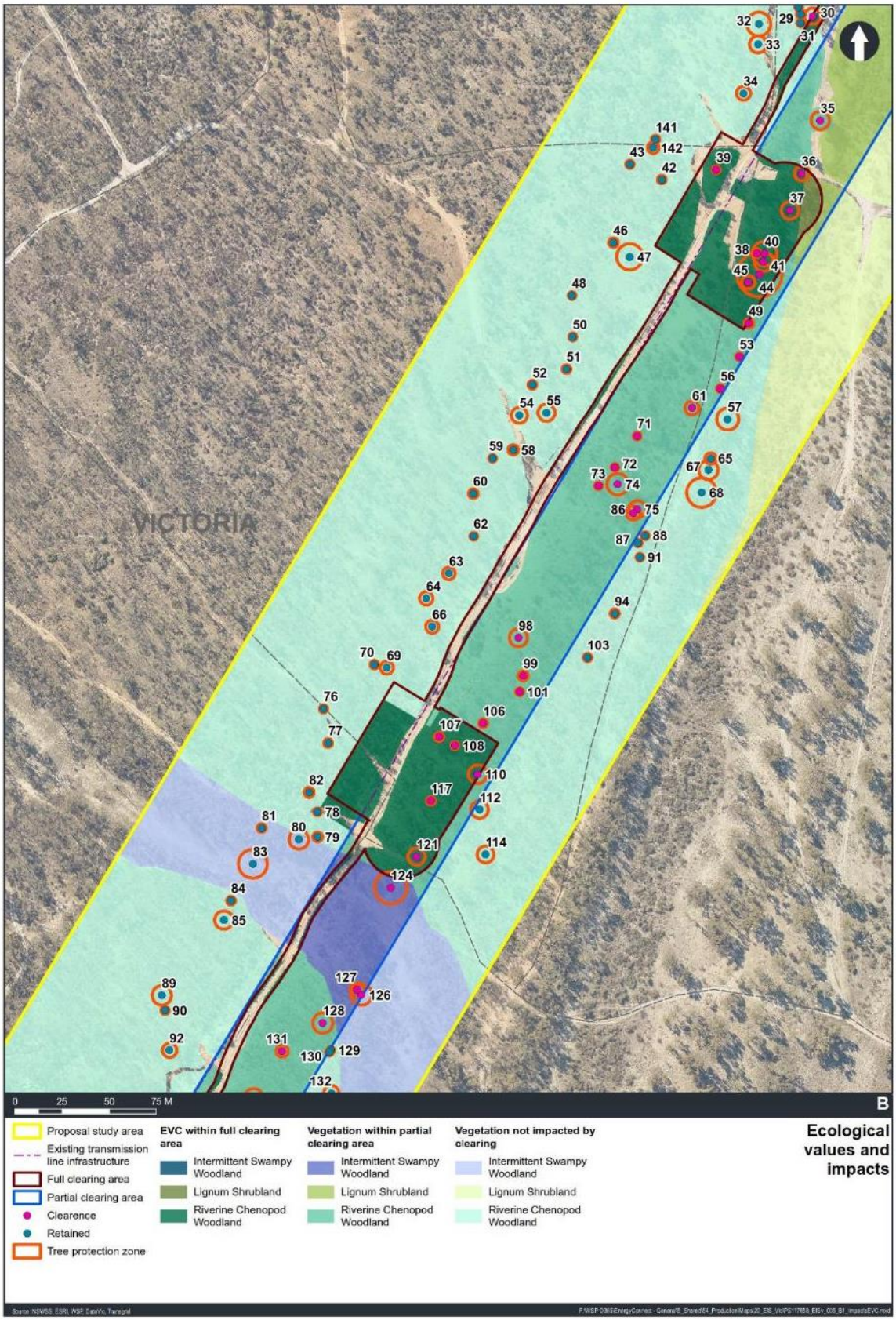
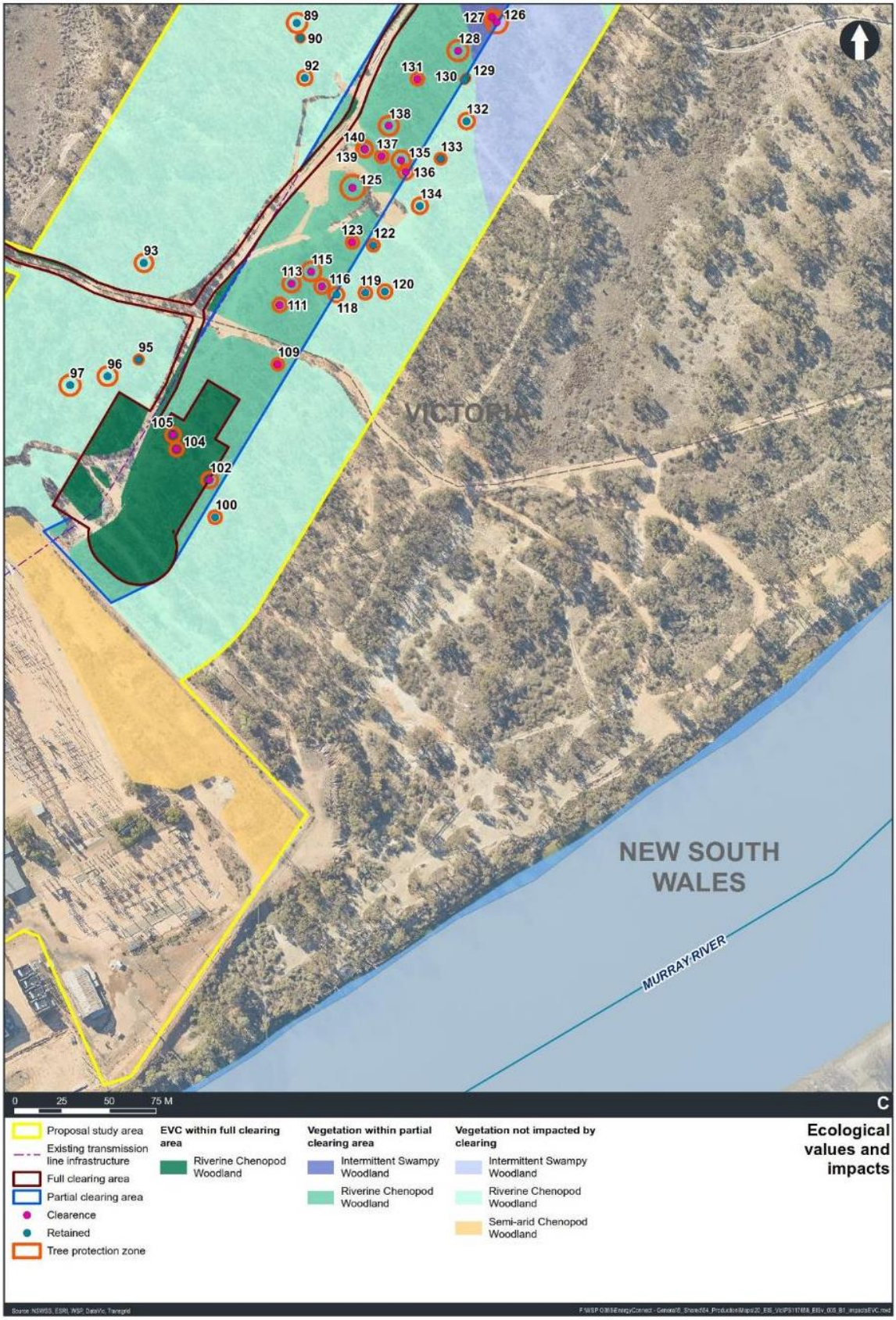
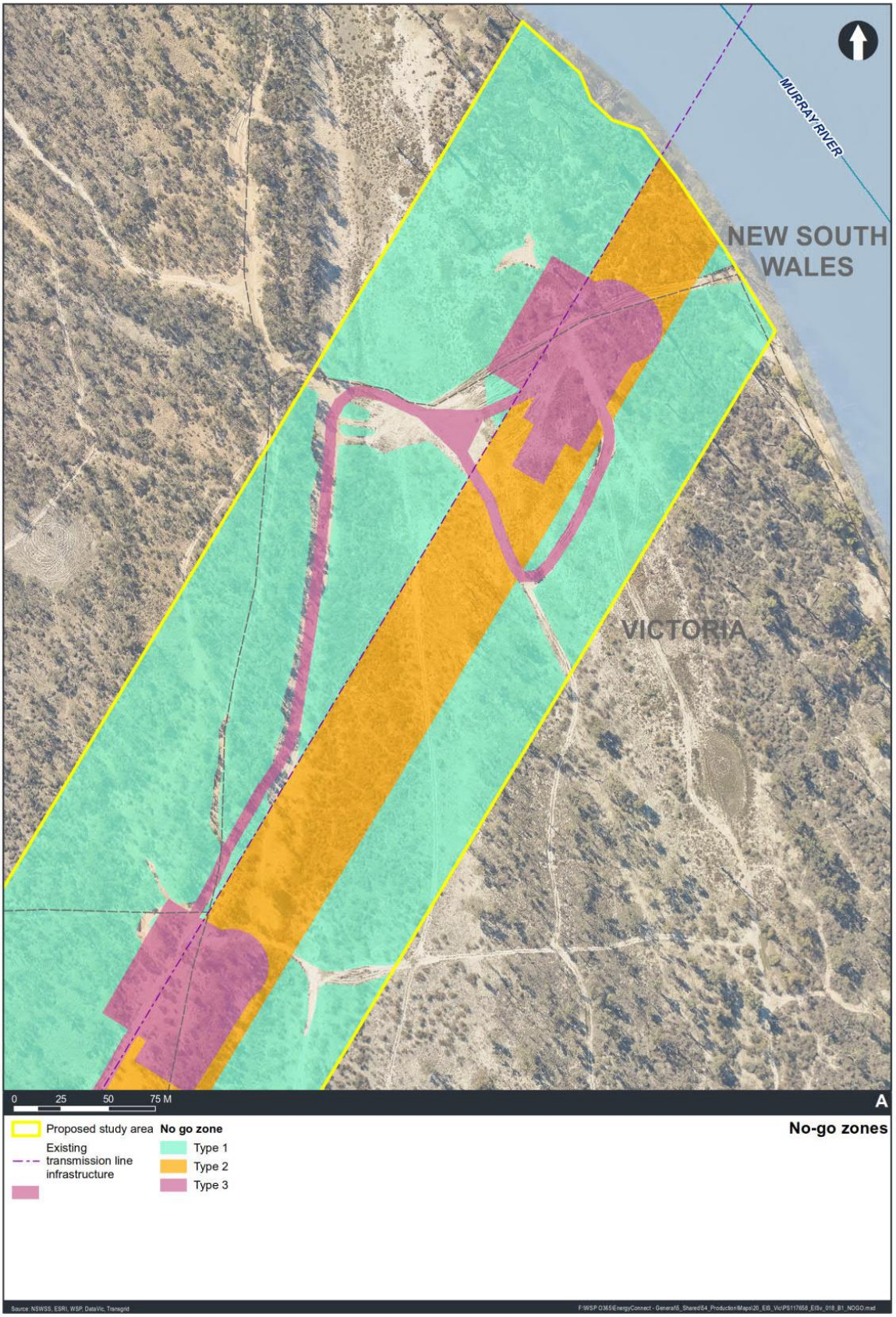
Significant flora impacts
Proposal study area
Existing transmission line infrastructure
Full clearing and access for construction
Pruning and maintenance over 2m only
Lower significant flora impacted
Lower siginificant flora not impacted

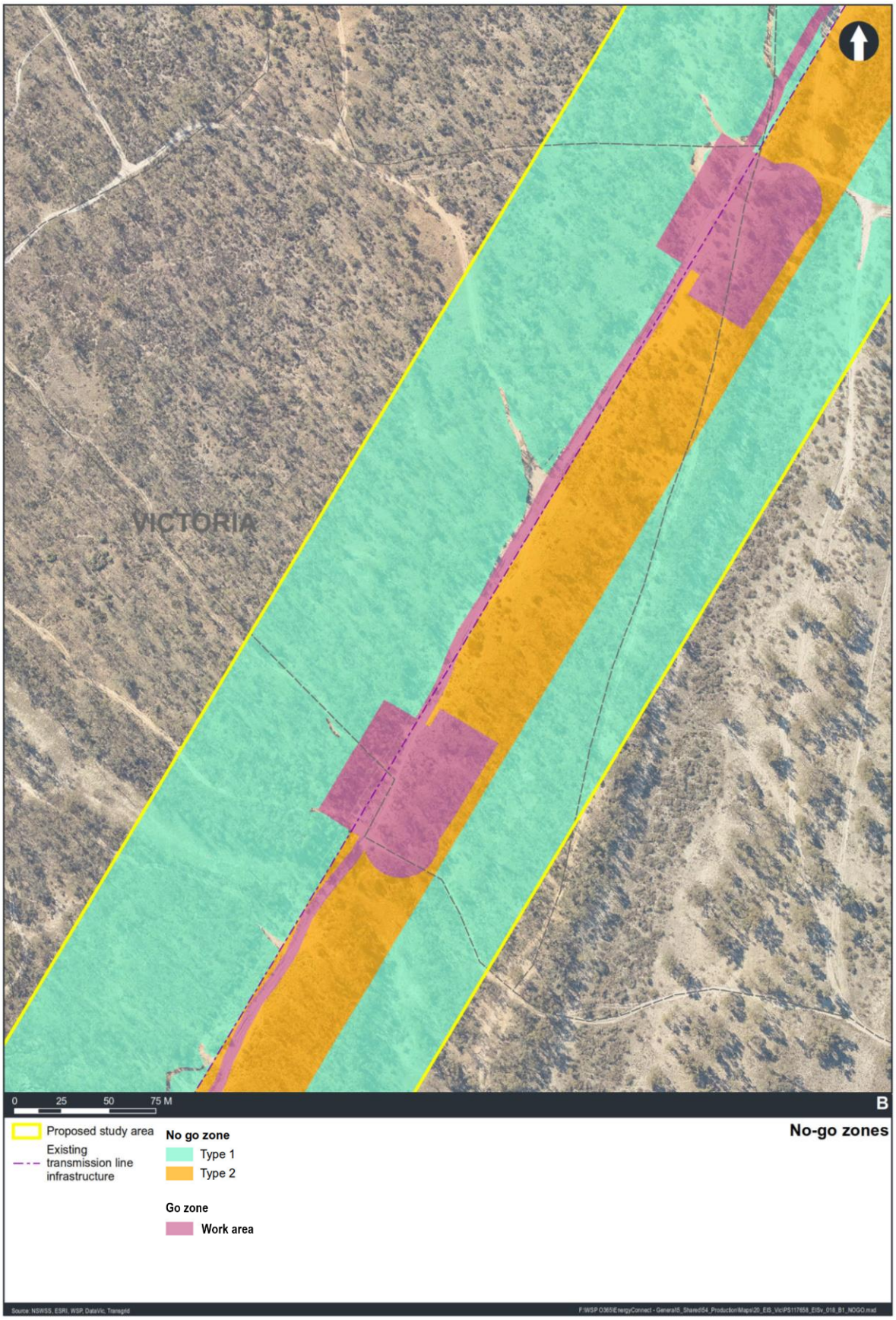
A2 NATIVE VEGETATION IMPACTS

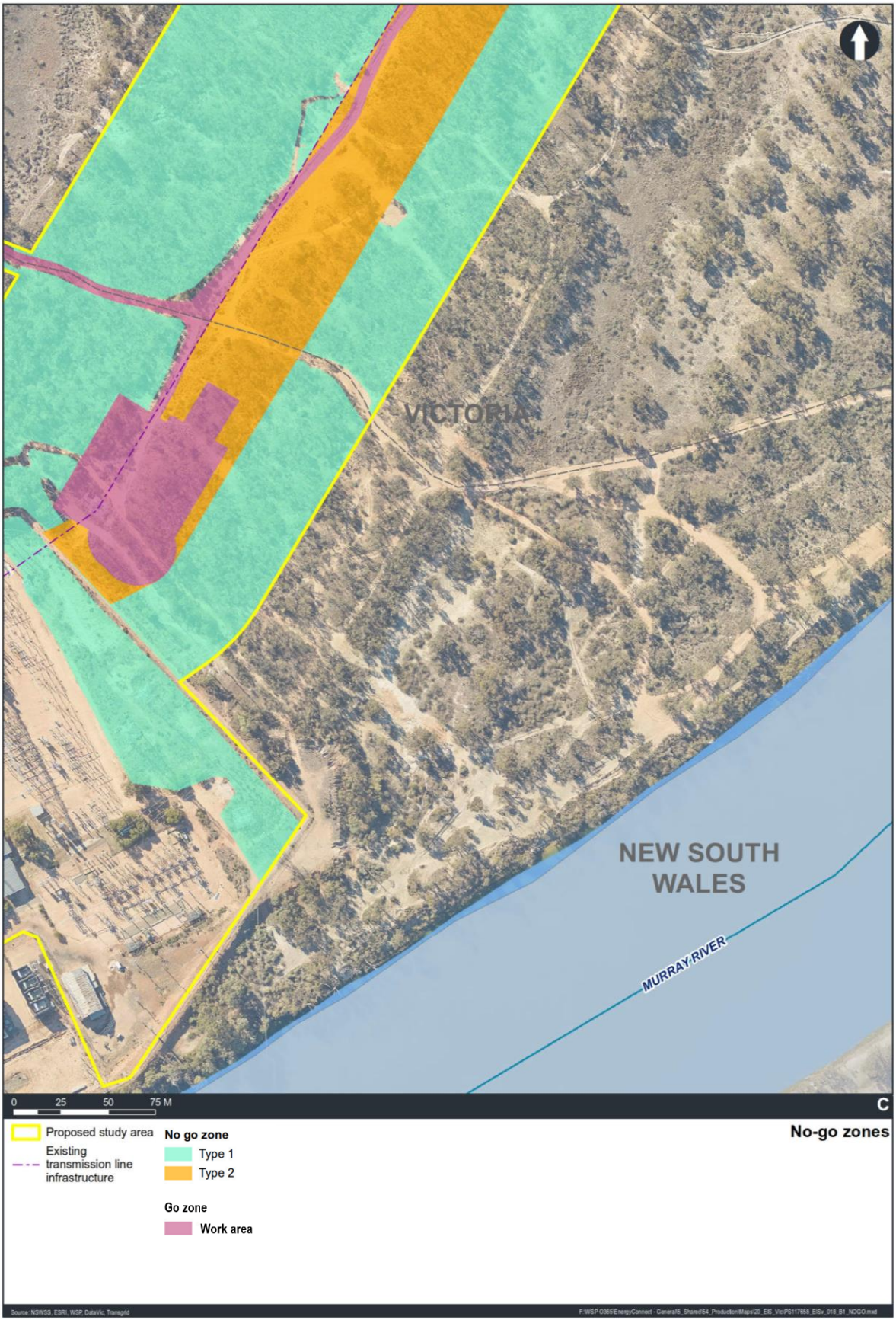

VICTORIA
0 25 50 75 M
B
Proposal study area
Existing transmission line infrastructure
Full clearing area
Partial clearing area
Clearence
Retained
Tree protection zone
EVC within full clearing area
Intermittent Swampy Woodland
Lignum Shrubland
Riverine Chenopod Woodland
Vegetation within partial clearing area
Intermittent Swampy Woodland
Lignum Shrubland
Riverine Chenopod Woodland
Vegetation not impacted by clearing
Intermittent Swampy Woodland
Lignum Shrubland
Riverine Chenopod Woodland
Ecological values and impacts


VICTORIA
NEW SOUTH WALES
MURRAY RIVER
0 25 50 75 M
C
Proposal study area
Existing transmission line infrastructure
Full clearing area
Partial clearing area
Clearence
Retained
Tree protection zone
EVC within full clearing area
Riverine Chenopod Woodland
Vegetation within partial clearing area
Intermittent Swampy Woodland
Riverine Chenopod Woodland
Vegetation not impacted by clearing
Intermittent Swampy Woodland
Riverine Chenopod Woodland
Semi-arid Chenopod Woodland
Ecological values and impacts

A3 NO-GO ZONES




VICTORIA
0
25
50
75 M
B
Proposed study area
Existing transmission line infrastructure
No go zone
Type 1
Type 2
Go zone
Work area
No-go zones
Source: NSWSS, ESRI, WSP, DataVic, Transgrid
F:\WSP 0365\EnergyConnect - General\5_Shared\54_ProductionMaps\20_EIS_Vic\PS117658_EISv_018_B1_NOGO.mxd


VICTORIA
NEW SOUTH WALES
MURRAY RIVER
0 25 50 75 M
C
Proposed study area
Existing transmission line infrastructure
No go zone
Type 1
Type 2
Go zone
Work area
No-go zones


VICTORIA
LEE STREET
WOOMERA AVENUE
0
25
50
75 M
D
Proposed study area
Existing transmission line infrastructure
No go zone
Type 1
Type 2
Go zone
Work area
No-go zones

APPENDIX B

SPECIES LISTS

B1 FLORA SPECIES LIST

Refer to key below table.

TAXON ORIGIN	SCIENTIFIC NAME	COMMON NAME	STATUS	FFG ACT PROTECTED FLORA	CALP ACT	RECORDED BY WSP	RECORDED BY OGYRIS ECO. CONS.
	Acacia salicina	Willow Wattle		yes		x	x
#	*Acacia stenophylla*	Eumong				x	
	Actinobole uliginosum	Flannel Cudweed		yes		x	
	Alectryon oleifolius subsp. canescens	Cattle Bush				x	
	Amyema miquelii	Box Mistletoe				x	
*	*Arctotheca calendula*	Cape Weed				x	
*	*Asparagus asparagoides*	Bridal Creeper			x	x	
	Asperula gemella	Twin-leaf Bedstraw	r			x	
*	*Asphodelus fistulosus*	Onion Weed				x	
	Atriplex eardleyae	Small Saltbush					x
	Atriplex leptocarpa	Slender-fruit Saltbush				x	
	Atriplex leptocarpa x semibaccata hybrid					x	x
	Atriplex limbata	Spreading Saltbush	vu L	yes		x	x
	Atriplex lindleyi subsp. inflata	Corky Saltbush				x	x
	Atriplex nummularia	Old-man Saltbush				x	
*	*Atriplex prostrata*	Hastate Orache				x	
	Atriplex rhagodioides	Silver Saltbush	vu L	yes		x	x
	Atriplex semibaccata	Berry Saltbush				x	
	Atriplex spp.	Saltbush				x	x
	Atriplex stipitata	Kidney Saltbush				x	x
	Atriplex stipitata ssp. miscella						x
#	*Atriplex suberecta*	Sprawling Saltbush				x	
	Austrostipa nitida	Balcarra Spear-Grass				x	
	Brachyscome ciliaris	Variable Daisy		yes		x	
	Brachyscome lineariloba	Hard-head Daisy		yes		x	

TAXON ORIGIN	SCIENTIFIC NAME	COMMON NAME	STATUS	FFG ACT PROTECTED FLORA	CALP ACT	RECORDED BY WSP	RECORDED BY OGYRIS ECO. CONS.
*	*Bromus rubens*	Red Brome				x	
	Bulbine semibarbata	Leek Lily				x	
	Calandrinia eremaea	Small Purslane				x	
	Callitris gracilis	Slender Cypress-pine				x	
	Calotis cuneifolia	Blue Burr-daisy	r	yes		x	x
	Calotis erinacea	Tangled Burr-daisy		yes		x	
	Calotis hispidula	Hairy Burr-daisy		yes		x	
*	*Capsella bursa-pastoris*	Shepherd's Purse				x	
	Cardamine spp.					x	
*	*Carrichtera annua*	Ward's Weed				x	
*	*Carthamus lanatus*	Saffron Thistle				x	
	Centipeda cunninghamii	Common Sneezeweed		yes		X	
	Chenopodium nitrariaceum	Nitre Goosefoot				X	
	Convolvulus remotus	Grass Bindweed					x
	Cotula australis	Common Cotula		yes		x	
*	*Cotula coronopifolia*	Water Buttons				x	
	Crassula colorata	Dense Crassula				X	
	Cynodon dactylon var. pulchellus	Native Couch	k			x	x
	Cyperus gymnocaulos	Spiny Flat-sedge				x	
	Cyperus spp.						x
	Dianella porracea	Riverine Flax-lily	vu			x	x
	Disphyma crassifolium subsp. clavellatum	Rounded Noon-flower				x	
	Dissocarpus paradoxus	Hard-head Saltbush				x	
#	*Dodonaea viscosa*	Sticky Hop-bush				x	
	Duma florulenta	Tangled Lignum				x	x
	Einadia nutans	Nodding Saltbush				x	
	Enchylaena tomentosa var. tomentosa	Ruby Saltbush				x	
	Enteropogon acicularis	Spider Grass				x	
	Eragrostis dielsii	Mallee Love-grass				x	x

TAXON ORIGIN	SCIENTIFIC NAME	COMMON NAME	STATUS	FFG ACT PROTECTED FLORA	CALP ACT	RECORDED BY WSP	RECORDED BY OGYRIS ECO. CONS.
	Eragrostis lacunaria	Purple Love-grass	vu			x	
	Eragrostis setifolia	Bristly Love-grass	vu				x
	Eremophila divaricata subsp. divaricata	Spreading Emu-bush	r	yes		x	x
	Eremophila maculata subsp. maculata	Spotted Emu-bush	r L	yes		x	
	Eucalyptus camaldulensis	River Red-gum	X			x	
	Eucalyptus largiflorens	Black Box				x	x
	Euphorbia dallachyana					x	
	Exocarpos aphyllus	Leafless Ballart				x	
*	*Galium spp.*					x	
	Goodenia glauca	Pale Goodenia				x	x
	Hakea leucoptera subsp. leucoptera	Silver Needlewood				x	x
	Harmsiodoxa blennodioides	May Smocks				x	
*	*Heliotropium curassavicum*					x	
*	*Hordeum murinum s.l.*	Barley-grass				x	
*	*Hypochaeris glabra*	Smooth Cat's-ear				x	
*	*Juncus acutus subsp. acutus*	Spiny Rush			x	x	x
	Juncus aridicola	Tussock Rush				x	
	Lachnagrostis filiformis s.l.	Common Blown-grass				x	
*	*Lactuca serriola*	Prickly Lettuce				x	
*	*Lepidium africanum*	Common Peppercress				x	
	Lepidium pseudohyssopifolium	Native Peppercress	k			x	
*	*Limonium lobatum*	Winged Sea-lavender				x	
*	*Lolium rigidum*	Wimmera Rye-grass				x	
	Lotus cruentus	Red Bird's-foot Trefoil				x	x
*	*Lycium ferocissimum*	African Box-thorn			x	x	
	Maireana appressa	Grey Bluebush				x	

TAXON ORIGIN	SCIENTIFIC NAME	COMMON NAME	STATUS	FFG ACT PROTECTED FLORA	CALP ACT	RECORDED BY WSP	RECORDED BY OGYRIS ECO. CONS.
	Malacocera tricornis	Goat Head	r			x	x
	Marsilea drummondii	Common Nardoo				x	
*	*Medicago minima*	Little Medic				x	
*	*Medicago polymorpha*	Burr Medic				x	
*	*Melilotus indicus*	Sweet Melilot				x	
*	*Mesembryanthemum crystallinum s.l.*	Common Ice-plant				x	
*	*Mesembryanthemum nodiflorum*	Small Ice-plant				x	
	Minuria cunninghamii	Bush Minuria	r	yes		x	
	Minuria integerrima	Smooth Minuria	r	yes		x	
	Olearia pimeleoides	Pimelea Daisy-bush		yes		x	x
	Opuntia robusta				x		x
*	*Opuntia spp.*	Prickly Pear			x	x	x
	Osteocarpum acropterum var. deminutum	Babbagia				x	
	Oxalis perennans	Grassland Wood-sorrel				x	
*	*Oxalis pes-caprae*	Soursob				x	
	Oxalis spp.	Wood Sorrel				x	
*	*Parapholis incurva*	Coast Barb-grass				x	
*	*Paronychia brasiliana*	Whitlow Wort				x	
#	*Paspalidium jubiflorum*	Warrego Summer-grass				x	x
*	*Paspalum distichum*	Water Couch				x	
	Phragmites australis	Common Reed				x	
*	*Phyla canescens*	Fog-fruit				x	
	Pimelea microcephala subsp. microcephala	Mallee Rice-flower				x	
	Plantago turrifera	Crowned Plantain				x	
	Potamogeton crispus	Curly Pondweed				x	
	Ranunculus pentandrus var. platycarpus	Inland Buttercup				x	
#	*Rhagodia spinescens*	Hedge Saltbush				x	

TAXON ORIGIN	SCIENTIFIC NAME	COMMON NAME	STATUS	FFG ACT PROTECTED FLORA	CALP ACT	RECORDED BY WSP	RECORDED BY OGYRIS ECO. CONS.
	Rhodanthe moschata	Musk Sunray		yes		x	x
	Roepera angustifolia	Scrambling Twinleaf	r			x	x
	Roepera crenata	Notched Twin-leaf				x	
	Roepera eremaea	Climbing Twin-leaf				x	
	Roepera glauca	Pale Twin-leaf				x	
	Roepera similis	White Twinleaf	r			x	
	Salsola tragus	Prickly Saltwort				x	
	Sarcozona praecox	Sarcozona	r			x	x
*	*Schismus barbatus*	Arabian Grass				x	
	Sclerochlamys brachyptera	Short-wing Saltbush				x	x
	Sclerolaena muricata	Black Roly-poly				x	x
	Sclerolaena stelligera	Star Bluebush				x	x
	Sclerolaena tricuspis	Streaked Copperburr				x	x
	Senecio glossanthus s.l.	Slender Groundsel		yes		x	
	Senecio pinnatifolius	Variable Groundsel		yes		x	
	Senecio runcinifolius	Tall Fireweed		yes		x	
	Senna artemisioides subsp. coriacea	Broad-leaf Desert Cassia				x	
	Senna artemisioides subsp. zygophylla	Narrow-leaf Desert Cassia				x	
	Sida trichopoda	Narrow-leaf Sida					x
*	*Sisymbrium erysimoides*	Smooth Mustard				x	
*	*Sisymbrium irio*	London Rocket				x	
*	*Solanum nigrum s.s.*	Black Nightshade				x	
*	*Sonchus oleraceus*	Common Sow-thistle				x	
	Spergularia brevifolia	Salt Sea-spurrey				x	
	Spergularia spp.	Sand Spurrey				x	
	Sporobolus mitchellii	Rat-tail Couch				x	x
	Stemodia florulenta	Blue Rod				x	
	Swainsona microphylla	Small-leaf Swainson-pea	r			x	x

TAXON ORIGIN	SCIENTIFIC NAME	COMMON NAME	STATUS	FFG ACT PROTECTED FLORA	CALP ACT	RECORDED BY WSP	RECORDED BY OGYRIS ECO. CONS.
*	*Symphyotrichum subulatum*	Aster-weed				x	
	Tecticornia pergranulata	Blackseed Glasswort				x	
	Tetragonia moorei	Annual Spinach	k			x	x
	Teucrium racemosum s.l.	Grey Germander				x	x
	Vallisneria australis	Eel Grass				x	
*	*Vicia hirsuta*	Tiny Vetch				x	
	Vittadinia cuneata var. cuneata	Fuzzy New Holland Daisy		yes		x	
	Vittadinia gracilis	Woolly New Holland Daisy		yes		x	
	Vittadinia spp.	New Holland Daisy		yes		x	x
*	*Vulpia myuros*	Rat's-tail Fescue				x	
*	*Vulpia spp.*	Fescue				x	

Key to 'taxon origin'

** = exotic*

 # = native but some strands may be alien

Key to 'status':

Status under the Flora and Fauna Guarantee Act 1988: *L = listed as threatened*
Conservation Status in Victoria (Victorian Advisory List): *e = endangered, v = vulnerable, r = rare, k = poorly known,*

B2 FAUNA SPECIES LIST

COMMON NAME	SCIENTIFIC NAME	STATUS
Birds		
Australasian Darter	*Anhinga novaehollandiae*	
Australian Magpie	*Gymnorhina tibicen*	
Australian Pelican	*Pelecanus conspicillatus*	
Australian Raven	*Corvus coronoides*	
Australian Reed-Warbler	*Acrocephalus australis*	
Australian Ringneck	*Barnardius zonarius*	
Australian Shelduck	*Tadorna tadornoides*	
Australian White Ibis	*Threskiornis molucca*	
Australian Wood Duck	*Chenonetta jubata*	
Black Kite	*Milvus migrans*	
Black Swan	*Cygnus atratus*	
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	
Blue Bonnet	*Northiella haematogaster*	
Brown Treecreeper	*Climacteris picumnus*	nt
Brown-headed Honeyeater	*Melithreptus brevirostris*	
Chestnut-crowned Babbler	*Pomatostomus ruficeps*	
Chestnut-rumped Thornbill	*Acanthiza uropygialis*	
Common Bronzewing	*Phaps chalcoptera*	
Crested Pigeon	*Ocyphaps lophotes*	
Crimson Rosella	*Platycercus elegans*	
Galah	*Eolophus roseicapillus*	
Grey Shrike-thrush	*Colluricincla harmonica*	
Grey Teal	*Anas gracilis*	
Laughing Kookaburra	*Dacelo novaeguineae*	
Little Black Cormorant	*Phalacrocorax sulcirostris*	
Little Eagle	*Hieraaetus morphnoides*	
Little Friarbird	*Philemon citreogularis*	
Little Raven	*Corvus mellori*	
Magpie-lark	*Grallina cyanoleuca*	

COMMON NAME	SCIENTIFIC NAME	STATUS
Mistletoebird	*Dicaeum hirundinaceum*	
Noisy Miner	*Manorina melanocephala*	
Peaceful Dove	*Geopelia striata*	
Pied Butcherbird	*Cracticus nigrogularis*	
Rainbow Bee-eater	*Merops ornatus*	
Red-capped Robin	*Petroica goodenovii*	
Red-rumped Parrot	*Psephotus haematonotus*	
Rufous Whistler	*Pachycephala rufiventris*	
Sacred Kingfisher	*Todiramphus sanctus*	
Singing Honeyeater	*Lichenostomus virescens*	
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	
Spotted Pardalote	*Pardalotus punctatus*	
Straw-necked Ibis	*Threskiornis spinicollis*	
Striated Pardalote	*Pardalotus striatus*	
Striped Honeyeater	*Plectorhyncha lanceolata*	
Tawny Frogmouth	*Podargus strigoides*	
Tree Martin	*Petrochelidon nigricans*	
Variegated Fairy-wren	*Malurus lamberti*	
Weebill	*Smicrornis brevirostris*	
Whistling Kite	*Haliastur sphenurus*	
White-plumed Honeyeater	*Lichenostomus penicillatus*	
White-winged Chough	*Corcorax melanorhamphos*	
Willie Wagtail	*Rhipidura leucophrys*	
Yellow Thornbill	*Acanthiza nana*	
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	
Mammals		
Black Rat	*Rattus rattus*	*
Chocolate Wattled Bat	*Chalinolobus morio*	
Eastern Grey Kangaroo	*Macropus giganteus*	
European Rabbit	*Oryctolagus cuniculus*	*
Forest Bat sp.	*Vespadelus baverstocki / V. regulus*	
Gould's Wattled Bat	*Chalinolobus gouldi*	
House Mouse	*Mus musculus*	*

COMMON NAME	SCIENTIFIC NAME	STATUS
Inland Broadnosed Bat	*Scoterepens balstoni*	
Inland Freetail Bat	*Mormopterus petersi*	
Little Broad-nosed Bat	*Scoterepens greyii*	
Little Forest Bat	*Vespadelus vulturnus*	
Long-eared Bat	*Nyctophilus sp*	
Mormopterus sp.	*Mormopterus planiceps & petersi*	
Rakali / Water Rat	*Hydromys chrysogaster*	
Red Fox	*Vulpes vulpes*	*
Scotorepens sp.	*Scoterepens balstoni / Scoterepens greyii*	
Southern Freetail bat	*Mormopterus planiceps*	
White-striped Freetail Bat	*Austronomus australis*	
Reptiles		
Boulenger's Skink	*Morethia boulengeri*	
Central Bearded	*Dragon Pogona vitticeps*	
Common Dwarf Skink	*Menetia greyii*	
Eastern Tree Skink	*Egernia striolata*	
Lace Monitor	*Varanus varius*	en
Shingleback Lizard	*Tiliqua rugosa*	
Yellow-faced Whip-Snake	*Demansia psammophis*	nt

Key to 'taxon origin'

* = *exotic*

Key to 'status':

Conservation Status in Victoria (Victorian Advisory List): *en = endangered, nt = near threatened*

APPENDIX C

LIKELIHOOD OF OCCURRENCE ASSESSMENT

C1 FLORA LIKELIHOOD OF OCCURRENCE

Table C.1 Likelihood of occurrence assessment for flora species returned in the VBA search and PMST query within a 10km buffer of the proposal.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Abutilon fraseri	Dwarf Lantern-flower	VBA		L	P	13	15/09/2002	Usually found as isolated plants on rocky slopes or outcrops.	Low - There is a lack of suitable habitat.
Abutilon fraseri subsp. fraseri	Dwarf Lantern-flower	VBA		L	e	2	4/06/2013	Known in Victoria only from sandy red loam soils between Sunny Cliffs and Red Cliffs, south of Mildura. Formerly known from Merbein but now considered to be extinct there.	Low - There is a lack of recent and abundant records within a 10km radius.
Abutilon malvifolium	Mallow-leaf Lantern-flower	VBA		L	e	13	17/01/2008	Known in Victoria only from cracking grey clay soils of the Murray River floodplain near Red Cliffs.	**Moderate** - Study area likely supports suitable habitat and the species is known to occur in the Red Cliffs area.
Abutilon otocarpum	Desert Lantern	VBA			v	2	10/03/1971	Confined to red loam ridges and dunes near the floodplain of the Murray River in the far north-west of Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Acacia colletioides	Wait-a-while	VBA			r	14	1/08/2018	In north-west of state only, growing mainly in mallee scrub or open woodland environments on sandy loam soils.	Low - There is a lack of suitable habitat.
Acacia loderi	Nealie	VBA		L	v	2	29/10/1989	In Victoria, this species is restricted to near Merbein and Nyah in the north-west, and near Pyramid Hill and Nathalia in the central north. It exists now as mostly remnant stands on or near private land.	Low - There is a lack of recent and abundant records within a 10km radius.
Acacia melvillei	Yarran	VBA		L	v	1	1/08/1940	Scattered throughout north-western Victoria, mostly along the Murray River and its floodplain, often in woodland environments.	Low - There is a lack of recent and abundant records within a 10km radius.
Acacia notabilis	Mallee Golden Wattle	VBA			v	1	8/10/2014	Grows in mallee communities and open woodland on stony and rocky hills.	Low - There is a lack of recent and abundant records within a 10km radius.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Acacia oswaldii	Umbrella Wattle	VBA		L	v	13	4/06/2013	Occurs throughout north-western Victoria, mainly in calcareous sands or loam soils.	Low - There is a lack of suitable habitat.
Acacia victoriae subsp. victoriae	Bramble Wattle	VBA			r	6	1/08/2018	Usually found growing in clay or loam soils on alluvial flats but can also grow in sand. Species distribution is restricted in Victoria to the far north-west and apparently near Rainbow.	Low - There is a lack of recent and abundant records within a 10km radius.
Allocasuarina luehmannii	Buloke	VBA		L	e	5	1/08/2018	Usually growing in woodland with Eucalyptus microcarpa, on non-calcareous soils.	Low - There is a lack of suitable habitat. Would likely have seen this during field surveys.
Alternanthera nodiflora	Common Joyweed	VBA			k	1	01/01/1770	Occurrences in Victoria are rare and mainly from the Murray River floodplain, downstream from Boundary Bend.	Low - There is a lack of recent and abundant records within a 10km radius.
Amaranthus grandiflorus	Large-flower Amaranth	VBA			v	3	7/04/1983	In Victoria, confined to sandy rises and sandy loam flats in the far north-west and probably only appearing in numbers following summer rain.	Low - There is a lack of recent and abundant records within a 10km radius.
Amaranthus macrocarpus var. macrocarpus	Dwarf Amaranth	VBA			v	2	20/12/1981	Appears only after summer rain along the Murray River floodplain downstream from about Echuca. Species can sometimes occur as an introduced plant along roadsides and in railyards.	Low - There is a lack of recent and abundant records within a 10km radius.
Ammannia multiflora	Jerry-jerry	VBA			v	8	24/01/1997	Species is mostly confined in Victoria to the Murray River floodplain in the north-west where it grows on heavy soils and is occasionally submerged. Disjunct occurrences are known from Kerang and Barmah.	Low - There is a lack of recent and abundant records within a 10km radius.
Amyema linophylla subsp. orientalis	Buloke Mistletoe	VBA			v	5	11/02/2005	Widespread in western Victoria but scarce due to the depletion of its main host plant Allocasuarina luehmannii (Buloke).	Low - There is a lack of suitable host plant
Arabidella nasturtium	Yellow Cress	VBA			k	1	01/01/1770	Grows in disturbed habitats on loamy, clayey or rock soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Aristida holathera var. holathera	Tall Kerosene Grass	VBA			v	2	20/01/2000	Apparently confined to the far north-west (between Red Cliffs and Boundary Bend), where it is usually found growing on stabilised dunes and sandy rises.	Low - There is a lack of recent and abundant records within a 10km radius.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Asperula gemella	Twin-leaf Bedstraw	VBA			r	12	26/10/2010	Species is known only from moist riparian sites along the Murray River downstream from Kerang, and with an isolated record from the upper Avoca River.	**Recorded**
Asperula wimmerana	Wimmera Woodruff	VBA			r	8	26/08/2004	In Victoria, the species is confined to the north-west region of the state, from Horsham to the New South Wales border. It usually grows in in woodland habitats where heavier, water-retentive soils are present. The species is supposedly endemic to Victoria however the presence of this species in semi-arid areas of South Australia and New South Wales is to be anticipated.	**Moderate** - Study area may support suitable habitat and, despite a lack of recent records, this species has previously been recorded in Kings Billabong Wildlife Reserve.
Atriplex acutibractea	Pointed Saltbush	VBA			P	1	01/01/1770	Two subspecies in Victoria; *subsp. accutibratea is* apparently confined to limestone-rich sandy soils in the far north-west (e.g. Benetook, Carwarp, Nowingi) while su*bsp. karoniensis* has been recorded on loamy soils from the eastern portion of the region (e.g. Annuello, Manangatang, Nyah).	Low - There is a lack of recent and abundant records within a 10km radius.
Atriplex acutibractea subsp. acutibractea	Pointed Saltbush	VBA		L	v	2	8/06/1950	Apparently confined to limestone-rich sandy soils in the far north-west of Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Atriplex limbata	Spreading Saltbush	VBA		L	v	3	7/02/1993	In Victoria confined to the extreme north-west, and known by only a few collections from near Red Cliffs, Mildura, Neds Corner Station and Lake Wallawalla and Lake Cullulerraine.	**Recorded**
Atriplex lindleyi subsp. conduplicata	Baldoo	VBA			r	1	01/01/1770	An invader of degraded or salted areas on heavier soils, this species is apparently confined to the Murray River floodplain downstream of Robinvale (e.g. Hattah Lakes, Red Cliffs, Merbein).	Low - There is a lack of recent and abundant records within a 10km radius.
Atriplex lindleyi subsp. lindleyi	Flat-top Saltbush	VBA			k	5	14/05/2018	Occasional occurrence on heavier soils along the Murray River floodplain in the north-west of Victoria.	**Moderate** - Study area likely supports suitable habitat and the species is known to occur in the Red Cliffs area.

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Atriplex nummularia subsp. omissa	Dwarf Old-man Saltbush	VBA			r	3	5/03/1999	In Victoria apparently confined to floodplains west of Mildura in the extreme north-west of the State (e.g. Neds Corner Station, Walpolla and Lindsay Islands).	Low - There is a lack of recent and abundant records within a 10km radius.
Atriplex papillata	Coral Saltbush	VBA			r	21	9/02/2001	Found on verges of salt-pans in the far north-west of Victoria where it usually grows on gypseous soils.	**Moderate** - Study area may contain suitable habitat to support this species.
Atriplex pseudocampanulata	Mealy Saltbush	VBA			r #	5	4/04/2006	Mainly found on heavier soils fringing lakes or rivers on the Murray River floodplain downstream from Cohuna. Common in degraded and salted areas. Records from railyards at Bairnsdale and Toora in Gippsland are introduced specimens.	Low - There is a lack of abundant records within a 10km radius.
Atriplex rhagodioides	Silver Saltbush	VBA		L	v	3	1/03/1991	In Victoria apparently confined to the Murray River floodplain in the far north-west and recorded only from the Natya area, Red Cliffs and Cowra.	**Recorded**
Atriplex spinibractea	Spiny-fruit Saltbush	VBA			e	13	27/09/1999	Species is found on heavy alluvial soil in Grey box, River Red Gum or Black Box woodlands. Known to occur in the Numurkah-Barmah area and Kings Billabong.	Low - There is a lack of abundant records within a 10km radius.
Austrobryonia micrantha	Mallee Cucumber	VBA			r	1	01/01/1770	Occurs on drying or dried clay soils along the Murray River floodplain in the far north-west of Victoria with some southerly occurrences at Lake Tyrrell and Wyperfeld National Park.	Low - There is a lack of recent and abundant records within a 10km radius.
Bergia ammannioides	Jerry Water-fire	VBA			v	3	3/05/1982	Confined to the far north-west where it usually occurs on recently inundated sandy soil beside lakes, rivers and billabongs.	Low - There is a lack of recent and abundant records within a 10km radius.
Bergia trimera	Small Water-fire	VBA			v	8	11/01/1990	Confined to floodplains of the Murray River in the far north-west and areas prone to inundation near Kerang. Species is rarely observed in the absence of recent floods.	Low - There is a lack of abundant records within a 10km radius.
Brachyscome gracilis subsp. robusta	Billabong Daisy	VBA		L	v	9	9/10/1991	Only known to occur in a Black Box floodplain on clay soil at Kings Billabong, near Red Cliffs in north-west Victoria.	**Moderate** - Known to occur in the Red Cliff area but old records

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Caladenia tensa	Greencomb Spider-orchid	PMST	EN		v			In Victoria found mainly in the Little Desert area (also with an isolated record for near Wood Wood) in Eucalyptus/Callitris woodland on well-drained sandy soil.	Low - Species has not been recorded in a 10km radius of the study area.
Calandrinia volubilis	Twining Purslane	VBA			r	2	30/05/1981	Largely restricted in Victoria to the far north-west in samphire and saltbush communities on saline flats and around salt lakes.	Low - There is a lack of recent and abundant records within a 10km radius.
Calotis cuneifolia	Blue Burr-daisy	VBA			r	19	31/10/2012	Occurs near the Murray River as well as its floodplain downstream from near Barmah. Is also found near Kamarooka and Chiltern.	**Recorded**
Calotis lappulacea	Yellow Burr-daisy	VBA			r	1	1/07/1986	In the north and north-west of the State it can be found growing on fertile loam or clay soils (i.e. near Picola and the Chinkapook districts).	Low - There is a lack of recent and abundant records within a 10km radius.
Cardamine moirensis	Riverina Bitter-cress	VBA			r	1	26/08/2004	In Victoria, occurring in the north and west in seasonally wet areas.	**High -** Known to occur in the Red Cliff area but old records. A Cardamine was identified during the field surveys but could not be identified to species level due to inadequate material.
Casuarina obesa	Swamp Sheoak	VBA		L	e	8	30/09/2004	Known to occur in north-west Victoria at the edge of Karadoc Swamp near Red Cliffs with some scattered occurrences further south near Mt Arapiles. Occurrences near Port Phillip Bay are likely from cultivated stock. Species can grow in occasionally flooded, sometimes brackish or saline areas but some populations are known to be suffering from increased water salinity.	Low - There is a lack of recent and abundant records within a 10km radius.
Centipeda crateriformis subsp. crateriformis	Lagoon Sneezeweed	VBA			e	1	26/10/2010	In Victoria species grows on clay soils of seasonally inundated areas and depressions in regions surrounding the Murray River, from Kerang through to South Australia.	Low - There is a lack of recent and abundant records within a 10km radius.

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Centipeda pleiocephala	Tall Sneezeweed	VBA			e	1	26/10/2010	In Victoria species grows in moist sandy, silty or clay soils in floodplains and on the edge of watercourses. Distributed near the Murray River, from Mildura west and between Kerang and Ulupna Island .	Low - There is a lack of recent and abundant records within a 10km radius.
Ceratophyllum demersum	Hornwort	VBA			k	3	1/07/1986	Often forms dense growths in usually fresh, still to slow-flowing waters that are a few metres deep.	Low - There is a lack of recent and abundant records within a 10km radius.
Chenopodium desertorum subsp. desertorum	Frosted Goosefoot	VBA			r	2	15/05/2018	In Victoria, the species is confined to the far north-west, mainly occurring on sand-ridges.	**Moderate** - Study area may support suitable habitat and, despite a low number of records, there are previous records within close proximity to the study area.
Chenopodium desertorum subsp. rectum	Frosted Goosefoot	VBA			v	1	13/11/2002	Occurs in mallee scrub on sand or slightly heavier soils throughout north-west Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Convolvulus clementii	Desert Bindweed	VBA			v	1	1/09/1964	In Victoria, confined to the north-west part of the State, growing in a variety of habitats from seasonally wet depressions to sandy rises.	Low - There is a lack of recent and abundant records within a 10km radius.
Convolvulus crispifolius	Silver Bindweed	VBA			r	1	01/01/1770	In Victoria, this species is apparently confined to the far north-west where it grows on sand-dunes, often only appearing after fire.	Low - There is a lack of recent and abundant records within a 10km radius.
Convolvulus microsepalus	Small-flower Bindweed	VBA			x	1	30/08/2010	Species occurs in Slender Cypress-pine and Black Box woodlands, sometimes on limestone-based soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Craspedia haplorrhiza	Plains Billy-buttons	VBA		L	k	3	14/09/2008	Usually grows on heavy soils or loamy sands, particularly on floodplains and seasonally wet depressions.	Low - There is a lack of suitable habitat.
Cullen australasicum	Native Scurf-pea	VBA		L	e	2	25/02/1993	Known with certainty from only two records in the vicinity of Lakes Albacutya and Hindmarsh.	Low - There is a lack of recent and abundant records within a 10km radius.

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Cullen cinereum	Hoary Scurf-pea	VBA		L	e	6	17/03/1993	Species is known only from a few localities in the far north-west of the State where it grows in moist depressions and on floodplains.	**Moderate** - Study area may contain suitable habitat to support this species.
Cullen discolor	Grey Scurf-pea	VBA		L	e	7	1/05/2011	Found in the far north-west of Victoria where it grows on sandy soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Cullen pallidum	Woolly Scurf-pea	VBA		L	e	21	29/08/2011	In Victoria it is Known from very few collections in the far north-west of the State where it grows in deep sand.	**High** - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Cullen patens	Spreading Scurf-pea	VBA		L	e	2	1/11/1965	Species is only known from a few records in the far north-west of the State where it grows on clay or sandy clay soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Cullen tenax	Tough Scurf-pea	VBA		L	e	12	29/08/2011	In Victoria it is usually found growing in drier parts of the State in grassland and grassy woodland environments on heavy soils.	**High** - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Cycnogeton dubium	Slender Water-ribbons	VBA			r	3	5/12/1981	Occurs in still ephemeral fresh water (up to 50 cm deep) in swamps, creeklets and floodplains, typically at sites dominated by Black Box and Tangled Lignum.	Low - There is a lack of recent and abundant records within a 10km radius.
Cynodon dactylon var. pulchellus	Native Couch	VBA			k	3	4/06/2013	Recorded from the Murray River floodplain downstream of Cobram where it usually grows on silty or clay soils in River Red Gum woodlands.	**Recorded**
Cyperus flaccidus	Lax Flat-sedge	VBA			v	2	1/07/1986	Recorded only from Mildura, Dimboola, Goroke and Cobram areas where it occurs in seasonally wet sites such as lake and river margins.	Low - There is a lack of recent and abundant records within a 10km radius.
Cyperus pygmaeus	Dwarf Flat-sedge	VBA			v	3	5/01/1984	Found on banks and seasonally wet floodways of the Murray River where it grows on clayey soils in open positions. Occurs between Mildura and Swan Hill, with a distant occurrence upstream near Yarrawonga.	Low - There is a lack of recent and abundant records within a 10km radius.

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Cyperus rigidellus	Curly Flat-sedge	VBA		L	e	2	13/01/1982	Grows in ephemerally wet situations such as lake beds, floodways and roadside drains in the far north-west of the State.	**Moderate -** Whilst there are few records, this species may occur near the stud area.
Cyperus squarrosus	Bearded Flat-sedge	VBA			v	2	1/07/1986	Known in Victoria only from collections made in the vicinity of Little Desert in 1895 and apparently now extinct in the State.	Low - There is a lack of recent and abundant records within a 10km radius.
Cyperus victoriensis	Yelka	VBA			k	4	1/07/1986	Occurs on floodplains, billabongs and clayey banks of the Murray River downstream from about Barmah, with an isolated occurrence near Dimboola.	Low - There is a lack of recent and abundant records within a 10km radius.
Dactyloctenium radulans	Finger Grass	VBA			r #	16	4/03/2007	Confined in Victoria to the Murray River floodplain and closely adjacent areas in the far north-west (Swan Hill to Mildura). Sometimes found colonising cleared or disturbed ground.	**Moderate** - Study area may contain suitable habitat to support this species.
Dianella porracea	Riverine Flax-lily	VBA			v	22	29/08/2011	Largely confined to the north-west of the State, mostly near the Murray River where it occurs in sandy soils and silty alluvium with outlying, scattered occurrences in the Quambatook area.	**Recorded**
Digitaria ammophila	Silky Umbrella-grass	VBA			v	5	12/01/1987	Scattered occurrence throughout northern and north-western Victoria, mainly along the Murray River floodplain.	Low - There is a lack of recent and abundant records within a 10km radius.
Diplachne fusca subsp. fusca	Brown Beetle-grass	VBA			r #	5	19/01/1993	Species is confined in Victoria to floodplains and billabongs of the Murray River and the lower reaches of its major tributaries where it grows in shallow water.	Low - There is a lack of recent and abundant records within a 10km radius.
Dissocarpus biflorus var. biflorus	Twin-flower Saltbush	VBA			r	6	25/09/2006	Occurs in far north-west Victoria where it grows on saline, seasonally wet, cracking clay soils, usually in low shrubland formations.	Low - There is a lack of recent and abundant records within a 10km radius.
Dodonaea viscosa subsp. angustifolia	Giant Hop-bush	VBA			r	1	7/06/2000	Confined to far eastern Victoria (Orbost, Suggan Buggan, Cann River, Genoa, Mallacoota areas) where it occurs mainly in dry sclerophyll forest and woodland environments, often in rocky areas.	Low - There is a lack of recent and abundant records within a 10km radius.

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Duma horrida subsp. horrida	Spiny Lignum	VBA			r	22	24/11/2011	Infrequently found growing on silty soils and clays fringing shallow swamps and lakes in the northwest, and near the Murray River downstream from about Swan Hill.	**Moderate** - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Elachanthus glaber	Smooth Elachanth	VBA			r	3	5/04/1984	Recorded from a few gypsum-rich, and sometimes saline, flats and low-rises in the far north-west of Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Elachanthus pusillus	Small Elachanth	VBA			r	2	29/08/1986	Species grows on loamy, often gypseous soils, and less commonly on light sands, in flat country and lake-beds of far north-west Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Elacholoma prostrata	Small Monkey-flower	VBA			r	1	01/01/1770	Confined to north-western and north-central areas of the State where it grows on heavy soils prone to seasonal inundation such as gilgais and floodplains.	Low - There is a lack of recent and abundant records within a 10km radius.
Eleocharis pallens	Pale Spike-sedge	VBA			k	2	1/07/1986	Uncommon in the state but predominately occurs in the north of Victoria in seasonally wet environments such as floodways and usually on clay soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Eragrostis alveiformis	Granite Love-grass	VBA			k	1	01/01/1770	Not known to occur in Victoria. Earlier records appear to have been based on misidentified specimens of *Eragrostis brownii*.	Low - There is a lack of recent and abundant records within a 10km radius.
Eragrostis australasica	Cane Grass	VBA			v	17	30/09/2009	Species is largely confined to clay-pan and shallow lake environments in the north-west, from near Kerang to the SA border.	**Moderate**- Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Eragrostis exigua	Slender Love-grass	VBA			e	3	3/03/1991	Known by only a few collections from Barmah Forest, Karadoc near Red Cliffs and King River. All specimens appear to have been collected from stream banks which is consistent with the species' occurrence in northern parts of Australia.	Low - There is a lack of recent and abundant records within a 10 km radius.

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Eragrostis lacunaria	Purple Love-grass	VBA			v	11	22/09/2003	Species is confined to sandy or alluvial soils fringing lakes and seasonally flooded areas in the far north-west with some isolated records from near Dimboola and Warracknabeal.	**Recorded**
Eragrostis setifolia	Bristly Love-grass	VBA			v	35	29/08/2011	Species is confined to the far north-west of the State where it occurs on clayey soils of seasonally flooded areas.	**Recorded**
Eremophila divaricata subsp. divaricata	Spreading Emu-bush	VBA			r	49	15/05/2018	Confined to woodland communities along the floodplain of the Murray River system, north-west from Kerang.	**Recorded**
Eremophila maculata subsp. maculata	Spotted Emu-bush	VBA		L	r	15	3/12/2011	In Victoria confined to the north-west, mainly in Black Box forests or woodlands where they grow on heavy clay soils.	**Recorded**
Eremophila oppositifolia subsp. oppositifolia	Twin-leaf Emu-bush	VBA			r	17	1/12/2011	In Victoria this species is confined to mallee and woodland communities where it grows on sandy loam soils in the far north-west.	**Moderate** - Study area may contain suitable habitat to support this species.
Eremophila polyclada	Twiggy Emu-bush	VBA			v	1	6/11/2012	Occurs along river flats and in depressions, mainly in Black Box forests and woodlands on heavy clay soils. Distribution in Victoria confined to the far north-west between Mildura and the South Australian border.	Low - There is a lack of recent and abundant records within a 10km radius.
Eriochlamys behrii s.s.	Woolly Mantle	VBA			r	1	14/09/2001	In Victoria species is known to occur in the far north-west, usually in mallee scrub or on saline soils around salt lakes.	Low - There is a lack of recent and abundant records within a 10km radius.
Eriochloa crebra	Tall Cup-grass	VBA			k	1	01/01/1770	Occurs in the far north-west on the Murray River floodplain in association with chenopod shrubland. Note an isolated occurrence amongst granite boulders near the summit of Mt Wycheproof.	Low - There is a lack of recent and abundant records within a 10km radius.

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Ethuliopsis cunninghamii	Tall Nut-heads	VBA			v	9	26/08/2004	Known in Victoria only from the far north-west area where it occurs on heavy clay soils that are prone to inundation, usually in River Red Gum and Black Box communities.	**Moderate** - Study area may support suitable habitat and, despite a lack of recent records, this species has previously been recorded in Kings Billabong Wildlife Reserve.
Eucalyptus phenax subsp. phenax	Green-leaf Mallee	VBA			r	3	7/06/2000	Occurs north from the Little Desert where it grows in mallee scrub environments.	Low - There is a lack of recent and abundant records within a 10km radius.
Fimbristylis aestivalis	Summer Fringe-sedge	VBA			k	2	1/07/1986	Grows in damp and usually sandy places beside watercourses and on floodplains (i.e. Ovens, King and Murray Rivers with a disjunct occurrence at Lake Glenmaggie near Heyfield).	Low - There is a lack of recent and abundant records within a 10km radius.
Fimbristylis velata	Veiled Fringe-sedge	VBA			r	2	1/07/1986	Mostly occurs in northern Victoria where it grows on drying mud near lakes and rivers and in seasonally wet depressions. Note some recent collections in the south including the Bairnsdale and Healesville areas.	Low - There is a lack of recent and abundant records within a 10km radius.
Frankenia serpyllifolia	Bristly Sea-heath	VBA			r	2	6/10/2004	Restricted to salt lake verges in the north-west, north of the Dimboola area.	Low - Study area lacks suitable habitat to support this species and there is a lack of abundant and recent records.
Glossostigma cleistanthum	Small-flower Mud-mat	VBA			r	3	11/10/1986	Occurs in temporary pools on granite outcrops, clayey soils of the Murray River floodplain and margins of subalpine bogs.	Low - There is a lack of recent and abundant records within a 10km radius.
Glossostigma diandrum	Spoon-leaf Mud-mat	VBA			v	2	1/10/1986	Species usually occurs along waterways or in shallow depressions on heavy clay soil.	Low - There is a lack of recent and abundant records within a 10km radius.
Gratiola pumilo	Dwarf Brooklime	VBA			r	2	27/12/1983	Grows on damp and drying mud beside lakes and watercourses and seasonally inundated depressions.	Low - There is a lack of recent and abundant records within a 10km radius.

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Hibiscus brachysiphonius	Low Hibiscus	VBA		L	e	10	4/03/2007	Apparently confined to cracking grey clay soils on the Murray River floodplain in the far north-west near Red Cliffs.	Low - There is a lack of recent and abundant records within a 10km radius.
Hydrilla verticillata	Hydrilla	VBA			r	3	1/07/1986	Occurs in still to slow-flowing freshwater of lakes and streams, to a depth of at least 3.5 meters. Distribution is scattered along the Murray River between Yarrawonga and Mildura, and possibly further downstream.	Low - There is a lack of recent and abundant records within a 10km radius.
Isolepis australiensis	Inland Club-sedge	VBA			k	2	1/07/1986	Species occurs in seasonally wet situations or following heavy summer rain. Predominantly found in the far north and north-west of Victoria as well as Echuca, and an isolated record near Edenhope,	Low - There is a lack of recent and abundant records within a 10km radius.
Jasminum didymum subsp. lineare	Desert Jasmine	VBA			v	11	19/06/2012	In Victoria, this species is confined to dry woodlands in the far north-west of the state.	Low - There is a lack of recent and abundant records within a 10km radius.
Leiocarpa leptolepis	Pale Plover-daisy	VBA		L	e	1	01/01/1770	Currently known in Victoria by a few collections near Mildura in Black Box riverine woodland.	Low - There is a lack of recent and abundant records within a 10km radius.
Leiocarpa tomentosa	Woolly Plover-daisy	VBA			e	7	8/10/2014	Species known by only a few collections from riverine woodland habitat in the far north-west (Boundary Point and Red Cliffs) and from near Murtoa in the Wimmera region.	**Moderate** - Study area likely supports suitable habitat and the species is known to occur in the Red Cliffs area, with recent records located < 1.5km in the Red Cliffs Scenic Reserve.
Lepidium monoplocoides	Winged Pepper-cress	PMST	EN	L	e			Uncommon occurrence in the north-western quarter of Victoria where it mostly grows on heavy soils near lakes and watercourses.	Low - Species has not been recorded in a 10km radius of the study area.
Lepidium papillosum	Warty Peppercress	VBA			k	38	14/09/2008	Generally grow on heavy soils near lakes, rivers and streams in semi-arid areas in north-west Victoria.	**Moderate** - Despite a lack of recent records, the study area likely contains suitable soil types and habitat to support this species.

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Lepidium phlebopetalum	Veined Peppercress	VBA			e	2	1/07/1986	Recent records are from open herbfields in the Quambatook area in relatively bare sites with crusting red clay loam soils. It is uncertain if the species persists in the far north-west of Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Lepidium pseudohyssopifolium	Native Peppercress	VBA			k	8	25/09/2006	Uncommon with the most recent records occurring near Ararat on heavy soils of the Murray River floodplain and the Yarra River banks in Melbourne.	**Recorded**
Lipocarpha microcephala	Button Rush	VBA			v	2	1/07/1986	Grows in open damp places such as sandy stream-banks and drying lake margins.	Low - There is a lack of recent and abundant records within a 10km radius.
Maireana aphylla	Leafless Bluebush	VBA			k	1	9/10/2003	Distributed across all mainland states of Australia. In Victoria the species is rare and scattered., occurring on heavy cracking clays and alluvium (often in flood-prone sites).	Low - There is a lack of recent and abundant records within a 10km radius.
Maireana georgei	Slit-wing Bluebush	VBA			v	2	8/09/2003	In Victoria this species is known to occur on heavier, loamy soils of interdune swales in the Sunset Country and near Kulwin.	Low - There is a lack of recent and abundant records within a 10km radius.
Maireana sedifolia	Pearl Bluebush	VBA			r	4	1/08/2018	Species is confined to a few sites in the far north-west that support loamy, often limestone-rich soils.	**Moderate** - Study area may support suitable habitat and the species is known to occur in the Red Cliffs area.
Maireana triptera	Three-wing Bluebush	VBA			r	2	8/11/2017	Usually found growing on red sandy loams of flats or dune swales in far north-west Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Malacocera tricornis	Goat Head	VBA			r	39	24/11/2011	Occasionally occurs on clay pans and heavy alluvial flats along the Murray River floodplain from Boundary Bend downstream to the South Australian border.	**Recorded**
Marsdenia australis	Doubah	VBA			v	15	4/06/2013	In Victoria, species is confined to the far north-west area where it occurs in dry woodland and scrubland environments, often near watercourses.	Low - Study area has limited suitable habitat to support this species.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Millotia macrocarpa	Large-fruited Millotia	VBA			r	3	1/07/1986	In Victoria confined to the far north-west, occurring in semi-arid shrublands and woodlands, usually on sandy soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Minuria cunninghamii	Bush Minuria	VBA			r	3	24/11/2011	Usually found in the north-west growing on slightly to strongly saline ground in sand, clay or gypseous soils.	**Recorded**
Minuria denticulata	Woolly Minuria	VBA			r	2	4/06/2013	Confined to the far north-west, where usually occurring in clay and clay-loam soils of low-lying seasonally wet areas such as lake beds and roadside drains.	Low - There is a lack of recent and abundant records within a 10km radius.
Minuria integerrima	Smooth Minuria	VBA			r	18	11/03/2012	In Victoria species is confined to heavy clay and alluvial silt soils on floodplains of the Murray River. Known from the Barmah district to the South Australian border (Strathmerton, Kerang, Kings Billabong, Lake Wallawalla).	**Recorded**
Myoporum montanum	Waterbush	VBA			r	14	3/10/2002	Scattered across northern Victoria where it mostly occurs in mallee and riparian woodland communities but also in rocky gorges.	Low - Study area has limited suitable habitat to support this species.
Najas tenuifolia	Water Nymph	VBA			r	2	1/07/1986	Grows in still or slow moving fresh, or occasionally brackish, water of billabongs and tributaries of the Murray River.	Low - There is a lack of recent and abundant records within a 10km radius.
Nicotiana goodspeedii	Small-flower Tobacco	VBA			r	2	1/07/1986	In Victoria, confined to the north-west where it's mostly found growing in alkaline soils, often in sand overlying limestone.	Low - There is a lack of recent and abundant records within a 10km radius.
Nymphoides crenata	Wavy Marshwort	VBA		L	v	1	01/01/1770	Occurs in fresh, still to slow-flowing water of swamps, lagoons, irrigation channels and streams, up to 1.5 meters deep. Also occurs in temporarily inundated depressions.	Low - There is a lack of recent and abundant records within a 10km radius.
Olearia asterotricha	Rough Daisy-bush	VBA			r	1	9/05/2017	Occurs in moist forest and swampy heathland, generally at lower altitudes (up to c. 300 m alt.), in a few disjunct areas of southern Victoria (e.g. Portland area, Emerald, Gembrook and Tonimbuk), but generally uncommon.	Low - Study area lacks suitable habitat to support this species and there is a lack of abundant records.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
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Olearia passerinoides	Slender Daisy-bush	VBA			P	1	01/01/1770	Two subspecies in Victoria; *subsp. glutescens* is confined to a single population near Inglewood, growing at the edges of Box-Ironbark forest dominated by Yellow Gum and Grey Box while *subsp. passerinoides* is restricted to mallee communities of the north-west (e.g. Red Cliffs, Hattah, Annuello, Robinvale).	Low - There is a lack of recent and abundant records within a 10km radius.
Olearia passerinoides subsp. passerinoides	Slender Daisy-bush	VBA			r	3	1/07/1986	In Victoria this species is confined to mallee communities in the north-west.	Low - There is a lack of recent and abundant records within a 10km radius.
Olearia subspicata	Spiked Daisy-bush	VBA			v	1	18/09/1951	In Victoria, species is only known to occur in sandy mallee communities in the far north-west, between Carwarp and Annuello.	Low - There is a lack of recent and abundant records within a 10km radius.
Ophioglossum polyphyllum	Upright Adder's-tongue	VBA			v	5	29/09/1986	Cryptic species which is thought to be restricted to north-western Victoria, where localized near Mildura, Hattah Lakes and southern Wyperfeld National Park.	Low - There is a lack of recent and abundant records within a 10km radius.
Phlegmatospermum eremaeum	Spreading Cress	VBA			v	2	19/08/1951	Rare plant of open mallee communities which grows on calcareous clay or loam soils in north-west Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Phyllanthus lacunarius	Lagoon Spurge	VBA			v	2	4/03/2007	Confined to cracking clay soils of the Murray River floodplain, downstream of Swan Hill.	Low - There is a lack of recent and abundant records within a 10km radius.
Phyllanthus lacunellus	Sandhill Spurge	VBA			r	3	29/08/2011	Species typically occurs on sandy rises and lunettes of lakes near the Murray River, downstream from the Chalka Creek anabranch.	Low - Known to occur in the Red Cliff area but old records
Picris squarrosa	Squat Picris	VBA			r	2	16/03/1990	Occurs primarily along the lower Murray River and its tributaries, but also on coastal sand-dunes or in alluvial soils on river banks.	Low - There is a lack of recent and abundant records within a 10km radius.
Poa lowanensis	Mallee Tussock-grass	VBA			r	2	24/09/1991	Endemic to Victoria, this species occurs in mallee-scrub or Triodia tussock grassland where it grows on deep sands in the north-west of the state.	Low - There is a lack of recent and abundant records within a 10km radius.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Potamogeton perfoliatus	Perfoliate Pondweed	VBA			k	3	1/07/1986	Occurs in flowing fresh water in creeks and rivers, on sandy, stony or muddy substrates, although can also supposedly tolerate brackish and still water environments.	Low - There is a lack of recent and abundant records within a 10km radius.
Ptilotus polystachyus	Long Tails	VBA			e	7	7/06/2000	Grows on red sandy loams on low dunes and heavier soils on the Murray River floodplain. Species' distribution is confined to the far north-west.	Low - There is a lack of recent and abundant records within a 10km radius.
Ptilotus sessilifolius	Crimson Tails	VBA			k	10	14/01/2012	Occurs on loamy, usually limestone-rich sands in far north-western Victoria but also recorded from near Swan Hill and Kerang.	Low - Study area lacks suitable habitat to support this species and there is a lack of abundant records.
Ranunculus pumilio var. politus	Ferny Small-flower Buttercup	VBA			k	1	27/09/1999	Only recently known to occur at a few scattered sites near the Murray River including Numurkah, Barmah, Kerang and Wyperfeld and Little Desert National Parks.	Low - There is a lack of recent and abundant records within a 10km radius.
Rhagodia ulicina	Spiny Goosefoot	VBA			r	2	13/11/2002	Occurs on red loamy soils, usually containing limestone, in dune swales and on flat ground.	Low - There is a lack of recent and abundant records within a 10km radius.
Rhodanthe polygalifolia	Milkwort Sunray	VBA			r	1	01/01/1770	In Victoria confined to the far north-west, often on heavy soils of the Murray River floodplain, but also in and near depressions away from the river (e.g. Pink Lakes).	Low - There is a lack of recent and abundant records within a 10km radius.
Rhyncharrhena linearis	Purple Pentatrope	VBA			v	9	13/02/2001	A rare and localized species in Victoria, restricted to the far north-west.	Low - There is a lack of recent and abundant records within a 10km radius.
Roepera angustifolia	Scrambling Twin-leaf	VBA			r	4	4/09/1991	In Victoria, confined to the far north-west where it mainly occurs on calcareous soils in mallee scrubland and herbfield environments.	**Recorded**
Rumex crystallinus s.s.	Glistening Dock	VBA			v	2	1/11/1965	Inland parts of all mainland states. Rare in Victoria, occurring only in the far north-west of the state on the Murray River floodplain, recorded only from the margins and drying beds of Lakes Walla Walla, Hattah and Lalbert.	Low - There is a lack of recent and abundant records within a 10km radius.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
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Sarcozona praecox	Sarcozona	VBA			r	65	29/08/2011	Found in mallee and Callitris-Casuarina woodlands of the north-west, usually on loamier soils.	**Recorded**
Sclerolaena decurrens	Green Copperburr	VBA			v	1	01/01/1770	Known in Victoria from low rises within floodplain country near the Murray River, downstream from about Merbein.	Low - There is a lack of recent and abundant records within a 10km radius.
Sclerolaena divaricata	Tangled Copperburr	VBA			k	1	01/01/1770	In Victoria apparently confined to the far north-west area, downstream from about Merbein, where it grows on heavy grey clay soils on the Murray River floodplain.	Low - There is a lack of recent and abundant records within a 10km radius.
Sclerolaena lanicuspis	Woolly Copperburr	VBA			e	2	21/10/1980	Known to occur from a few alluvial flats and lakeside lunettes supporting chenopod shrublands.	Low - There is a lack of recent and abundant records within a 10km radius.
Sclerolaena muricata var. muricata	Black Roly-poly	VBA			k	3	14/05/2018	Occasional along the Murray River and associated lakes and floodplains from near Kerang downstream toward the South Australian border, with isolated records from Sunbury (but not recorded from there since 1920).	Low - There is a lack of recent and abundant records within a 10km radius.
Sclerolaena patenticuspis	Spear-fruit Copperburr	VBA			v	4	1/08/2018	Species occurs in mallee communities and on alluvial plain shrublands. It is mainly confined to the far north-west area of the State, near the Murray River downstream from Robinvale, with some disjunct occurrences in the Kerang-Quambatook area.	Low - There is a lack of recent and abundant records within a 10km radius.
Sclerolaena uniflora	Two-spined Copperburr	VBA			r	2	1/09/1937	In Victoria confined to the far north-west where it grows on loamy, subsaline soils which are often rich in limestone or gypsum rubble.	Low - There is a lack of recent and abundant records within a 10km radius.
Sclerolaena X ramsayae	Ramsay's Hybrid Copperburr	VBA			r	1	01/01/1770	N/A	Low - There is a lack of recent and abundant records within a 10km radius.
Senecio cunninghamii var. cunninghamii	Branching Groundsel	VBA			r	1	01/01/1770	Occurs in Victoria, New south Wales and Western Australia. Widespread across Victoria, this species grows in heavy, sometimes winter-wet soils, as well as dry rocky soils, commonly on embankments or escarpments.	Low - There is a lack of recent and abundant records within a 10km radius.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
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Senecio gregorii	Fleshy Groundsel	VBA			r	1	3/12/2011	In Victoria species is confined to mallee and Callitris woodlands in the far north-west. Can be locally prolific following favourable rains and fires.	Low - There is a lack of recent and abundant records within a 10km radius.
Senecio productus subsp. productus	Riverina Groundsel	VBA			v	1	27/09/2010	Occurs along the edges of watercourses on clay soils in chenopod shrubland near the Murray River and upstream to near Kerang.	Low - There is a lack of recent and abundant records within a 10km radius.
Senna artemisioides subsp. artemisioides	Silver Cassia	VBA			e	2	4/06/2013	Previously known in Victoria from a few pre-1900 collections near Swan Hill, the Echuca district and Wimmera, but rediscovered east of Ouyen in 2004 occurring on a low dune with mallee vegetation.	Low - There is a lack of recent and abundant records within a 10km radius.
Sesbania cannabina var. cannabina	Yellow Pea-bush	VBA			v	2	31/05/1998	Known in Victoria from two collections near Red Cliffs, where it grows in floodplain woodlands on heavy clay soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Sida aff. corrugata (grey-leaf Boort form)	Variable Sida (grey-leaf form)	VBA			e	2	1/01/2012	A distinctive, suberect, grey-leaved form recently collected near Boort where it was growing with the more common green-leaved form which occurs in grassland and grassy woodland communities on fertile loams in northern and north-western Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Sida ammophila	Sand Sida	VBA			v	7	25/09/2006	Occurs on red sand and loam soils in the Hattah-Mildura area, mostly in non-eucalypt open shrublands, on dunes and roadsides.	Low - There is a lack of recent and abundant records within a 10km radius.
Sida fibulifera	Pin Sida	VBA			v	33	4/06/2013	Confined to red loam or clay loam soils near the Murray River between Hattah-Kulkyne and Mildura.	**Moderate** - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Sida intricata	Twiggy Sida	VBA			v	19	1/12/2011	Occurs in open areas of the far north and north-west where it usually grows on heavier loam and clay loam soils near the Murray River.	**Moderate** - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
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Sida spodochroma	Limestone Sida	VBA		L	v	11	7/05/2012	Species is restricted to growing in limestone soils in far north-west Victoria. Known occurrences include 'Boundary Point' near the South Australian border, Werrimull, and the Red Cliffs-Cardross area.	**Moderate** - Study area may contain suitable habitat to support this species.
Solanum karsense	Menindee Nightshade	PMST	VU					Species is largely confined to floodplain lakes, depressions and Black Box swamps where it grows with Saltbush and Bluebush plains and Mallee associations. This species is found in heavy grey clays with a highly self-mulching surface but also on sandy floodplains and ridges and in calcareous, sandy and loamy soils.	Low - Species has not been recorded within a 10km radius of the study area.
Sporobolus caroli	Yakka Grass	VBA			r	1	01/01/1770	Apparently confined in Victoria to seasonally inundated areas along the Murray River floodplain downstream of about Echuca.	Low - There is a lack of recent and abundant records within a 10km radius.
Stemodia glabella s.s.	Smooth Blue-rod	VBA			k	1	1/11/1965	In Victoria known with certainty only from clay soils on the banks or floodplains of the Murray River near Cohuna, Kerang and Piangil, and the extreme north-west corner of the State.	Low - There is a lack of recent and abundant records within a 10km radius.
Stenopetalum velutinum	Velvet Thread-petal	VBA			v	2	3/09/1981	Very rare and now apparently only known from a 1981 collection from Mildura and a 2003 report from the Big Desert.	Low - There is a lack of recent and abundant records within a 10km radius.
Swainsona microphylla	Small-leaf Swainson-pea	VBA			r	30	29/08/2011	Species mostly grows in light soils on sand-hills and sandplains. It is mainly confined to the far north-west of the State but also occurs near Echuca and on the upper Snowy River near Willis.	**Recorded**
Swainsona murrayana	Slender Darling-pea	PMST	VU	L	e			Often grows in depressions on heavy soils in Bladder Saltbush herbland, Black Box woodland and grassland communities. Species is frequently associated with Maireana species.	Low - Species has not been recorded within a 10km 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	VIC ADV LIST				
Swainsona phacoides	Dwarf Swainson-pea	VBA		L	e	3	25/01/1993	Mostly confined to the north-west of Victoria, downstream from Echuca where it grows on low dunes or sandy rises associated with lakes or the Murray River. Occasionally found on plains with heavier soils, but rarely in deep sand mallee communities.	Low - There is a lack of recent and abundant records within a 10km radius.
Swainsona pyrophila	Yellow Swainson-pea	PMST	VU		v			In Victoria, known only from the far north-west where it grows in mallee scrub environments on sandy or loamy soil. Usually only found after fire.	Low - Species has not been recorded within a 10km radius of the study area.
Swainsona reticulata	Kneed Swainson-pea	VBA		L	v	4	14/09/2001	Species usually grows on alluvial flats in grassland and grassy woodland environments. Mainly occurs in north-west Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Swainsona sericea	Silky Swainson-pea	VBA		L	v	7	29/08/2011	Species has a disjunct occurrence across the north of Victoria where it occurs in grassland and grassy woodland environments.	**High** - Study area likely supports suitable habitat and there are previous records in close proximity to the study area.
Tecticornia triandra	Desert Glasswort	VBA			r	1	1/09/1964	Occurs in samphire or mallee communities in the far north-west of Victoria.	Low - There is a lack of recent and abundant records within a 10km radius.
Templetonia egena	Round Templetonia	VBA			v	7	16/06/2011	In Victoria this species is confined to the north-west where it favours deep sandy soils in mallee and woodland communities.	Low - There is a lack of recent and abundant records within a 10km radius.
Tetragonia moorei	Annual Spinach	VBA			k	5	4/06/2013	Occurs in floodplains of the Murray River in the far north-west of Victoria, mainly growing in River Red Gum and Black Box woodlands on grey clay.	**Recorded**
Trachymene thysanocarpa	Mallee Trachymene	VBA			r	1	1/10/1928	A rare species of mallee, broombush scrub and grassland communities that grows on sandy loam soils. Known in Victoria from the Sunset Country in the north-west.	Low - There is a lack of recent and abundant records within a 10km radius.
Tragus australianus	Small Burr-grass	VBA			r #	5	5/04/1969	Rare in Victoria and generally confined to sandy tracts of the far north-west with disjunct occurrences further east.	Low - There is a lack of recent and abundant records within a 10km radius.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Trichanthodium skirrophorum	Woolly Yellow-heads	VBA			v	1	01/01/1770	In Victoria species is confined to the far north-west where it occurs in chenopod shrubland on saline and gypseous soils.	Low - There is a lack of recent and abundant records within a 10km radius.
Trigonella suavissima	Sweet Fenugreek	VBA			r	1	01/01/1770	Apparently confined to the drier north-west areas of Victoria where it grows along seasonal watercourses, floodplains and depressions.	Low - There is a lack of recent and abundant records within a 10km radius.
Triraphis mollis	Needle Grass	VBA			r	4	1/07/1986	Confined to dry sandy ground of north-west Victoria. Can be locally abundant following suitable rains and is occasionally known to persist in semi-improved pasture.	Low - There is a lack of recent and abundant records within a 10km radius.
Vittadinia condyloides	Club-hair New Holland Daisy	VBA			r	1	26/10/2010	Usually occurs in grassland and grassy woodland environments on better mallee soils and loams of the Riverina.	Low - There is a lack of recent and abundant records within a 10km radius.
Wahlenbergia tumidifructa	Mallee Annual-bluebell	VBA			r	2	22/09/2003	Occurs on sandy flats and shallow depressions in the Big Desert and the Hattah-Kulkyne area, and on black soils of the floodplain of the Murray River between Barmah and Strathmerton.	Low - There is a lack of recent and abundant records within a 10km radius.

Key to the table - Conservation status

- **Conservation Status in Australia (EPBC Act)** EN = Endangered, VU = Vulnerable
- **Conservation Status in Victoria (FFG Act)** L = Listed as threatened
- **Conservation Status in Victoria (Vic Advisory List)** x = Presumed Extinct in Victoria, e = Endangered in Victoria, v = Vulnerable in Victoria, r = Rare in Victoria, k = Poorly Known in Victoria, P = All infraspecific taxa included in Advisory List, # = native but some strands may be alien

C2 FAUNA LIKELIHOOD OF OCCURRENCE

Table C.2 Likelihood of occurrence assessment for fauna species returned in the VBA search and PMST query within a 10km buffer of the proposal.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Birds									
Accipiter novaehollandiae	Grey Goshawk	VBA		L	vu	3	1/04/2007	Found in most forest types, especially tall closed forests, including rainforests.	Low- Study area is unlikely to support the species' preferred habitat and there is a lack of abundant and recent records.
Actitis hypoleucos	Common Sandpiper	PMST	M		vu			The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats.	Low - The species may periodically occur at the nearby Kings Billabong Wetlands but there is minimal suitable habitat within the study area
Antigone rubicunda	Brolga	VBA		L as *Grus rubicundas*	vu as *Grus rubicunda*	1	12/12/1994	Occurs in well vegetated shallow freshwater wetlands, small isolated swamps in eucalypt forests, floodplains, grasslands, paddocks, ploughed fields, irrigated pastures, stubbles, crops, desert claypans, bore drains, tidal areas, mangroves, beach wastes.	Low - There is a lack of abundant and recent records.
Apus pacificus	Fork-tailed Swift	PMST	M					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.	**High** - There is a recent record of this species at Kings Billabong Wetlands (eBird) The species may fly over and forage at the study area.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Ardea alba	Great Egret	VBA		L	vu	78	28/04/2018	Migratory species that breeds in northern hemisphere. They prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands.	**High** - Parts of the study area may provide suitable habitat for this species and there are a high number of records in the surrounding area.
Ardea intermedia plumifera	Plumed Egret	VBA		L	en	46	15/06/2019	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.	**High** - Parts of the study area may provide suitable habitat for this species and there are a high number of records in the surrounding area.
Aythya australis	Hardhead	VBA			vu	31	9/10/2018	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.	**Moderate** - There are a high number of records in the surrounding area but no high quality deep water wetland habitat with suitable aquatic vegetation in the study area itself, although some potential for the species to occasionally utilise the edge of the Murray River.
Biziura lobata	Musk Duck	VBA			vu	20	5/12/2011	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.	**Moderate** - There are a high number of records in the surrounding area but no high quality deep water wetland habitat with suitable aquatic vegetation in the study area itself, although some potential for the species to occasionally utilise the edge of the Murray River.
Botaurus poiciloptilus	Australasian Bittern	PMST	EN	L	en			Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spike rushes. Whilst it can be found feeding in more open areas, the species relies on dense vegetation cover to breed and roost.	Low - There are no previous records of this species within a 10km radius. There is no potential habitat for this species in the study area.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Burhinus grallarius	Bush Stone-curlew	VBA		L	en	3	17/10/1973	Confined to grassy woodlands and farmlands, nests in Buloke, gum or box with a low, sparse grassy or herb understorey.	Low - There is a lack of abundant and recent records and no suitable potential habitat.
Calidris acuminata	Sharp-tailed Sandpiper	PMST	M					Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland.	**Moderate** - Although there is no high quality mudflat habitat at the study area, the species may occur should the saltmarsh habitat be periodically inundated. There are nearby observations of this species such as at Lake Hawthorn and Lake Ranfurly at Mildura (eBird).
Calidris alba	Sanderling	VBA			nt	1	1/01/1954	The Sanderling occurs in coastal areas around Australia. Inland records have occurred in most states of singles or small groups, birds probably on migration. They are regular around Corner Inlet, Shallow Inlet and Wilson's Promontory, and on the southwest coast between Killarney and Nelson. In eastern Victoria they have been recorded at Mallacoota, Lakes Entrance and Kalimna. Widespread records occur between Venus Bay and the southern Bellarine Peninsula, west to Breamlea, with a few isolated records from further west at Anglesea and Apollo Bay.	Low - Predominately a coastal wetland species. Additionally, there is a lack of abundant and recent records.
Calidris canutus	Red Knot	VBA	EN		en	1	1/01/1910	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 - Predominately a coastal wetland species. Additionally, there is a lack of abundant and recent records.

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			EPBC ACT	FFG ACT	VIC ADV LIST				
Calidris ferruginea	Curlew Sandpiper	VBA PMST	CR, M	L	en	3	24/01/1987	Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes.	Low - There is a lack of abundant and recent records in the VBA, although more recent observations near Mildura in eBird. The study area is unlikely to support this species given the lack of lakes or other wetland habitats.
Calidris melanotos	Pectoral Sandpiper	PMST	M		nt			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 - Predominately a coastal wetland species and there is no suitable wetland habitat at the study area. Additionally, there are no previous records of this species within a 10km radius.
Calidris subminuta	Long-toed Stint	VBA			nt	1	4/09/1982	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.	Low - There is a lack of abundant and recent records.

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Calidris tenuirostris	Great Knot	VBA	CR	L	en	1	26/01/1966	Occurs across the Australian coast but is more common in the north, especially in the Kimberly region, than the south. Species prefers sheltered coastal habitats, with large intertidal mudflats or sandflats but can be found on rock platforms shorelines with mangrove vegetation. They rarely occur inland.	Low - Species rarely occurs inland and there is a lack of abundant and recent records.
Ceyx azureus	Azure Kingfisher	VBA			nt	1	19/10/1977	Preferred habitat includes the banks of vegetated freshwater creeks and rivers but can also be found near lakes, swamps, dams, billabongs, tidal estuaries and mangroves.	Low - Although the study area may support potential habitat, there is a lack of abundant and recent records.
Chlamydera maculata	Spotted Bowerbird	VBA		L	cr	1	1/10/1932	Most commonly occurs in dry open sclerophyll woodlands dominated by acacias and/or eucalypts, especially where there is a dense understorey of small trees or shrubs, including fruit-bearing species such as Myoporum. They also often occur in dry woodlands vegetated with casuarinas, Wilga and Cypress-pines and will sometimes inhabit riverine associations, especially where they are adjacent to dry woodlands.	Low - Whilst the study area may support potential habitat, there is a lack of recent records.
Chlidonias hybrida	Whiskered Tern	VBA			nt	30	15/05/2019	Prefer shallow terrestrial freshwater wetlands, either permanent or ephemeral, including lakes swamps, billabongs, river pools, reservoirs, large dams, sewage ponds, flooded saltmarsh and farmland; often around floodwaters. Usually in wetlands with much submerged and emergent vegetation, such as grass, sedges, reeds and rushes, occasionally also in swamps of lignum, bluebush, canegrass or saltmarsh.	**Moderate** - This species has recently been recorded within Kings Billabong Wildlife Reserve and may periodically utilise habitat within the study area, although it is suboptimal. It is likely to fly over the study area.

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Chrysococcyx osculans	Black-eared Cuckoo	VBA			nt	2	18/02/1993	Mainly open vegetation associations, especially open woodlands and open shrublands. Often in open woodlands dominated by Eucalyptus, particularly stunted Mallee communities; Open woodlands of River Red Gum or Coolabah along rivers or round other wetlands in otherwise open grasslands.	Low - Whilst the study area may support potential habitat, there is a lack of abundant and recent records in the area. There is an observation from 2004 in eBird at Kings Billabong Park, however no other records of the species, so the study area is unlikely to regularly support the species.
Cinclosoma castanotum	Chestnut Quail-thrush	VBA			nt	2	17/02/2011	Occurs in a wide range of arid and semi-arid habitats, mainly in the low shrubs and undergrowth of mallee scrub but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine.	**Moderate** - Despite only a few records in the area, the study area may provide habitat for this species. The species was not recorded during targeted bird surveys or incidentally. As such the study area itself is unlikely to support permanent resident birds.
Circus assimilis	Spotted Harrier	VBA			nt	6	2/07/2019	Found in open grasslands, woodland including Mallee country, inland riparian woodland and shrubland particularly in arid and semi-arid areas.	**Moderate** - The study area is likely to provide suitable habitat for this species and there are records in the surrounding area. However, the species was not recorded during targeted bird surveys. As such, the study area is unlikely to regularly support foraging or breeding for this species.

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Climacteris affinis	White-browed Treecreeper	VBA		L	vu	11	29/12/2008	Usually inhabit shrublands and woodlands in arid and semi-arid regions. They mostly occur in tall shrubland and low woodland dominated by acacias, such as Mulga, Western Myall and Gidgee, or casuarinas, such as Buloke and Belah, or woodlands dominated by cypress-pines Callitris. The species sometimes inhabits Coolabah, River Red Gum or Black Box woodlands near wetlands. The understorey of suitable woodlands may be closed and dominated by a lower layer of shrubs, open and dominated by grasses, or absent altogether.	**Moderate** - The species was not recorded during recent targeted surveys and the study area does not support preferred habitat. However there is a record from within the study area in 1993 so the species may move through or utilise the study area. As there are no recent records from Kings Billabong Park in eBird, if present, the habitat is unlikely to support a high density population.
Climacteris picumnus	Brown Treecreeper	VBA			nt	174	25/07/2019	Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range. Mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts.	**Recorded** - The species was recorded within the study area, almost exclusively toward the Murray River in Grassy Riverine Forest and adjacent Lignum Swampy Woodland.
Coracina maxima	Ground Cuckoo-shrike	VBA		L	vu	6	7/10/2017	Inhabits open, usually rather dry, lightly timbered or sparsely vegetated country, including low eucalypt woodland and acacia scrub where they hunt out in the open on the ground.	**Moderate** - Although records in the area are infrequent, the species (which is nomadic) may periodically occur as the study area is likely to support suitable habitat features. The species was not recorded during targeted surveys.
Dromaius novaehollandiae	Emu	VBA			nt	4	11/08/2010	The main habitats of the Emu are sclerophyll forest and savanna woodland. These birds are rarely found in rainforest or very arid areas.	Low - Although the study area supports potential habitat, the species (or signs of the species) were not recorded during recent surveys. When considered with the low number of records, and lack of records for Kings Billabong Park since 1984 in eBird, the species is unlikely to be a frequent visitor or resident at the study area.

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Egretta garzetta	Little Egret	VBA		L	en	3	3/06/2018	Little Egrets inhabit mudflats, saltworks and shallow margins of tidal estuaries and inland rivers and lakes.	**Moderate** - There are some recent records and the study area may support some of the species' preferred habitat features. The species may utilise the Murray River edge of visit flooded saltmarsh.
Falco hypoleucos	Grey Falcon	VBA		L	en	3	10/04/1997	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 - Whilst the study area may support potential habitat, this species would be a vagrant in the area.
Falco subniger	Black Falcon	VBA		L	vu	3	11/07/2018	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** - There are some recent records and the study area may support some of the species' preferred habitat features. However, the species was not recorded during recent targeted bird surveys, and is therefore unlikely to be currently breeding at the study area or utilising the study area regularly for foraging.
Gallinago hardwickii	Latham's Snipe	VBA PMST	M		nt	1	18/11/1953	Occurs in freshwater or brackish wetlands generally near protective vegetation cover.	Low - There is a lack of abundant and recent records.
Gelochelidon macrotarsa	Australian Gull-billed Tern	VBA		L as *Sterna nilotica*	en as *Sterna nilotica macrotarsa*	2	25/09/1995	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 - There is a lack of abundant and recent records.

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Geopelia cuneata	Diamond Dove	VBA		L	nt	4	22/04/2019	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.	**Moderate** - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.
Grantiella picta	Painted Honeyeater	VBA PMST	VU	L	vu	1	1/01/1965	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 is a lack of abundant and recent records.
Haliaeetus leucogaster	White-bellied Sea-Eagle	VBA		L	vu	11	15/06/2019	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs.	**High** - Parts of the study area may provide suitable habitat for this species and there is a high number of records in the surrounding area, including observations from Kings Billabong Park in eBird. As the species was not recorded in the study area during recent targeted surveys or opportunistically, it is considered unlikely to be currently breeding within or regularly utilising the study area.
Hydroprogne caspia	Caspian Tern	VBA		L	nt	63	23/07/2019	Occur in most coastal regions, with scattered records throughout the western half of the state, including the Murray Valley.	Low - The species has recently been recorded within Kings Billabong Wildlife Reserve and is likely to fly over the study area, although there is no suitable wetland habitat in the study area for foraging.

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Ixobrychus dubius	Australian Little Bittern	VBA		L	en	3	1/02/1976	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 - Although there may be some potential habitat nearby the study area, there is a lack of recent records in the area.
Lathamus discolor	Swift Parrot	VBA	CR	L	en	1	23/07/1992	In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering Acacia pycnantha.	Low - Study area lacks suitable habitat to support this species and there is a lack of abundant and recent records.
Leipoa ocellata	Malleefowl	VBA PMST	VU	L	en	1	1/01/1975	Ground dwelling species found in scrubland and woodland dominated by Mallee and wattle species. Found across New South Wales, Victoria, South Australia and Western Australia.	Low - There is a lack of abundant and recent records and no suitable mallee habitat.
Limosa lapponica	Bar-tailed Godwit	VBA	VU			1	1/11/1959	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 - Predominately a coastal wetland species. Additionally, there is a lack of abundant and recent records.

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Lophochroa leadbeateri	Major Mitchell's Cockatoo	VBA		L	vu	11	11/08/2010	Favours conifers, sheoaks and eucalyptus woodlands in arid or semi-arid regions.	**Moderate** - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.
Lophoictinia isura	Square-tailed Kite	VBA		L	vu	4	27/07/2019	This species hunts primarily over open forest, woodland and Mallee communities as well as over adjacent heaths and other low scrubby habitats in wooded towns.	**Moderate** - There are some recent records and the study area may support some of the species' preferred habitat features. The species was not recorded during recent targeted surveys and is therefore unlikely to be regularly utilising the study area.
Manorina melanotis	Black-eared Miner	PMST	EN	L	cr			The Black-eared Miner occurs in extensive mallee eucalypt shrublands, particularly in areas that are unburnt for more than 40 years. It formerly occurred in the 'Murray Mallee' region of South Australia, Victoria and New South Wales, but is now absent from much of its range.	Low - There are no previous records of this species within a 10km radius and there is no suitable mallee habitat in the study area or nearby.
Melanodryas cucullata	Hooded Robin	VBA		L	nt	56	16/06/2019	Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and Mallee and acacia shrubland.	**High** - The study area is likely to provide suitable habitat and the species has recently been recorded within Kings Billabong Wildlife Reserve. The species was not recorded during recent targeted surveys and is therefore unlikely to regularly utilise the study area itself.

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Motacilla flava	Yellow Wagtail	PMST	M					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 - Study area lacks high quality suitable habitat and there are no previous records of this species within a 10km radius.
Myiagra cyanoleuca	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 - Study area lacks suitable habitat to support this species and there are no previous records of this species within a 10km radius.
Ninox connivens	Barking Owl	VBA		L	en	1	3/01/1944	Found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat. They are usually found in habitats that are dominated by Eucalyptus species, particularly red gum, and, in the tropics, paperbark species. They prefer woodlands and forests with a high density of large trees and particularly sites with hollows that are used by the owls as well as their prey.	Low - There is a lack of abundant and recent records. The species was not recorded during recent targeted surveys (call-playback and spotlighting).
Numenius madagascariensis	Eastern Curlew	PMST	CR, M	L	vu			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 - Predominately a coastal wetland species. Additionally, there are no previous records of this species within a 10km radius.
Nycticorax caledonicus	Nankeen Night-Heron	VBA			nt	16	23/10/2017	The Nankeen Night Heron frequents well-vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens.	**High** - Parts of the study area may provide suitable habitat for this species and there is a high number of records in the surrounding area. Although the species was not detected during recent surveys, presence should be assumed.

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Oreoica gutturalis	Crested Bellbird	VBA		L	nt	13	10/08/2012	Occurs west of the great dividing range from semi-arid to arid shrublands, woodlands, spinifex and chenopod plains.	Low - The study area supports potential habitat for this species and there are records in the surrounding area. However, the species was not detected in targeted surveys and there are no observations from Kings Billabong Park in eBird.
Oxyura australis	Blue-billed Duck	VBA		L	en	9	3/12/2006	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** - There are some recent records and the study area supports some potential low quality habitat near the Murray River. The species is also likely to fly over the study area.
Pedionomus torquatus	Plains-wanderer	PMST	CR	L	cr			Sparse grasslands that have 50% bare ground, widely spaced plants up to 10 cm high and remaining standing vegetation less than 5 centimetres in height. Occasionally uses cereal stubble but cannot persist in agricultural landscape. Suitable habitat tends to be restricted to small (50-300 ha) patches that do not support dense pasture growth under any seasonal conditions.	Low - There are no previous records of this species within a 10km radius. Study area does not support preferred habitat.
Pezoporus occidentalis	Night Parrot	PMST	EN	L	cr			Cryptic species which usually inhabits arid or semi-arid grasslands that are dominated by spinifex. Also recorded in shrublands dominated by samphire, bluebush and saltbush.	Low - There are no previous records of this species within a 10km radius. No spinifex in study area.
Phalacrocorax varius	Pied Cormorant	VBA			nt	85	25/07/2019	Inhabit terrestrial wetlands and coastal waters. Inland on lakes, swamps, rivers, billabongs, pools and sewage ponds. Associated with large sheets of open water, particularly permanent freshwater lakes and reservoirs and open water in deep freshwater marshes.	**High** - The study area is likely to provide suitable habitat, particularly along the Murray River and the species has recently been recorded within Kings Billabong Wildlife Reserve.

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Platalea regia	Royal Spoonbill	VBA			nt	7	15/10/2017	Found in terrestrial wetlands, sheltered marine habitats and wet grasslands; permanent and ephemeral waters used where available in arid interior. Feeds in shallow waters (less than 0.4m) over substrate of sand, mud or clay.	**Moderate** - There are some recent records although the study area is unlikely to regularly support habitat. After high rainfall or flood, lowing-lying parts of the study area may provide foraging habitat.
Plegadis falcinellus	Glossy Ibis	VBA			nt	6	7/10/2017	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons.	**Moderate** - There are some recent records in the area. Although the study area does not support freshwater marsh habitat, the species may periodically occur in low-lying areas after rain, or forage in the saltmarsh habitat in the study area.
Polytelis anthopeplus	Regent Parrot	VBA PMST	VU as *P. anthopeplus monarchoides*	L as *P. anthopeplus monarchoides*	vu as *P. anthopeplus monarchoides*	19	10/09/2018	Primarily inhabits riparian or littoral River Red Gum forests or woodlands and adjacent Black Box woodlands. Nearby open Mallee woodland or shrubland, usually with a ground cover of spinifex or other grasses, supporting various eucalypts, as well as Belah, Buloke or Slender Cypress Pine also provide important habitat for this species. They often occur in farmland, especially if the farmland supports remnant patches of woodland along roadsides or in paddocks. It seldom occurs in more extensively cleared areas.	**High** - The study area is likely to provide suitable habitat and the species has recently been recorded within Kings Billabong Wildlife Reserve. For surveys conducted for the broader project in NSW, the species was recorded on the other side of the Murray River within the NSW project area (directly opposite the current Victorian study area). However, the species was not recorded during recent targeted surveys, and the habitat in the study area is therefore unlikely to be frequently utilised or currently used for breeding.

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Porzana pusilla	Baillon's Crake	VBA		L	vu	5	3/10/1999	Baillon's Crakes inhabit vegetated wetlands, usually with fresh or brackish water, including swamps, billabongs, lakes and reservoirs and temporarily inundated areas. They often prefer wetlands with floating aquatic vegetation.	Low- There is no suitable wetland habitat within the study area.
Ptilotula plumula	Grey-fronted Honeyeater	VBA			vu	1	2/08/1997	Endemic to Australia, this species occurs in open woodlands, mallee and mulga-dominated scrub across inland Australia.	Low - There is a lack of abundant and recent records. Species was not recorded during targeted surveys and no nearby observations on eBird.
Rostratula australis	Australian Painted-snipe	VBA PMST	EN	L	cr	1	1/01/1910	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such River Red Gum, Poplar Box or shrubs such as Lignum or Samphire.	Low - There is a lack of abundant and recent records of this species in the locality.
Spatula rhynchotis	Australasian Shoveler	VBA			vu	12	9/10/2018	Uses a wide variety of wetlands. Prefers large permanent lakes or swamps that have abundant cover.	Low - Species may fly over but there is no suitable habitat in the study area and the Murray River is unlikely to be utilised.
Stagonopleura guttata	Diamond Firetail	VBA		L	nt	3	1/01/1970	Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and Mallee.	Low - There is a lack of abundant and recent records. Species was not recorded during targeted surveys.
Stictonetta naevosa	Freckled Duck	VBA		L	en	9	22/04/2019	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.	Low - Species may fly over but there is no suitable habitat in the study area and the Murray River is unlikely to be utilised.
Stiltia isabella	Australian Pratincole	VBA			nt	1	10/01/1973	Occurs inland in northern and eastern Australia, as well as some offshore islands. Primarily found inhabiting sparsely vegetated areas near water such as open inland plains and wooded plains.	Low - There is a lack of abundant and recent records.

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Struthidea cinerea	Apostlebird	VBA		L		22	5/12/2011	The Apostlebird is found in open dry forests and woodlands near water. It may also be found in farmlands with trees, as well as along roadsides, in orchards and on golf courses.	**High** - There are recent records, including from Kings Billabong Park (eBird). However the species was not recorded during targeted surveys so may not be a regular resident of the study area itself.
Todiramphus pyrrhopygius	Red-backed Kingfisher	VBA			nt	10	17/02/2011	Species is known to occur in sparse inland woodlands, scrublands and often far from water. Is also known from gibber, spinifex and other grasslands along with tree-lined dry watercourses and in some grassy tropical woodlands.	**Moderate** - There are some records in the area and the study area may support some of the species' preferred habitat features. There are no observations of this species from Kings Billabong Park in eBird. Species was not recorded during targeted surveys but has the potential to periodically occur.
Tringa glareola	Wood Sandpiper	VBA			vu	1	10/01/1973	Found in well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes with emergent aquatic plants and taller fringing vegetation.	Low - There is a lack of abundant and recent records and no suitable habitat.
Tringa nebularia	Common Greenshank	VBA PMST	M		vu	5	24/01/1987	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity including estuaries, mudflats, mangrove swamps, lagoons, billabongs, swamps, sewage farms and flooded crops.	Low - Study area is unlikely to support suitable habitat to support this species and there is a lack of abundant and recent records.
Tringa stagnatilis	Marsh Sandpiper	VBA			vu	3	17/05/2011	Permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks.	Low - The study area is unlikey to support the species' preferred habitat features.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Turnix velox	Little Button-quail	VBA			nt	2	29/06/1982	This species is known to inhabit grassy plains, creek flats, woodlands, burned areas, areas containing saltbush, spinifex, mulga and Mallee species. It is also known to occur along the margins of wetlands and within crops, pastures, stubble.	Low - There is a lack of recent records and species was not recorded during targeted surveys.
Mammals									
Bettongia lesueur graii	Burrowing Bettong (mainland subspecies)	VBA	EX			7	01/01/1857	Now extinct, this species' habitat once ranged from open eucalypt or acacia woodland with a grass and shrub understorey to sandridge desert with spinifex hummocks and sparse shrubs.	Negligible - Species is extinct
Bettongia penicillata penicillata	Brush-tailed Bettong (eastern subspecies)	VBA	EX	L	ex	5	01/01/1857	Now extinct, this species was once associated with grassland, heath and sclerophyll woodland environments as well as open eucalypt forest with low woody scrub, tussock grass and occasional bare patches.	Negligible - Species is extinct
Cercartetus concinnus	Western Pygmy-possum	VBA			nt	1	1/01/1955	In Victoria it occurs in the west and north west of the state in temperate to arid woodland environments that support dense heath understorey such as Banksia and Hakea species.	Low - There is a lack of abundant and recent records. Species was not recorded on arboreal cameras during the targeted fauna surveys.
Chaeropus ecaudatus	Pig-footed Bandicoot	VBA	EX	L	ex	4	01/08/1857	Now extinct, this species appears to have been a plains dweller with a preference for open woodlands supporting an understorey of shrubs and grasses.	Negligible - Species is extinct
Dasyurus geoffroii	Western Quoll	VBA	VU	I	rx	2	01/01/1857	Species is extinct in Victoria, now only known to occur in forest, mallee shrublands, woodland and desert habitats in Western Australia.	Negligible - Species is considered to be extinct in Victoria
Isoodon sp. (c.f. auratus)	Short-nosed Bandicoot (inland form)	VBA			ex	5	01/01/1857	Species is extinct.	Negligible - Species is extinct

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Lagorchestes leporides	Eastern Hare-wallaby	VBA	EX	L	ex	3	01/01/1857	Species is extinct.	Negligible - Species is extinct
Leporillus apicalis	Lesser Stick-nest Rat	VBA	EX	L	ex	5	01/01/1856	Species is extinct.	Negligible - Species is extinct
Leporillus conditor	Greater Stick-nest Rat	VBA	VU	I	rx	1	01/01/1856	Species is extinct in Victoria but due to reintroduction from island populations, the species now persists in SA and WA where it inhabits perennial shrublands that support dense vegetation, in particular succulent and semi-succulent plant species.	Negligible - Species is considered to be extinct in Victoria
Myotis macropus	Southern Myotis	Other			nt			Found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. They generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, road culverts, buildings, under bridges and in dense foliage.	Low - There are no previous records of this species within a 10 km radius of the study area and no *Myotis* bats were recorded during targeted surveys.
Nyctophilus corbeni	Corben's Long-eared Bat	PMST	VU	L as *Nyctophilus timoriensis*	en			In Victoria, species occurs in the north -west, within the Murray Darling Basin. It occupies a range of inland woodland vegetation types including box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee.	Low - There are no previous records of this species within a 10 km radius however the species was recorded in Mallee vegetation for the NSW component of this project (approx. 15 km north of the Murray River). Based on the results of targeted surveys and further research into habitat preferences, the species is considered unlikely to occur.
Onychogalea fraenata	Bridled Nail-tailed Wallaby	VBA	EN	L	rx	2	01/01/1857	Species is extinct in Victoria, now only known to occur in Queensland in woodland environments with a preference for areas with fertile soil and vegetation edges.	Negligible - Species is considered to be extinct in Victoria

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Ornithorhynchus anatinus	Platypus	VBA		N		1	11/11/1952	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.	Low - There is a lack of abundant or recent records.
Perameles notina	Bandicoot	VBA	EX	L	ex	4	01/01/1857	Species is extinct.	Negligible - Species is extinct
Phascogale calura	Red-tailed Phascogale	VBA	VU	L	rx	2	01/01/1857	Species is extinct in Victoria	Negligible - Species is considered to be extinct in Victoria
Pseudomys bolami	Bolam's Mouse	VBA		I	rx	26	01/01/1857	Recorded in a wide variety of habitats, with a preference for chenopod shrubland plains or low mallee woodland where there is a developed understorey of Acacia, Dodonaea or Eremophila species. Considered extinct in Victoria (but see likelihood)	Low - Although the species is considered to be extinct in Victoria, it is quite a cryptic and poorly known species and was recorded just on the other side of the Murray River for surveys for the project in NSW. However, it was not recorded in the study area during targeted surveys for this project.
Pseudomys desertor	Desert Mouse	VBA		I	rx	1	01/01/1856	Species is extinct in Victoria	Low - Species is considered to be extinct in Victoria, although is another cryptic species so the likelihood is not negligible. Species was not recorded in NSW.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	VBA		L	dd	2	3/10/2008	Roosts in hollows in old trees, and sometimes in the abandoned nests of sugar gliders. These bats usually form small colonies of up to 30 and feed on insects living in open forests and open grasslands.	Low - There is a lack of abundant and recent records and the species was not recorded during targeted surveys.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Reptiles									
Chelodina expansa	Broad-shelled Turtle	VBA		L	en	3	27/10/2015	A river turtle that inhabits permanent streams and waterholes within the Murray-Darling River system of South Eastern Australia. Preferred aquatic habitat consists of structured vegetation with emergent reeds, submerged logs and root systems while undisturbed dryland habitats with moderate to dense vegetation cover is selected for nesting purposes.	**Moderate** - There are some recent records and the study area supports some of the species' preferred habitat features along the Murray River.
Chelodina longicollis	Eastern Snake-necked Turtle	VBA			dd	5	4/06/1996	Typically inhabiting swamps, lagoons and slow-moving rivers and creeks, but often seen wandering overland far from any apparent water.	**High** - Although there are no recent records, potential habitat is present along the Murray River and the species may roam between waterbodies.
Demansia psammophis	Yellow-faced Whip Snake	VBA			nt	6	12/02/2016	Occurs in a wide range of habitats from the coast of Australia to the arid interior including forests, grasslands, dry rainforests, modified pastures and even urban environments.	**Recorded** - The species was recorded during surveys for this proposal.
Emydura macquarii	Murray River Turtle	VBA			vu	2	1/01/1965	Primarily found in the Murray River Basin and its major tributaries.	**Moderate** - Whilst the nearby wetlands and river could provide suitable habitat for this species, there is a lack of recent records in the area. However, the species may persist.
Lerista timida	Dwarf Burrowing Skink	VBA		L	en	17	14/02/2005	In Victoria, the species occurs in the semi-arid zone where it shelters under ground debris in chenopod shrublands of Black Box Woodland ecosystems (Robertson & Coventry 2019). The north-west of Victoria is the southern limit of its distribution, being more common and widespread in inland areas of most of the other states and territories.	**Moderate** - There are recent records and the study area supports some of the species' preferred habitat features. However past disturbance and high rabbit density in the study area may have affected habitat quality in the study area. The species was not recorded during targeted surveys (tile survey).

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Morelia spilota metcalfei	Carpet Python	VBA		L	en	2	14/01/2005	Occurs in the north of Victoria where it inhabits two distinct environments; River Red Gum forests and associated Black Box woodlands along the major watercourses and rocky hills, often within Blakely's Red Gum Woodlands. There are also some records from other vegetation types, such as mallee shrublands, Callitris woodlands and freshwater swamps.	Low - Whilst the study area may support some suitable habitat, there are no records in the immediate vicinity and the site is located near the southern extent of the species' known distribution.
Pseudonaja aspidorhyncha	Patch-nosed Brown Snake	VBA			nt	4	23/12/1994	The species is found across central-southern Australia where it occurs in arid and semiarid habitats, including grassland, shrubland, savannah woodland and dry forest.	Low - There is a lack of recent records and the species was not recorded during fauna surveys.
Rhynchoedura ornata	Beaked Gecko	VBA		L	cr	1	19/03/1928	In Victoria, the species is restricted to the semi-arid zone in the far north west. It occurs in Black Box Woodlands, Pine-buloke Woodlands, and sometimes Mallee, where it shelters in spider burrows during the day.	Low - Although originally considered to have a moderate likelihood due to its cryptic and nocturnal nature, following habitat assessment and targeted survey (specifically spotlighting), the species is now considered unlikely to occur in the study area due to past disturbance and habitat modification combined with the lack of recent records.
Tiliqua occipitalis	Western Blue-tongued Lizard	VBA			nt	2	9/10/2008	Occurs in semi-arid areas, often associated with mallee and spinifex including mixed mallee/Triodia communities. May occasionally extend into nearby Black Box Woodland or Pine-Buloke Woodlands.	Low - Whilst the study area may support some suitable habitat, the record from 2008 is from NSW and the other record a museum specimen from 1954. There is no primary mallee habitat present. Species was not observed across several field surveys or during targeted survey.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Tympanocryptis lineata	Lined Earless Dragon	VBA		L	cr	1	4/10/1948	In Victoria, appears to be largely restricted to grassland, samphire and saltbush shrubland habitats of the Mallee and Pine-Buloke Woodland ecosystems. Shelters in burrows or under debris when inactive.	Low - There is a lack of recent records and the study area does not provide high quality potential habitat.
Varanus varius	Lace Monitor	VBA			en	2	2/11/2007	Occurs in well-timbered areas, from dry woodlands to cool temperate southern forests. Arboreal, ascending large trees when disturbed. Will shelter in tree hollows, hollow logs and burrows dug by other animals. Active termite mounds are required for nesting.	**Recorded** - Species was recorded using remote terrestrial and arboreal cameras, and Lace Monitor tracks were observed across vehicle access tracks under the existing powerlines. No termite mounds were observed in the study area although potential shelter for the species in the form of burrows, some rare hollow logs and some large hollows near the Murray River are present.
Vermicella annulata	Bandy Bandy	VBA		L	vu	1	31/12/1929	In Victoria, this burrowing snake is restricted to northern areas of the warm temperate and semi-arid zones. It is rarely seen, although it has been recorded in Dry Sclerophyll Forest, Box-Ironbark Forest, Black Box Woodland, Pine-Buloke Woodland and Mallee ecosystems. Feeds on Blind Snakes.	Low - The species is rarely seen, however there are no records in the locality since 1929 which makes the species' persistence in the area unlikely.
Amphibians									
Litoria raniformis	Growling Grass Frog	VBA PMST	VU	L	en	10	22/11/1999	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 - The study area does not currently support suitable habitat for this species. There is no wetland habitat and nearby modelled wetland EVCs are dry. Further, recent records are lacking in the area and the site is at the northern extent of the species' distribution. Unless the area has substantial rain events, the species is not likely to occur or move through the study area.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Fish									
Ambassis agassizii	Agassiz's Glassfish	VBA		L	rx	1	15/03/1929	Occurs in freshwater habitats in the Murray-Darling basin, although is considered naturally extinct in Victoria.	Low - Species is considered to be extinct in Victoria. No aquatic habitat in the study area itself.
Bidyanus bidyanus	Silver Perch	VBA PMST	CR	L	vu	2	1/01/1981	Habitat includes rivers and large streams although preferred conditions are not definitive. Silver Perch has been recorded from 12 river basins in Victoria, with the majority of records from the Goulburn River, Loddon River, Murray Riverina, and the Mallee.	Low - There is no aquatic habitat in the study area itself.
Craterocephalus fluviatilis	Murray Hardyhead	PMST	EN	L	cr			Species' distribution appears limited to northern Victoria where they occur along the edges of slow-flowing lowland rivers, as well as in lakes, billabongs and backwaters. They are often found amongst aquatic weeds, in both fresh and quite saline waters.	Low - There are no previous records of this species within a 10km radius and no aquatic habitat within the study area.
Craterocephalus stercusmuscarum fulvus	Unspecked Hardyhead	VBA		L		5	6/12/2015	It occurs around the margins of large, slow-flowing, lowland rivers, and in lakes, backwaters and billabongs where it prefers slow-flowing or still habitats with aquatic vegetation and sand, gravel or mud substrates. However, the species distribution is restricted or absent from most tributaries in Victoria.	Low - There is no aquatic habitat in the study area itself.
Engaeus sericatus	Hairy Burrowing Crayfish	VBA			vu	1	23/01/2000	A small burrowing crayfish from the lowland regions of western and south western Victoria. Generally found along the edge of rivers and streams or in small seepages and creeks.	Low - Species is unlikely to be regularly surveyed however the record in the locality is likely to be an anomaly/mistake as it is so far from the usual range of this species. No burrowing crayfish burrows were observed during surveys.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Galaxias rostratus	Flathead Galaxias	PMST	CR	X	vu			Only known in the Southern half of the Murray-Darling Basin system. Inhabits a variety of habitats including billabongs, lakes, swamps, and rivers with a preference for still or slow flowing waters.	Low - There are no previous records of this species within a 10km radius in the VBA although it is listed on the species list for the Kings Billabong Wetlands in the Directory of Important Wetlands. There is no aquatic habitat in the study area itself.
Maccullochella peelii	Murray Cod	PMST	VU	L	vu			Occurs in lower reaches of the Murray-Darling Basin, where the water temperature is warm. The diverse range of habitats frequented by the Murray Cod includes slow moving rivers, murky billabongs and clear, rocky rivers.	Low - There are no previous records of this species within a 10km radius in the VBA although it is listed on the species list for the Kings Billabong Wetlands in the Directory of Important Wetlands. There is no aquatic habitat in the study area itself.
Macquaria ambigua	Golden Perch	VBA		X	nt	3	14/12/1995	Naturally inhabit the Murray-Darling river system (except at high elevations) and exist in the internal drainage systems of Lake Eyre and the Bulloo River. They prefer warm, slow moving, turbid streams.	Low - This species is listed on the species list for the Kings Billabong Wetlands in the Directory of Important Wetlands, however there is no aquatic habitat in the study area itself and there is a lack of recent records.
Macquaria australasica	Macquarie Perch	PMST	EN	L	en			Small discreet populations remain in the Murray Darling Catchment in Northern Victoria with a larger translocated population occurring in the Yarra River near Warrandyte.	Low - There are no previous records of this species within a 10km radius.
Melanotaenia fluviatilis	Murray-Darling Rainbowfish	VBA		L	vu	5	23/01/2000	Typically found in the lowland areas of the Murray-Darling Basin, preferring slow-flowing rivers, wetlands and billabongs. In Victoria, cold winter temperatures restrict the species distribution to the Murray, Goulburn and Broken rivers.	Low - Although it may be present in the locality, this species is unlikely to utilise habitat within the study area itself.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE
			EPBC ACT	FFG ACT	VIC ADV LIST				
Tandanus tandanus	Freshwater Catfish	VBA		L	en	11	7/12/2015	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 - Although it may be present in the locality, this species is unlikely to utilise habitat within the study area itself.
Invertebrates									
Ogyris subterrestris subterrestris	Mildura Ogyris Butterfly	VBA		L	vu	1	01/01/1760	Confined to the north west of the state where it mostly occurs north of Hattah-Kulkyne National Park in low Melaleuca lanceolata woodland. Species has also previously been recorded at the Mildura cemetery and Murray-Sunset National Park. This species occurs in association with a sugar ant *Camponotus terebrans*.	Low - Nests of the required sugar ant species were not recorded during targeted Componotus surveys. As such, the Mildura Ogyris Butterfly is highly unlikely to occur.
Temognatha tricolorata	Jewel Beetle	Other			vu			Jewel Beetle species recorded from several locations around Australia. From Victoria, only known from Kings Billabong Reserve (Sluiter pers com 2020). This species is a specialist feeder on Red Gums.	**Moderate** - this species has been recorded nearby the study area and may occur in the River Red Gums along the Murray River. It was not recorded in scats or deceased during surveys but may still occur.

Key to the table - Conservation status

- **Conservation Status in Australia (EPBC Act)** CR = Critically Endangered, EN = Endangered, VU = Vulnerable, M = Migratory
- **Conservation Status in Victoria (FFG Act)** L = listed as threatened, N = Nominated for listing as threatened, X = Rejected for listing as threatened; taxon ineligible I = Rejected for listing as threatened; taxon invalid
- **Conservation Status in Victoria (Victorian Advisory List)** ex = Extinct in Victoria, rx = Regionally Extinct in Victoria, cr = Critically Endangered in Victoria, en = Endangered in Victoria, vu = Vulnerable in Victoria, nt = Near Threatened in Victoria, dd = Data Deficient in Victoria

APPENDIX D

THREATENED FAUNA TARGETED SURVEY RESULTS

D1 TILE SURVEY RESULTS

DATE/TIME	TIME	SURVEY NUMBER	LINE NUMBER	TEMPERATURE	CLOUD COVER	WIND (STILL, SLIGHT, LIGHT OR STRONG)	RAIN IN THE PAST 24 HOURS (NONE, LIGHT, HEAVY)	CURRENT RAIN	SPECIES RECORDED	COUNT	TILE NUMBER
6/10/2020	8:00	1	1	10	100%	Slight	None	None	Nil found	0	
6/10/2020	8:17	1	2	10	100%	Slight	None	None	Nil found	0	
6/10/2020	8:35	1	3	10	100%	Light	None	None	Nil found	0	
6/10/2020	8:50	1	4	10	90%	Light	None	None	Nil found	0	
6/10/2020	9:19	1	5	10	90%	Light	None	None	Nil found	0	
6/10/2020	9:37	1	6	10	90%	Light	None	None	Nil found	0	
9/10/2020	8:13	2	1	7	15%	Slight	Light (3mm at Irymple Sth)	None	Nil found	0	
9/10/2020	8:25	2	2	7	10%	Still	Light (3mm at Irymple Sth)	None	Nil found	0	
9/10/2020	8:42	2	3	9	10%	Slight	Light (3mm at Irymple Sth)	None	Nil found	0	
9/10/2020	8:54	2	4	9	10%	Still	Light (3mm at Irymple Sth)	None	Nil found	0	
9/10/2020	9:17	2	5	11	10%	Slight	Light (3mm at Irymple Sth)	None	Nil found	0	
9/10/2020	9:33	2	6	11	15%	Light	Light (3mm at Irymple Sth)	None	Morethia boulengeri	1	4
12/10/2020	8:09	3	1	11	5%	Still	None	None	Nil found	0	
12/10/2020	8:20	3	2	11	5%	Still	None	None	Nil found	0	
12/10/2020	8:35	3	3	11	5%	Still	None	None	Nil found	0	
12/10/2020	8:45	3	4	11	5%	Slight	None	None	Nil found	0	
12/10/2020	9:04	3	5	11	5%	Still	None	None	Nil found	0	
12/10/2020	9:16	3	6	11	5%	Slight	None	None	Menetia greyii	1	25
15/10/2020	8:02	4	1	20	20%	Still	None	None	Morethia boulengeri	1	17

DATE/TIME	TIME	SURVEY NUMBER	LINE NUMBER	TEMPERATURE	CLOUD COVER	WIND (STILL, SLIGHT, LIGHT OR STRONG)	RAIN IN THE PAST 24 HOURS (NONE, LIGHT, HEAVY)	CURRENT RAIN	SPECIES RECORDED	COUNT	TILE NUMBER
			1						Morethia boulengeri	1	21
15/10/2020	8:20	4	2	22	20%	Slight	None	None	Menetia greyii	1	1
			2						Menetia greyii	1	18
15/10/2020	8:45	4	3	22	20%	Slight	None	None	Nil found		
15/10/2020	8:55	4	4	22	20%	Slight	None	None	Nil found		
15/10/2020	9:13	4	5	22	20%	Slight	None	None	Menetia greyii	1	8
15/10/2020	9:26	4	6	22	25%	Slight	None	None	Nil found		
19/10/2020	10:00	5	1	14	0%	slight	none	none	Morethia boulengeri	1	16
19/10/2020	10:14	5	2	14	0%	slight	none	none	unidentified skink	1	8
			2						Morethia boulengeri	1	12
			2						unidentified skink probably Morethia boulengeri	1	20
			2						Menetia greyii	1	23
			2						Morethia boulengeri	1	25
19/10/2020	9:40	5	3	13	0	still	none	none	Menetia greyii	1	3
19/10/2020	9:30	5	4	13	0	still	none	none	nil		
19/10/2020	8:50	5	5	11	0	still	none	none	nil		
19/10/2020	8:32	5	6	11	0%	still	none	none	nil		
			6								
21/10/2020	7:57	6	2	13	5	slight	none	none	nil		
	7:57	6	1	13					nil		
21/10/2020	8:24	6	3	15	0	still	none	none	nil		
21/10/2020	8:24	6	4	15					Morethia boulengeri	1	2
21/10/2020	8:41	6	1	16.5					nil		

DATE/TIME	TIME	SURVEY NUMBER	LINE NUMBER	TEMPERATURE	CLOUD COVER	WIND (STILL, SLIGHT, LIGHT OR STRONG)	RAIN IN THE PAST 24 HOURS (NONE, LIGHT, HEAVY)	CURRENT RAIN	SPECIES RECORDED	COUNT	TILE NUMBER
21/10/2020	8:41	6	2	16.5	5	still	none		Morethia boulengeri	1	10
			2						Morethia boulengeri	1	11
			2						unidentified skink	1	16
21/10/2020	17:45	7	4	28	20	slight	none	none	nil		
21/10/2020	17:55	7	3	27	40	slight	none	none	Menetia greyii	1	20
21/10/2020	18:11	7	1	27	50	sllight	none	none	nil		
21/10/2020	18:22	7	2	27	60	slight	none	none	unidentified skink	1	11
			2			slight			Menetia greyii	1	21
21/10/2020	18:39	7	6	27	70	slight	none	none	Morethia boulengeri	1	26
			6						unidentified skink	2	4
21/10/2020	19:02	7	5	26	70	slight	none	none	unidentified skink	1	4
			5						unidentified skink	1	8

D2 BAT DETECTOR RESULTS

D2.1 PASSIVE DETECTORS

D2.1.1 PASSIVE 409353

SPECIES	DEPLOYMENT 1											DEPLOYMENT 2				TOTAL
Date	24/9/20	26/9/20	27/9/20	28/9/20	29/9/20	30/9/20	1/10/20	2/10/20	3/10/20	4/10/20	5/10/20	18/10/20	19/10/20	20/10/20	21/10/20	
Number of files per day	7	3	13	5	15	13	3	4	19	16	19	36	72	80	85	390
Species recorded on that day (identified to species level)	2	2	1	0	3	1	2	2	2	2	3	6	2	5	4	
Chocolate Wattled Bat Chalinolobus morio												☑		☑		
Gould's Wattled Bat Chalinolobus gouldi	☑	☐	☐	☐	☑	☐	☐	☑	☑	☑	☑	☑	☑	☑	☑	
Inland Broadnosed Bat Scoterepens balstoni												☑				
Inland Freetail Bat Mormopterus petersi		☑									☑	☑		☑	☑	
Southern Freetail bat Mormopterus planiceps	☑	☑	☑	☐	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑	☑	
White-striped Freetail Bat Austronomous australis					☑		☑	☑				☑		☑	☑	
Call complexes recorded on that day	1		1	1		1		1	2	1		1	1	1	1	
Mormopterus spp Mormopterus planiceps & petersi	☑	☐	☑	☑	☐	☑	☐	☑	☑	☐	☐	☐	☑	☑	☑	
Scotorepens sp Scoterepens balstoni / Scoterepens greyii									☑	☑		☑				

D2.1.2 PASSIVE 575424

SPECIES	DEPLOYMENT 1																	DEPLOYMENT 2				TOTAL
Date	24/9/20	26/9/20	27/9/20	28/9/20	29/9/20	30/9/20	1/10/20	2/10/20	3/10/20	4/10/20	5/10/20	6/10/20	7/10/20	8/10/20	9/10/20	10/10/20	11/10/20	18/10/20	19/10/20	20/10/20	21/10/20	
Number of files	10	37	34	46	161	56	262	155	205	145	165	116	37	157	143	159	7	74	121	109	98	2297
Identified to species level (number of species detected)	1	1	2	3	5	1	2	3	4	3	3	4	3	3	2	2	1	4	4	4	6	
Chocolate Wattled Bat Chalinolobus morio					☑													☑	☑		☑	
Gould's Wattled Bat Chalinolobus gouldi	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Inland Broadnosed Bat Scoterepens balstoni				☑	☑							☑	☑					☑				
Inland Freetail Bat Mormopterus petersi					☑		☑		☑					☑	☑							
Little Broad-nosed Bat Scoterepens greyii										☑										☑	☑	
Little Forest Bat Vespadelus vulturnus									☑	☑	☑								☑	☑	☑	
Southern Freetail bat Mormopterus planiceps	☐	☐	☑	☐	☑	☐	☐	☑	☑	☐	☑	☑	☐	☐	☐	☑	☐	☑	☑	☑	☑	
White-striped Freetail Bat Austronomous australis								☑				☑	☑	☑							☑	
Identified to call complex (number of complexes detected)			1		1	2	2	2	2	2	1	2	2	2	2	2	1	1	2	1	1	
Mormopterus spp Mormopterus planiceps & petersi	☐	☐	☑	☐	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Scotorepens sp Scoterepens balstoni / Scoterepens greyii						☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑			☑			

D2.1.3 PASSIVE 575458

SPECIES	DEPLOYMENT 1															DEPLOYMENT 2					TOTAL
Date	23/9/20	25/9/20	26/9/20	27/9/20	28/9/20	29/9/20	30/9/20	1/10/20	2/10/20	3/10/20	4/10/20	5/10/20	6/10/20	9/10/20	10/10/20	17/10/20	18/10/20	19/10/20	20/10/20	21/10/20	
Number of files	7	5	10	27	167	25	49	360	224	153	101	18	8	49	32	17	81	54	66	78	1531
Identified to species level (number of species)	**1**	**0**	**3**	**3**	**4**	**4**	**5**	**5**	**5**	**4**	**5**	**4**	**3**	**4**	**4**	**0**	**2**	**3**	**3**	**6**	
White-striped Freetail Bat Austronomous australis						☑		☑	☑		☑	☑			☑						
Chocolate Wattled Bat Chalinolobus morio			☑	☑			☑	☑	☑		☑	☑	☑	☑						☑	
Gould's Wattled Bat Chalinolobus gouldi	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☐	☑	☑	☐	☐	☑	☐	☑	
Inland Broadnosed Bat Scoterepens balstoni							☑														
Inland Freetail Bat Mormopterus petersi					☑	☑			☑	☑									☑	☑	
Little Broad-nosed Bat Scoterepens greyii																		☑		☑	
Little Forest Bat Vespadelus vulturnus					☑		☑	☑	☐	☑	☑	☐	☑	☑	☑	☐	☑	☑	☑	☑	
Southern Freetail bat Mormopterus planiceps			☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☐	☑	☐	☑	☑	
Identified to call complex (number of complexes)					**1**		**1**	**1**	**1**	**1**	**1**			**1**		**0**		**1**	**2**	**1**	
Mormopterus spp Mormopterus planiceps & petersi					☑			☑	☑	☑	☑			☑					☑	☑	
Scotorepens sp Scoterepens balstoni / Scoterepens greyii																		☑			
Long-eared Bat Nyctophilus sp																			☑		
Forest Bat sp Vespadelus baverstocki / V. regulus							☑														

D2.2 ACTIVE DETECTORS

D2.2.1 ACTIVE 1

SPECIES	19/10/20	20/10/20	TOTAL
Number of files	24	11	35
Identified to species level	3	1	
Gould's Wattled Bat Chalinolobus gouldii	☑		
Little Forest Bat Vespadelus vulturnus	☑		
Southern Freetail bat Mormopterus planiceps	☑	☑	
Identified to call complex	1		
Mormopterus spp Mormopterus planiceps & petersi	☑		

D2.2.2 ACTIVE 2

SPECIES	19/10/20	20/10/20	TOTAL
Number of files	42	7	49
Identified to species level	5	1	
Chocolate Wattled Bat Chalinolobus morio	☑		
Gould's Wattled Bat Chalinolobus gouldii	☑		
Little Forest Bat Vespadelus vulturnus	☑		
Southern Freetail bat Ozimops planiceps	☑	☑	
White-striped Freetail Bat Austronomous australis	☑		
Identified to call complex	1		
Mormopterus spp Mormopterus planiceps & petersi	☑		

D3 BIRD SURVEY DETAILED RESULTS

SURVEY POINTS

Three survey points were visited three times each, as detailed below. 20 minutes of survey was undertaken at each point per visit, and all birds which could be identified were recorded. The survey timer was paused when extra time was needed to document or identify a species.

KB1: survey point 1, located on the Murray River in the north of the study area. Site was a 400x50 m rectangular survey area

- Surveyed 22/09/2020, 9:10 am
- Surveyed 19/10/2020, 8:35 am
- Surveyed 20/10/2020, 8:05 am

KB2: survey point 2, located in Riverine Chenopod Woodland in the middle of the study area. Site was a circle with an 80m radius

- Surveyed 23/09/2020, 8:00 am
- Surveyed 19/10/2020, 9:30 am
- Surveyed 20/10/2020, 7:31 am

KB3: survey point 3, located in Riverine Chenopod Woodland in the south of the study area. Site was a circle with an 80m radius

- Surveyed 23/09/2020, 9:30 am
- Surveyed 19/10/2020, 10:00 am
- Surveyed 20/10/2020, 7:05 am

OPORTUNISTIC SURVEY

Records of birds were made opportunistically between surveys or when conducting other flora and fauna survey. Not all species which could be identified were recorded opportunistically - the surveyor focused on species which had not previously been recorded or which were of interest in characterising the avifauna of the study area. The following opportunistic lists were made:

KBLIGOPP: Kings Billabong Park Lignum and Saltmarsh Opportunistic

KBFOROPP: Kings Billabong Park Grassy Forest River Edge opportunistic records

KBMUROPP: Kings Billabong Murray River Opportunistic records

KBOPPORTUN: Kings Billabong Park woodland opportunistic records

SUBSTA: substation and surrounds opportunistic records

SPECIES SUMMARY

SPECIES	SUM OF QUANTITY
Australasian Darter	4
Australian Magpie	2
Australian Pelican	1
Australian Raven	4
Australian Reed-Warbler	1
Australian Ringneck	11
Australian Shelduck	2
Australian White Ibis	6
Australian Wood Duck	3
Black Kite	3
Black Swan	9
Black-faced Cuckoo-shrike	2
Brown Treecreeper	16
Brown-headed Honeyeater	3
Chestnut-crowned Babbler	22
Chestnut-rumped Thornbill	18
Common Bronzewing	4
Crested Pigeon	7
Crimson Rosella	31
Galah	21
Grey Shrike-thrush	7
Grey Teal	2
Laughing Kookaburra	1
Little Black Cormorant	1
Little Eagle	2
Little Friarbird	4
Little Raven	6
Magpie-lark	1
Mistletoebird	1
Noisy Miner	10
Peaceful Dove	2
Pied Butcherbird	5
Rainbow Bee-eater	7
Red-capped Robin	1
Red-rumped Parrot	52
Rufous Whistler	1
Sacred Kingfisher	3
Singing Honeyeater	3
Spiny-cheeked Honeyeater	7
Spotted Pardalote	1
Straw-necked Ibis	6
Striated Pardalote	12
Striped Honeyeater	5
Tree Martin	15
Variegated Fairy-wren	2
Weebill	21
Whistling Kite	7
White-plumed Honeyeater	8
White-winged Chough	6
Willie Wagtail	3
Yellow Thornbill	7
Yellow-rumped Thornbill	2
Grand Total	**381**

ALL SURVEY DATA

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
22/09/2020 8:08	Australian Shelduck	*Tadorna tadornoides*	2		41m alt.	-34.2821	142.248	KBMUROPP
22/09/2020 9:04	Black Swan	*Cygnus atratus*	4		45m alt.	-34.2821	142.248	KBMUROPP
22/09/2020 9:10	Red-rumped Parrot	*Psephotus haematonotus*	7		43m alt., NB: entering hollows	-34.2827	142.2483	KB1RIVER
22/09/2020 9:11	Galah	*Eolophus roseicapillus*	1		45m alt.	-34.2828	142.2483	KB1RIVER
22/09/2020 9:13	Brown Treecreeper	*Climacteris picumnus*	2	H	46m alt.	-34.2823	142.248	KB1RIVER
22/09/2020 9:14	Tree Martin	*Petrochelidon nigricans*	6		46m alt. nesting	-34.2822	142.2479	KB1RIVER
22/09/2020 9:19	Crimson Rosella	*Platycercus elegans*	5		44m alt.	-34.2813	142.2472	KB1RIVER
22/09/2020 9:21	Black Kite	*Milvus migrans*	1		44m alt.	-34.281	142.2471	KBMUROPP
22/09/2020 9:22	Australian Pelican	*Pelecanus conspicillatus*	1		42m alt., Flyover	-34.2809	142.2469	KB1RIVER
22/09/2020 9:22	White-plumed Honeyeater	*Lichenostomus penicillatus*	2		39m alt.	-34.2808	142.2468	KB1RIVER
22/09/2020 9:25	Willie Wagtail	*Rhipidura leucophrys*	1		40m alt.	-34.2803	142.2464	KB1RIVER
22/09/2020 9:26	Australasian Darter	*Anhinga novaehollandiae*	1		40m alt. calling and seen	-34.2803	142.2464	KB1RIVER
22/09/2020 9:28	Australian Ringneck	*Barnardius zonarius*	2		41m alt. in hollow	-34.2803	142.2463	KB1RIVER
22/09/2020 9:28	Striated Pardalote	*Pardalotus striatus*	2		41m alt.	-34.2803	142.2463	KB1RIVER
22/09/2020 9:40	Crimson Rosella	*Platycercus elegans*	2		48m alt.	-34.2809	142.2469	KBMUROPP
22/09/2020 9:40	Red-rumped Parrot	*Psephotus haematonotus*	4		47m alt.	-34.2809	142.2469	KBMUROPP
22/09/2020 9:41	Spotted Pardalote	*Pardalotus punctatus*	1	H	42m alt.	-34.281	142.247	KBMUROPP
22/09/2020 9:50	Little Raven	*Corvus mellori*	1		48m alt. on stick nest along river	-34.2814	142.2474	KBMUROPP
22/09/2020 9:55	Australian Wood Duck	*Chenonetta jubata*	2		45m alt.	-34.2815	142.2477	KBMUROPP
22/09/2020 10:05	Brown Treecreeper	*Climacteris picumnus*	5		46m alt. nesting in hollows and foraging	-34.2821	142.248	KBFOROPP
22/09/2020 10:08	Black Kite	*Milvus migrans*	1		45m alt.	-34.2822	142.248	KBFOROPP
22/09/2020 10:17	Crimson Rosella	*Platycercus elegans*	2		49m alt.	-34.2815	142.2466	KBLIGOPP

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
22/09/2020 10:17	White-plumed Honeyeater	*Lichenostomus penicillatus*	1		42m alt.	-34.2814	142.2465	KBLIGOPP
22/09/2020 10:18	Tree Martin	*Petrochelidon nigricans*	2		44m alt.	-34.2814	142.2463	KBLIGOPP
22/09/2020 10:19	Red-rumped Parrot	*Psephotus haematonotus*	7		43m alt. at hollow	-34.2813	142.2462	KBLIGOPP
22/09/2020 10:40	Chestnut-crowned Babbler	*Pomatostomus ruficeps*	6		48m alt.	-34.2818	142.2472	KBLIGOPP
22/09/2020 10:45	Little Friarbird	*Philemon citreogularis*	1		46m alt.	-34.282	142.248	KBFOROPP
22/09/2020 11:00	Straw-necked Ibis	*Threskiornis spinicollis*	6		46m alt., Flyover	-34.2847	142.2444	KBOPPORTUN
22/09/2020 11:04	Whistling Kite	*Haliastur sphenurus*	1		44m alt., Flyover	-34.2845	142.245	KBLIGOPP
22/09/2020 11:23	Weebill	*Smicrornis brevirostris*	7		46m alt.	-34.2848	142.2448	KBOPPORTUN
22/09/2020 11:25	Australian Magpie	*Gymnorhina tibicen*	1		47m alt.	-34.2848	142.2446	KBOPPORTUN
22/09/2020 11:25	Little Raven	*Corvus mellori*	3		46m alt.	-34.2848	142.2446	KBOPPORTUN
22/09/2020 12:25	Crimson Rosella	*Platycercus elegans*	1		40m alt.	-34.2862	142.2442	KBOPPORTUN
22/09/2020 13:34	Little Eagle	*Hieraaetus morphnoides*	1		39m alt., Flyover	-34.2869	142.2437	KBOPPORTUN
22/09/2020 14:17	Striated Pardalote	*Pardalotus striatus*	2	H	45m alt.	-34.2865	142.2438	KBOPPORTUN
22/09/2020 14:28	Pied Butcherbird	*Cracticus nigrogularis*	2		44m alt.	-34.2868	142.2436	KBOPPORTUN
22/09/2020 15:52	Mistletoebird	*Dicaeum hirundinaceum*	1		52m alt.	-34.2894	142.2415	KBOPPORTUN
22/09/2020 16:07	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	5		46m alt.	-34.2892	142.2412	KBOPPORTUN
23/09/2020 8:00	Weebill	*Smicrornis brevirostris*	2	H	52m alt.	-34.2879	142.2427	KB2WOOD
23/09/2020 8:08	Pied Butcherbird	*Cracticus nigrogularis*	1	H	52m alt.	-34.2885	142.2431	KB2WOOD
23/09/2020 8:18	Red-rumped Parrot	*Psephotus haematonotus*	3		49m alt.	-34.2883	142.2419	KB2WOOD
23/09/2020 8:20	Grey Shrike-thrush	*Colluricincla harmonica*	2		49m alt.	-34.2884	142.2421	KB2WOOD
23/09/2020 8:33	Grey Shrike-thrush	*Colluricincla harmonica*	1		47m alt.	-34.2897	142.2405	KBOPPORTUN
23/09/2020 8:33	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	1		45m alt.	-34.2895	142.2405	KBOPPORTUN
23/09/2020 8:35	Yellow Thornbill	*Acanthiza nana*	3		45m alt.	-34.2898	142.2403	KBOPPORTUN
23/09/2020 8:37	Galah	*Eolophus roseicapillus*	2		45m alt. , Flyover	-34.2904	142.2399	KBOPPORTUN

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
23/09/2020 8:39	Striated Pardalote	*Pardalotus striatus*	1	H		-34.2907	142.2392	KBOPPORTUN
23/09/2020 8:45	Red-rumped Parrot	*Psephotus haematonotus*	1		49m alt., Flyover	-34.2914	142.2373	KBOPPORTUN
23/09/2020 8:47	Australian Magpie	*Gymnorhina tibicen*	1		50m alt.	-34.2915	142.2373	SUBSTA
23/09/2020 8:47	Noisy Miner	*Manorina melanocephala*	2		50m alt.	-34.2915	142.2373	SUBSTA
23/09/2020 8:48	Crested Pigeon	*Ocyphaps lophotes*	5		50m alt.	-34.2915	142.2373	SUBSTA
23/09/2020 8:48	Red-rumped Parrot	*Psephotus haematonotus*	2		50m alt., Flyover	-34.2915	142.2372	SUBSTA
23/09/2020 8:51	Crimson Rosella	*Platycercus elegans*	4		49m alt., Flyover	-34.2916	142.2372	SUBSTA
23/09/2020 9:16	Rufous Whistler	*Pachycephala rufiventris*	1		49m alt., Male	-34.2903	142.2406	KBOPPORTUN
23/09/2020 9:26	Striped Honeyeater	*Plectorhyncha lanceolata*	2		52m alt.	-34.2897	142.2391	KBOPPORTUN
23/09/2020 9:27	Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	1		51m alt.	-34.2897	142.2392	KBOPPORTUN
23/09/2020 9:28	Little Friarbird	*Philemon citreogularis*	1		47m alt.	-34.2897	142.2391	KBOPPORTUN
23/09/2020 9:30	Common Bronzewing	*Phaps chalcoptera*	1		47m alt., Calling	-34.2897	142.239	KBOPPORTUN
23/09/2020 9:31	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	1		41m alt.	-34.2898	142.2393	KB3
23/09/2020 9:32	Weebill	*Smicrornis brevirostris*	2		46m alt.	-34.2898	142.2395	KB3
23/09/2020 9:34	Common Bronzewing	*Phaps chalcoptera*	1		45m alt.	-34.2902	142.2395	KB3
23/09/2020 9:36	Red-rumped Parrot	*Psephotus haematonotus*	2		46m alt. in dead tree	-34.2902	142.2394	KB3
23/09/2020 9:41	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	2		43m alt.	-34.2904	142.2405	KB3
23/09/2020 9:45	Variegated Fairy-wren	*Malurus lamberti*	2		46m alt.	-34.2899	142.2407	KB3
23/09/2020 9:50	Striped Honeyeater	*Plectorhyncha lanceolata*	1		53m alt.	-34.2899	142.2401	KB3
23/09/2020 9:51	Yellow Thornbill	*Acanthiza nana*	1		49m alt.	-34.2899	142.2401	KB3
23/09/2020 9:57	Singing Honeyeater	*Lichenostomus virescens*	2		45m alt.	-34.2896	142.2407	KBOPPORTUN
23/09/2020 10:40	Brown Treecreeper	*Climacteris picumnus*	2		43m alt.	-34.2818	142.2472	KBLIGOPP
23/09/2020 10:55	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	2		40m alt.	-34.2836	142.2458	KBLIGOPP
23/09/2020 11:05	Striated Pardalote	*Pardalotus striatus*	1	H	45m alt.	-34.2821	142.2478	KBFOROPP

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
23/09/2020 11:06	Crimson Rosella	*Platycercus elegans*	2		45m alt.	-34.2819	142.2478	KBFOROPP
23/09/2020 11:06	Tree Martin	*Petrochelidon nigricans*	1		43m alt.	-34.2819	142.2479	KBFOROPP
23/09/2020 11:09	Red-rumped Parrot	*Psephotus haematonotus*	1		40m alt.	-34.2815	142.2475	KBFOROPP
23/09/2020 11:11	White-plumed Honeyeater	*Lichenostomus penicillatus*	1		40m alt.	-34.2813	142.247	KBFOROPP
23/09/2020 11:13	Little Raven	*Corvus mellori*	2		41m alt.	-34.2812	142.2472	KBFOROPP
23/09/2020 15:06	Little Eagle	*Hieraaetus morphnoides*	1		Flyover, 45m alt.	-34.289	142.2397	KBOPPORTUN
23/09/2020 15:06	Peaceful Dove	*Geopelia striata*	1		45m alt.	-34.289	142.2397	KBOPPORTUN
23/09/2020 15:48	Whistling Kite	*Haliastur sphenurus*	1		38m alt.	-34.2803	142.2464	KBMUROPP
23/09/2020 16:19	Little Black Cormorant	*Phalacrocorax sulcirostris*	1		45m alt.	-34.282	142.2479	KBMUROPP
24/09/2020 0:00	Brown Treecreeper	*Climacteris picumnus*	2		42m alt.	-34.2833	142.2484	KBFOROPP
24/09/2020 10:48	Australian Wood Duck	*Chenonetta jubata*	1		43m alt.	-34.2834	142.2485	KBMUROPP
24/09/2020 10:48	Australasian Darter	*Anhinga novaehollandiae*	1		43m alt.	-34.2834	142.2485	KBMUROPP
19/10/2020 8:34	Crimson Rosella	*Platycercus elegans*	6		43m alt.	-34.2811	142.2471	KB1RIVER
19/10/2020 8:35	Noisy Miner	*Manorina melanocephala*	1		43m alt.	-34.2811	142.2471	KB1RIVER
19/10/2020 8:36	Grey Shrike-thrush	*Colluricincla harmonica*	1		43m alt.	-34.2811	142.2471	KB1RIVER
19/10/2020 8:36	Red-rumped Parrot	*Psephotus haematonotus*	10		43m alt.	-34.2811	142.2471	KB1RIVER
19/10/2020 8:37	Australasian Darter	*Anhinga novaehollandiae*	2		42m alt.	-34.2811	142.2471	KB1RIVER
19/10/2020 8:40	Tree Martin	*Petrochelidon nigricans*	3		39m alt.	-34.2807	142.2466	KB1RIVER
19/10/2020 8:44	White-plumed Honeyeater	*Lichenostomus penicillatus*	1		40m alt.	-34.2803	142.2462	KB1RIVER
19/10/2020 8:45	Grey Teal	*Anas gracilis*	2		28m alt.	-34.28	142.2461	KB1RIVER
19/10/2020 8:48	Brown Treecreeper	*Climacteris picumnus*	4		40m alt.	-34.2801	142.2459	KB1RIVER
19/10/2020 8:49	Striated Pardalote	*Pardalotus striatus*	1	H	40m alt.	-34.2801	142.2459	KB1RIVER
19/10/2020 8:53	Galah	*Eolophus roseicapillus*	3		42m alt.	-34.2809	142.2469	KB1RIVER
19/10/2020 8:57	Willie Wagtail	*Rhipidura leucophrys*	1		38m alt.	-34.2819	142.2478	KB1RIVER

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
19/10/2020 8:58	Whistling Kite	*Haliastur sphenurus*	1		45m alt.	-34.2819	142.2478	KB1RIVER
19/10/2020 8:58	Laughing Kookaburra	*Dacelo novaeguineae*	1		40m alt.	-34.282	142.2479	KB1RIVER
19/10/2020 8:59	Magpie-lark	*Grallina cyanoleuca*	1		42m alt.	-34.2822	142.2481	KB1RIVER
19/10/2020 9:01	Australian Raven	*Corvus coronoides*	1		43m alt.	-34.2824	142.2481	KB1RIVER
19/10/2020 9:02	Black Swan	*Cygnus atratus*	5		44m alt. adult and 4 cygnets on water	-34.2827	142.2483	KB1RIVER
19/10/2020 9:04	Sacred Kingfisher	*Todiramphus sanctus*	1		42m alt.	-34.2827	142.2483	KB1RIVER
19/10/2020 9:11	Australian Ringneck	*Barnardius zonarius*	1		42m alt.	-34.282	142.2472	KBLIGOPP
19/10/2020 9:15	Australian White Ibis	*Threskiornis molucca*	6		45m alt. Flyover	-34.282	142.2471	KBLIGOPP
19/10/2020 9:33	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	3	H	48m alt.	-34.2874	142.242	KB2WOOD
19/10/2020 9:36	Crimson Rosella	*Platycercus elegans*	1		42m alt.	-34.2881	142.2418	KB2WOOD
19/10/2020 9:44	Common Bronzewing	*Phaps chalcoptera*	1		46m alt.	-34.288	142.2424	KB2WOOD
19/10/2020 9:46	Noisy Miner	*Manorina melanocephala*	1		46m alt.	-34.2876	142.2426	KB2WOOD
19/10/2020 9:47	Crested Pigeon	*Ocyphaps lophotes*	1	H	43m alt.	-34.2874	142.2426	KB2WOOD
19/10/2020 9:50	Weebill	*Smicrornis brevirostris*	2		45m alt.	-34.2872	142.2423	KB2WOOD
19/10/2020 10:00	Striated Pardalote	*Pardalotus striatus*	1	H	45m alt.	-34.29	142.2405	KB3
19/10/2020 10:01	Crimson Rosella	*Platycercus elegans*	1		47m alt. Flyover	-34.2899	142.2398	KB3
19/10/2020 10:02	Weebill	*Smicrornis brevirostris*	5		47m alt.	-34.2899	142.2397	KB3
19/10/2020 10:04	Yellow Thornbill	*Acanthiza nana*	1		46m alt.	-34.2899	142.2397	KB3
19/10/2020 10:09	Little Friarbird	*Philemon citreogularis*	1		49m alt.	-34.2898	142.2398	KB3
19/10/2020 10:09	White-winged Chough	*Corcorax melanorhamphos*	3		48m alt.	-34.2898	142.2398	KB3
19/10/2020 10:16	Peaceful Dove	*Geopelia striata*	1	H	49m alt.	-34.29	142.2413	KB3
19/10/2020 10:16	Galah	*Eolophus roseicapillus*	13		49m alt. Flyover	-34.2902	142.2411	KB3
19/10/2020 10:20	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	4		45m alt.	-34.2909	142.2407	KB3
19/10/2020 10:23	Grey Shrike-thrush	*Colluricincla harmonica*	1		48m alt.	-34.2909	142.2405	KB3

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
19/10/2020 18:14	Red-capped Robin	*Petroica goodenovii*	1		47m alt.	-34.29	142.2411	KBOPPORTUN
19/10/2020 19:44	Singing Honeyeater	*Lichenostomus virescens*	1		44m alt.	-34.2817	142.2476	KBFOROPP
20/10/2020 7:08	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	1		49m alt.	-34.2898	142.2413	KB3
20/10/2020 7:12	Little Friarbird	*Philemon citreogularis*	1		43m alt.	-34.2896	142.2397	KB3
20/10/2020 7:14	Striped Honeyeater	*Plectorhyncha lanceolata*	2		45m alt.	-34.2902	142.2394	KB3
20/10/2020 7:15	Australian Raven	*Corvus coronoides*	3	H	44m alt.	-34.2902	142.2394	KB3
20/10/2020 7:18	White-winged Chough	*Corcorax melanorhamphos*	3	H	39m alt.	-34.2907	142.2396	KB3
20/10/2020 7:23	Yellow Thornbill	*Acanthiza nana*	2		64m alt.	-34.29	142.2409	KB3
20/10/2020 7:24	Red-rumped Parrot	*Psephotus haematonotus*	2		54m alt. Flyover	-34.2899	142.2406	KB3
20/10/2020 7:32	Striated Pardalote	*Pardalotus striatus*	4		44m alt.	-34.2883	142.2422	KB2WOOD
20/10/2020 7:34	Chestnut-rumped Thornbill	*Acanthiza uropygialis*	1	H	49m alt.	-34.2887	142.2428	KB2WOOD
20/10/2020 7:35	Noisy Miner	*Manorina melanocephala*	4		51m alt.	-34.2885	142.2429	KB2WOOD
20/10/2020 7:36	Crimson Rosella	*Platycercus elegans*	2		47m alt. Flyover	-34.2884	142.243	KB2WOOD
20/10/2020 7:38	Weebill	*Smicrornis brevirostris*	3		50m alt.	-34.2877	142.2427	KB2WOOD
20/10/2020 7:40	Pied Butcherbird	*Cracticus nigrogularis*	1	H	52m alt.	-34.2873	142.242	KB2WOOD
20/10/2020 7:47	Red-rumped Parrot	*Psephotus haematonotus*	3		63m alt.	-34.2876	142.2414	KB2WOOD
20/10/2020 7:47	Brown-headed Honeyeater	*Melithreptus brevirostris*	3		69m alt.	-34.2878	142.2414	KB2WOOD
20/10/2020 7:55	Australian Ringneck	*Barnardius zonarius*	1		62m alt.	-34.2881	142.2422	KB2WOOD
20/10/2020 7:57	Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	2		54m alt.	-34.2881	142.2421	KB2WOOD
20/10/2020 8:05	Grey Shrike-thrush	*Colluricincla harmonica*	2	H	59m alt.	-34.2817	142.2476	KB1RIVER
20/10/2020 8:06	Rainbow Bee-eater	*Merops ornatus*	7		48m alt.	-34.2817	142.2477	KB1RIVER
20/10/2020 8:07	Red-rumped Parrot	*Psephotus haematonotus*	10		47m alt.	-34.2817	142.2477	KB1RIVER
20/10/2020 8:08	Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	4		51m alt.	-34.2818	142.2477	KB1RIVER
20/10/2020 8:08	Tree Martin	*Petrochelidon nigricans*	3		51m alt.	-34.2818	142.2477	KB1RIVER

DATE, TIME	COMMON NAME	SCIENTIFIC NAME	QUANTITY	HEARD ONLY	SIGHTING NOTES	LATITUDE	LONGITUDE	LOCATION ABBREVIATION
20/10/2020 8:09	Australian Ringneck	*Barnardius zonarius*	5		46m alt.	-34.2818	142.2478	KB1RIVER
20/10/2020 8:10	Crimson Rosella	*Platycercus elegans*	5		47m alt.	-34.2819	142.2478	KB1RIVER
20/10/2020 8:10	White-plumed Honeyeater	*Lichenostomus penicillatus*	3		49m alt.	-34.2819	142.2478	KB1RIVER
20/10/2020 8:20	Sacred Kingfisher	*Todiramphus sanctus*	2		44m alt.	-34.2828	142.2484	KB1RIVER
20/10/2020 8:22	Galah	*Eolophus roseicapillus*	2	H	50m alt.	-34.2823	142.248	KB1RIVER
20/10/2020 8:23	Brown Treecreeper	*Climacteris picumnus*	1		47m alt.	-34.2821	142.2479	KB1RIVER
20/10/2020 8:25	Willie Wagtail	*Rhipidura leucophrys*	1		45m alt.	-34.2814	142.2474	KB1RIVER
20/10/2020 8:26	Crested Pigeon	*Ocyphaps lophotes*	1		37m alt.	-34.2812	142.2471	KB1RIVER
20/10/2020 8:32	Noisy Miner	*Manorina melanocephala*	2		46m alt.	-34.2801	142.2457	KB1RIVER
20/10/2020 8:35	Whistling Kite	*Haliastur sphenurus*	2		57m alt.	-34.2807	142.246	KBFOROPP
20/10/2020 8:36	Chestnut-crowned Babbler	*Pomatostomus ruficeps*	4		46m alt.	-34.281	142.246	KBLIGOPP
20/10/2020 17:27	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	2		40m alt.	-34.2847	142.2454	KBLIGOPP
21/10/2020 7:19	Chestnut-crowned Babbler	*Pomatostomus ruficeps*	2		53m alt. nests here too	-34.2846	142.244	KBOPPORTUN
21/10/2020 7:23	Pied Butcherbird	*Cracticus nigrogularis*	1		46m alt.	-34.2841	142.2443	KBOPPORTUN
21/10/2020 7:38	Australian Reed-Warbler	*Acrocephalus australis*	1		44m alt.	-34.2811	142.2473	KBFOROPP
21/10/2020 7:42	Chestnut-crowned Babbler	*Pomatostomus ruficeps*	4		43m alt.	-34.2824	142.2465	KBLIGOPP
21/10/2020 7:48	Black Kite	*Milvus migrans*	1		41m alt. Flyover	-34.284	142.2458	KBLIGOPP
21/10/2020 8:05	Chestnut-crowned Babbler	*Pomatostomus ruficeps*	1		45m alt. nests start	-34.2829	142.2483	KBFOROPP
21/10/2020 8:36	Australian Ringneck	*Barnardius zonarius*	2		49m alt.	-34.2867	142.243	KBOPPORTUN
21/10/2020 8:44	Common Bronzewing	*Phaps chalcoptera*	1		52m alt.	-34.2899	142.2402	KBOPPORTUN
21/10/2020 9:11	Whistling Kite	*Haliastur sphenurus*	2		46m alt.	-34.2884	142.2471	KBFOROPP
22/10/2020 7:24	Chestnut-crowned Babbler	*Pomatostomus ruficeps*	5		37m alt.	-34.2842	142.244	KBOPPORTUN

D4 CAMERA DATA

CAMERA NUMBER	INSTALL DATE	RE-BAIT DATE	REMOVAL DATE	SPECIES RECORDED
Arboreal				
WSP092	18/10/2020		22/10/2020	Central Bearded Dragon *Pogona vitticeps* Eastern Grey Kangaroo
WSP154	18/10/2020		22/10/2020	NIL
WSP156	18/10/2020		22/10/2020	NIL
WSP278	18/10/2020		22/10/2020	NIL
WSP495	18/10/2020		22/10/2020	Lace Monitor
WSP562	18/10/2020		22/10/2020	Tawny Frogmouth *Podargus strigoides*
WSP663	18/10/2020		22/10/2020	Eastern Tree Skink *Egernia striolata*
Terrestrial				
WSP378	24/09/2020	18/10/2020	22/10/2020	Shingleback Grey Butcherbird and chicks
WSP381	24/09/2020	18/10/2020	22/10/2020	European Rabbit Shingleback Red Fox Chestnut-crowned Babbler Pied Butcherbird
WSP623	24/09/2020	18/10/2020	22/10/2020	Crimson Rosella Magpie Eastern Grey Kangaroo Chestnut-rumped Thornbill Chestnut-crowned Babbler Pied Butcherbird
WSP665	24/09/2020	18/10/2020	22/10/2020	Chestnut-crowned Babbler Eastern Grey Kangaroo Lace Monitor European Rabbit Brown Treecreeper Crested Pigeon Crimson Rosella House Mouse Red-rumped Parrot Pied Butcherbird

CAMERA NUMBER	INSTALL DATE	RE-BAIT DATE	REMOVAL DATE	SPECIES RECORDED
WSP841	24/09/2020	18/10/2020	22/10/2020	Echidna Black Rat Eastern Grey Kangaroo Lace Monitor House Mouse Brown Treecreepers Domestic dog (pet)
WSP844	24/09/2020	18/10/2020	22/10/2020	White Winged Chough Chestnut-crowned Babbler Blue Bonnet *Northiella haematogaster* Pied Butcherbird Domestic Dog (pet) Shingleback Foxes (cubs)
WSP850	24/09/2020	18/10/2020	22/10/2020	White Winged Chough Red Fox Eastern Grey Kangaroo Shingleback Yellow-rumped Thornbill

Grey Butcherbird and chicks at camera WSP378

Shingleback at WSP381

Rabbit at WSP381

APPENDIX E

EPBC ACT SIGNIFICANT IMPACT ASSESSMENTS

E1 REGENT PARROT

The EPBC Act listed Vulnerable Regent Parrot, is known to occur in the area and may periodically occur in the study area. 0.009 ha of low quality potential breeding habitat (River Red Gums along the Murray River) and 5.41 ha of potential foraging habitat (the remaining native vegetation in the study area) are proposed to be impacted by the project. However, the species is considered unlikely to regularly utilise the study area as records are sporadic and the species was not recorded despite targeted survey during the breeding season.

For a vulnerable species, prior to conducting a significant impact assessment it is important to first determine whether the population is an 'important population'.

An 'important population' is defined in the significant impact guidelines as:

> *one that is necessary for a species' long-term survival and recovery.*
>
> *This may include populations identified as such in recovery plans, and/or that are:*
>
> - *key source populations either for breeding or dispersal*
> - *populations that are necessary for maintaining genetic diversity, and/or*
> - *populations that are near the limit of the species range.*

Source: (Department of the Environment 2013)

As the study area is only likely to periodically support the species and is unlikely to support breeding individuals, a resident population is not present, and the habitat present in the area is unlikely to be necessary for the species' long-term survival and recovery. As such, the study area (and the remaining habitat in Kings Billabong Reserve) is unlikely to support an 'important population' as per this definition.

A significant impact criteria assessment for this species has been completed and is provided below.

Table E.1 Potential for significant impact upon Regent Parrot assessed under the EPBC Act Significant Impact Guidelines (Vulnerable Species) (Department of the Environment 2013)

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION OR FURTHER INFORMATION REQUIRED	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of an important population of a species	Important population not present. The loss of a small amount of potential foraging habitat, and tiny amount of potential low quality breeding habitat, is unlikely to affect the species.	Low	N/A	Low
Reduce the area of occupancy of an important population	Important population not present. The loss of a small amount of potential foraging habitat, and tiny amount of potential low-quality breeding habitat, is unlikely to have a material impact on the species.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION OR FURTHER INFORMATION REQUIRED	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Fragment an existing important population into two or more populations	Important population not present. The species is highly mobile and a population would not be fragmented by the project.	Low	N/A	Low
Adversely affect habitat critical to the survival of a species	The habitat at the study area is unlikely to be critical to the survival of the species as it is unlikely to be utilised for breeding or regularly utilised for foraging.	Low	N/A	Low
Disrupt the breeding cycle of an important population	The habitat is unlikely to be utilised for breeding although there is the potential for it to be utilised at some point in the future.	Low	Precautionary mitigation is recommended: Avoid night works. Minimise use of heavy machinery and mitigate noise where possible. Avoid clearing during the spring breeding season (approximately August-November inclusive)	Low
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project is considered unlikely to result in the decline of the species due to the small area of proposed impact and the remaining available habitat.	Low	N/A	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in invasive species which could affect habitat values for this species.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION OR FURTHER INFORMATION REQUIRED	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Introduce disease that may cause the species to decline	The construction activities have the potential to introduce disease such as *Phytophthora cinnamoni* however this would be unlikely to cause decline of this species.	Low	Controls required to prevent introduction of disease include *Phytophthora cinnamoni* hygiene protocols, washdown of all equipment, vehicles and footwear prior to coming on site, and use of only certified Phytophthora free materials in construction. These are general controls required for the other sensitive values of the study area and are not specifically required due to Regent Parrot.	Low
Interfere with the recovery of the species.	The project is unlikely to interfere with the recovery of the species due to the small scale of the impact and current low usage of the potential habitat present. The species is likely to utilise habitat in the area at the same frequency post-works.	Low	N/A	Low
Overall likelihood of a significant impact		Low	None required specifically for Regent Parrot although see precautionary mitigation above.	Low

APPENDIX F

HABITAT HECTARE SCORING AND LARGE TREE DATA

F1 HABITAT HECTARE SCORES FOR ALL HABITAT ZONES IN THE STUDY AREA

EVC NAME	EVC BCS	HH_SI	HH_ZI	LARGET REE	TREE CANOPY	WEEDS	UNDER STORY	RECRUIT MENT	ORGANIC LITTER	LOGS	VQASITE SCORE	LAND SCAPE SCORE	HH_H_S	AREA (HA)	HABITAT HECTARES	CLEARING TYPE
Riverine Chenopod Woodland	D	1	A	0	0	15	20	6	5	2	48	20.4	0.68	0.002828809	0.00192359	Maintenance
Riverine Chenopod Woodland	D	1	B	0	0	15	20	6	5	2	48	11.4	0.59	0.042585205	0.025125271	To ground
Riverine Chenopod Woodland	D	1	C	0	0	15	20	6	5	2	48	10.4	0.58	0.001837305	0.001065637	To ground
Riverine Chenopod Woodland	D	1	D	0	0	15	20	6	5	2	48	10.4	0.58	0.037531152	0.021768068	Maintenance
Riverine Chenopod Woodland	D	1	D	0	0	15	20	6	5	2	48	20.4	0.68	0.003563086	0.002422898	To ground
Riverine Chenopod Woodland	D	1	E	0	0	15	20	6	5	2	48	20.4	0.68	0.000135791	9.23379E-05	To ground
Riverine Chenopod Woodland	D	1	F	0	0	15	20	6	5	2	48	20.4	0.68	0.001053711	0.000716523	To ground
Riverine Chenopod Woodland	D	1	G	0	0	15	20	6	5	2	48	20.4	0.68	0.054830762	0.037284918	To ground
Riverine Chenopod Woodland	D	1	H	0	0	15	20	6	5	2	48	20.4	0.68	0.067142041	0.045656588	To ground
Riverine Chenopod Woodland	D	1	I	0	0	15	20	6	5	2	48	20.4	0.68	0.295190918	0.200729824	Maintenance
Riverine Chenopod Woodland	D	1	J	0	0	15	20	6	5	2	48	9.8	0.58	0.005614648	0.003256496	To ground
Riverine Chenopod Woodland	D	1	K	0	0	15	20	6	5	2	48	10.4	0.58	0.00442373	0.002565764	To ground
Riverine Chenopod Woodland	D	1	L	0	0	15	20	6	5	2	48	10.4	0.58	0.018652539	0.010818473	Maintenance
Riverine Chenopod Woodland	D	1	M	0	0	15	20	6	5	2	48	20.4	0.68	0.002786377	0.001894736	To ground
Riverine Chenopod Woodland	D	1	N	0	0	15	20	6	5	2	48	20.4	0.68	0.011295654	0.007681045	Maintenance
Riverine Chenopod Woodland	D	1	O	0	0	15	20	6	5	2	48	20.4	0.68	0.005763379	0.003919098	To ground
Riverine Chenopod Woodland	D	1	P	0	0	15	20	6	5	2	48	20.4	0.68	0.024424219	0.016608469	Maintenance

EVC NAME	EVC BCS	HH_SI	HH_ZI	LARGET REE	TREE CANOPY	WEEDS	UNDER STORY	RECRUIT MENT	ORGANIC LITTER	LOGS	VQASITE SCORE	LAND SCAPE SCORE	HH_H_S	AREA (HA)	HABITAT HECTARES	CLEARING TYPE
Riverine Chenopod Woodland	D	1	Q	0	0	15	20	6	5	2	48	20.4	0.68	0.064518115	0.043872318	To ground
Riverine Chenopod Woodland	D	1	R	0	0	15	20	6	5	2	48	20.4	0.68	0.000470752	0.000320111	To ground
Riverine Chenopod Woodland	D	1	T	0	0	15	20	6	5	2	48	20.4	0.68	0.006272852	0.004265539	Maintenance
Riverine Chenopod Woodland	D	1	U	0	0	15	20	6	5	2	48	20.4	0.68	0.000545361	0.000370846	To ground
Riverine Chenopod Woodland	D	1	V	0	0	15	20	6	5	2	48	20.4	0.68	0.001198389	0.000814904	To ground
Riverine Chenopod Woodland	D	1	W	0	0	15	20	6	5	2	48	20.4	0.68	0.042420264	0.028845779	To ground
Riverine Chenopod Woodland	D	1	X	0	0	15	20	6	5	2	48	21.2	0.69	0.008478223	0.005849974	To ground
Riverine Chenopod Woodland	D	1	Y	0	0	15	20	6	5	2	48	21.2	0.69	0.020752539	0.014319252	To ground
Riverine Chenopod Woodland	D	1	Z	0	0	15	20	6	5	2	48	11.4	0.59	0.043724463	0.025797433	Maintenance
Riverine Chenopod Woodland	D	1	AA	0	0	15	20	6	5	2	48	11.4	0.59	0.060529053	0.035712141	To ground
Riverine Chenopod Woodland	D	1	AB	0	0	15	20	6	5	2	48	20.4	0.68	0.011019434	0.007493215	To ground
Riverine Chenopod Woodland	D	1	AC	0	0	15	20	6	5	2	48	20.4	0.68	0.053522217	0.036395107	Maintenance
Riverine Chenopod Woodland	D	2	A	0	0	6	5	6	5	0	22	9.8	0.32	0.002040723	0.000653031	To ground
Riverine Chenopod Woodland	D	2	B	0	0	6	5	6	5	0	22	9.8	0.32	0.003468848	0.001110031	To ground
Riverine Chenopod Woodland	D	3	A	0	0	15	5	6	5	0	31	10.4	0.41	0.002650098	0.00108654	Maintenance
Riverine Chenopod Woodland	D	4	A	0	4	13	15	6	3	2	43	21.2	0.64	0.133582471	0.085492781	Maintenance
Riverine Chenopod Woodland	D	5	A	7	4	13	15	6	3	2	50	11.2	0.61	0.036329932	0.022161258	To ground
Riverine Chenopod Woodland	D	5	B	7	4	13	15	6	3	2	50	9.8	0.6	0.004462842	0.002677705	Maintenance
Riverine Chenopod Woodland	D	5	C	7	4	13	15	6	3	2	50	9.8	0.6	0.037941602	0.022764961	To ground
Riverine Chenopod Woodland	D	5	D	7	4	13	15	6	3	2	50	11.4	0.61	0.021638672	0.01319959	To ground
Riverine Chenopod Woodland	D	5	E	7	4	13	15	6	3	2	50	11.4	0.61	0.048842383	0.029793854	Maintenance

EVC NAME	EVC BCS	HH_SI	HH_ZI	LARGET REE	TREE CANOPY	WEEDS	UNDER STORY	RECRUIT MENT	ORGANIC LITTER	LOGS	VQASITE SCORE	LAND SCAPE SCORE	HH_H_S	AREA (HA)	HABITAT HECTARES	CLEARING TYPE
Riverine Chenopod Woodland	D	5	F	7	4	13	15	6	3	2	50	11.4	0.61	0.217092188	0.132426234	Maintenance
Riverine Chenopod Woodland	D	5	G	7	4	13	15	6	3	2	50	11.4	0.61	0.355236133	0.216694041	To ground
Riverine Chenopod Woodland	D	5	H	7	4	13	15	6	3	2	50	20.4	0.7	0.001533496	0.001073447	To ground
Riverine Chenopod Woodland	D	5	I	7	4	13	15	6	3	2	50	20.4	0.7	0.313513818	0.219459673	Maintenance
Riverine Chenopod Woodland	D	5	J	7	4	13	15	6	3	2	50	20.4	0.7	0.361879932	0.253315952	Maintenance
Riverine Chenopod Woodland	D	5	K	7	4	13	15	6	3	2	50	20.4	0.7	0.000126025	8.82178E-05	Maintenance
Riverine Chenopod Woodland	D	5	L	7	4	13	15	6	3	2	50	20.4	0.7	0.001082568	0.000757798	Maintenance
Riverine Chenopod Woodland	D	5	M	7	4	13	15	6	3	2	50	20.4	0.7	0.002387598	0.001671318	Maintenance
Riverine Chenopod Woodland	D	5	N	7	4	13	15	6	3	2	50	20.4	0.7	0.249151807	0.174406265	To ground
Riverine Chenopod Woodland	D	5	O	7	4	13	15	6	3	2	50	20.4	0.7	0.271387646	0.189971353	To ground
Riverine Chenopod Woodland	D	5	P	7	4	13	15	6	3	2	50	20.4	0.7	1.073920508	0.751744355	Maintenance
Riverine Chenopod Woodland	D	5	Q	7	4	13	15	6	3	2	50	21.2	0.71	0.000310693	0.000220592	To ground
Riverine Chenopod Woodland	D	5	R	7	4	13	15	6	3	2	50	21.2	0.71	0.000516211	0.00036651	To ground
Riverine Chenopod Woodland	D	5	S	7	4	13	15	6	3	2	50	21.2	0.71	0.014881934	0.010566173	To ground
Riverine Chenopod Woodland	D	5	T	7	4	13	15	6	3	2	50	21.2	0.71	0.028922656	0.020535086	To ground
Riverine Chenopod Woodland	D	5	U	7	4	13	15	6	3	2	50	21.2	0.71	0.029053809	0.020628204	To ground
Riverine Chenopod Woodland	D	6	A	0	2	13	15	6	3	2	41	21.2	0.62	0.007123145	0.00441635	To ground
Riverine Chenopod Woodland	D	6	B	0	2	13	15	6	3	2	41	21.2	0.62	0.016238086	0.010067613	To ground
Riverine Chenopod Woodland	D	6	C	0	2	13	15	6	3	2	41	21.2	0.62	0.105346582	0.065314881	Maintenance
Intermittent Swampy Woodland	D	7	A	0	2	13	15	6	3	0	39	20.4	0.59	0.000939941	0.000554565	To ground
Intermittent Swampy Woodland	D	7	B	0	2	13	15	6	3	0	39	20.4	0.59	0.002708496	0.001598013	Maintenance

EVC NAME	EVC BCS	HH_SI	HH_ZI	LARGET REE	TREE CANOPY	WEEDS	UNDER STORY	RECRUIT MENT	ORGANIC LITTER	LOGS	VQASITE SCORE	LAND SCAPE SCORE	HH_H_S	AREA (HA)	HABITAT HECTARES	CLEARING TYPE
Intermittent Swampy Woodland	D	7	C	0	2	13	15	6	3	0	39	20.4	0.59	0.00339458	0.002002802	To ground
Intermittent Swampy Woodland	D	7	D	0	2	13	15	6	3	0	39	20.4	0.59	0.008354395	0.004929093	Maintenance
Intermittent Swampy Woodland	D	7	E	0	2	13	15	6	3	0	39	20.4	0.59	0.00179668	0.001060041	To ground
Intermittent Swampy Woodland	D	7	F	0	2	13	15	6	3	0	39	20.4	0.59	0.010163818	0.005996653	To ground
Intermittent Swampy Woodland	D	7	G	0	2	13	15	6	3	0	39	20.4	0.59	0.244427246	0.144212075	Maintenance
Intermittent Swampy Woodland	D	8	A	0	0	9	5	3	0	0	17	20.4	0.37	0.058081055	0.02148999	Maintenance
Grassy Riverine Forest	D	9	A	9	4	9	15	10	5	3	55	21.2	0.76	0.009018213	0.006853842	Maintenance
Lignum Swampy Woodland	D	10	A	4	3	9	20	6	3	5	50	21.2	0.71	0.078383936	0.055652594	To ground
Lignum Swampy Woodland	D	10	B	4	3	9	20	6	3	5	50	21.2	0.71	0.255307715	0.181268478	Maintenance
Lignum Swampy Woodland	D	10	C	4	3	9	20	6	3	5	50	21.2	0.71	0.018200635	0.012922451	Maintenance
Lignum Swampy Woodland	D	10	D	4	3	9	20	6	3	5	50	21.2	0.71	0.021216455	0.015063683	Maintenance
Lignum Swampy Woodland	D	10	E	4	3	9	20	6	3	5	50	21.2	0.71	0.141386523	0.100384432	To ground
Lignum Shrubland	LC	11	A	N/A	N/A	13	15	3	3	N/A	34	21.2	0.67	0.000268164	0.00017967	To ground
Lignum Shrubland	LC	11	B	N/A	N/A	13	15	3	3	N/A	34	21.2	0.67	0.01473291	0.00987105	To ground
Lignum Shrubland	LC	11	C	N/A	N/A	13	15	3	3	N/A	34	10.6	0.57	0.000779395	0.000444255	To ground
Lignum Shrubland	LC	11	D	N/A	N/A	13	15	3	3	N/A	34	21.2	0.67	0.000946338	0.000634046	Maintenance
Lignum Shrubland	LC	11	E	N/A	N/A	13	15	3	3	N/A	34	21.2	0.67	0.030154492	0.02020351	To ground
Sub-saline Depression Shrubland	D	12	A	N/A	N/A	15	15	1	5	N/A	36	21.2	0.7	0.066742676	0.046719873	To ground
Sub-saline Depression Shrubland	D	12	B	N/A	N/A	15	15	1	5	N/A	36	11.2	0.6	0.021241699	0.01274502	To ground

EVC NAME	EVC BCS	HH_SI	HH_ZI	LARGET REE	TREE CANOPY	WEEDS	UNDER STORY	RECRUIT MENT	ORGANIC LITTER	LOGS	VQASITE SCORE	LAND SCAPE SCORE	HH_H_S	AREA (HA)	HABITAT HECTARES	CLEARING TYPE
Sub-saline Depression Shrubland	D	12	C	N/A	N/A	15	15	1	5	N/A	36	11.2	0.6	0.191139355	0.114683613	To ground
Sub-saline Depression Shrubland	D	12	D	N/A	N/A	15	15	1	5	N/A	36	21.2	0.7	0.003278271	0.00229479	To ground
Semi-arid Chenopod Woodland	V	14	A	0	0	9	10	3	3	0	25	9.8	0.35	0.00223125	0.000780938	To ground

EVC BCS = EVC Bioregional Conservation Status: V = Vulnerable, D = Depleted, LC = Least Concearn

F2 LARGE TREE DATA

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	TPZ (M)	STATUS
1	River Red Gum	*Eucalyptus camaldulensis*	149	15	Retained
2	River Red Gum	*Eucalyptus camaldulensis*	111	13.32	Retained
3	Dead		93	11.16	Clearance
4	Dead		92	11.04	Retained
6	Dead		84	10.08	Retained
7	Dead		108	12.96	Retained
8	River Red Gum	*Eucalyptus camaldulensis*	100	12	Retained
11	Dead		219	15	Clearance
12	Dead		181	15	Retained
13	Dead		160	15	Clearance
14	Dead		113	13.56	Retained
22	Black Box	*Eucalyptus larginflorens*	40	4.8	Retained
23	Black Box	*Eucalyptus larginflorens*	44	5.28	Retained
32	Black Box	*Eucalyptus larginflorens*	53	6.36	Retained
35	Black Box	*Eucalyptus larginflorens*	41	4.92	Clearance
40	Black Box	*Eucalyptus larginflorens*	55	6.6	Clearance
41	Black Box	*Eucalyptus larginflorens*	43	5.16	Clearance
44	Black Box	*Eucalyptus larginflorens*	100	12	Clearance
53	Black Box	*Eucalyptus larginflorens*	4	2	Clearance
57	Black Box	*Eucalyptus larginflorens*	49	5.88	Retained
67	Black Box	*Eucalyptus larginflorens*	43	5.16	Retained
68	Black Box	*Eucalyptus larginflorens*	66	7.92	Retained
74	Black Box	*Eucalyptus larginflorens*	48	5.76	Clearance
85	Dead		41	4.92	Retained
89	Dead		43	5.16	Retained
96	Black Box	*Eucalyptus larginflorens*	42	5.04	Retained
97	Black Box	*Eucalyptus larginflorens*	45	5.4	Retained
98	Black Box	*Eucalyptus larginflorens*	40	4.8	Clearance
110	Black Box	*Eucalyptus larginflorens*	41	4.92	Clearance

TREE NUMBER	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	TPZ (M)	STATUS
115	Black Box	*Eucalyptus larginflorens*	42	5.04	Clearance
124	Dead		72	8.64	Clearance
125	Black Box	*Eucalyptus larginflorens*	53	6.36	Clearance
126	Black Box	*Eucalyptus larginflorens*	47	5.64	Clearance
128	Black Box	*Eucalyptus larginflorens*	45	5.4	Clearance
135	Black Box	*Eucalyptus larginflorens*	41	4.92	Clearance
138	Black Box	*Eucalyptus larginflorens*	42	5.04	Clearance
150	Black Box	*Eucalyptus larginflorens*	40	4.8	Retained
152	Black Box	*Eucalyptus larginflorens*	45	5.4	Retained
157	Black Box	*Eucalyptus larginflorens*	43	5.16	Retained

APPENDIX G

NVR REPORT

Native vegetation removal report

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

Date of issue: **14/02/2021**
Time of issue: **11:02 pm**

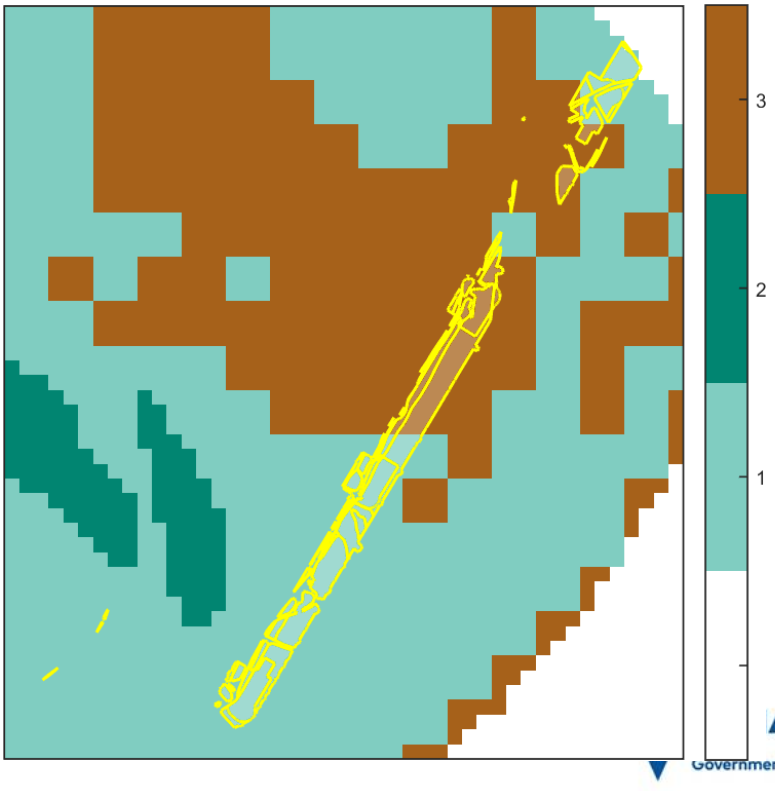
Report ID: WSP_2021_003

Project ID	Ensym_20210211

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	5.419 ha
Extent of past removal	0.000 ha
Extent of proposed removal	5.419 ha
No. Large trees proposed to be removed	18
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); and a wetland listed in the Directory of Important Wetlands of Australia; and an internationally important site for Migratory Shorebirds of the East Asian-Australasian Flyway.

1. Location map



Offset requirements if a permit is granted

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

General offset amount[1]	0.044 general habitat units
Vicinity	Mallee Catchment Management Authority (CMA) or Mildura Rural City Council
Minimum strategic biodiversity value score[2]	0.602
Large trees*	0 large trees
Species offset amount[3]	2.882 species units of habitat for Slender Love-grass, *Eragrostis exigua* 4.891 species units of habitat for Spotted Bowerbird, *Ptilonorhynchus maculatus* 2.735 species units of habitat for Low Hibiscus, *Hibiscus brachysiphonius* 4.443 species units of habitat for Lagoon Nightshade, *Solanum lacunarium* 4.442 species units of habitat for Native Madder, *Synaptantha tillaeacea var. tillaeacea*
Large trees*	18 trees
*** The total number of large trees that the offset must protect**	18 large trees to be protected in either the general, species or combination across all habitat units protected

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

Appendix 1 includes information about the native vegetation to be removed

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

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

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

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

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

Next steps

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

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

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

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

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

Additional application requirements must be met including:

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

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

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
11-D	Patch	robp0808	Least Concern	0	no	0.670	0.001	0.001	0.970	0.780	0.001	505252 Slender Love-grass *Eragrostis exigua*
										0.520	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.780	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.780	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-A	Patch	robp0103	Depleted	0	no	0.680	0.003	0.003	0.970	0.780	0.003	505252 Slender Love-grass *Eragrostis exigua*
										0.515	0.003	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.534	0.004	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.775	0.003	503180 Lagoon Nightshade *Solanum lacunarium*

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**
										0.775	0.003	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
10-B	Patch	robp0823	Depleted	1	no	0.710	0.255	0.255	0.900	0.500	0.272	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.735	0.314	503180 Lagoon Nightshade *Solanum lacunarium*
										0.427	0.314	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
10-C	Patch	robp0823	Depleted	0	no	0.710	0.018	0.018	0.900	0.510	0.020	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.750	0.023	503180 Lagoon Nightshade *Solanum lacunarium*
										0.224	0.023	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
10-D	Patch	robp0823	Depleted	0	no	0.710	0.021	0.021	0.900	0.750	0.026	503180 Lagoon Nightshade *Solanum lacunarium*
										0.750	0.026	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
4-A	Patch	robp0103	Depleted	0	no	0.640	0.134	0.134	0.980	0.779	0.152	505252 Slender Love-grass *Eragrostis exigua*
										0.779	0.152	503180 Lagoon Nightshade *Solanum lacunarium*
										0.779	0.152	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-D	Patch	robp0103	Depleted	0	no	0.580	0.038	0.038	0.870	0.517	0.033	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
7-D	Patch	robp0813	Depleted	0	no	0.590	0.008	0.008	0.970	0.520	0.007	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.009	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.009	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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**
7-B	Patch	robp0813	Depleted	0	no	0.590	0.003	0.003	0.804	0.520	0.002	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.059	0.003	503180 Lagoon Nightshade *Solanum lacunarium*
										0.059	0.003	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
7-G	Patch	robp0813	Depleted	2	no	0.590	0.244	0.244	0.862	0.520	0.219	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.313	0.257	503180 Lagoon Nightshade *Solanum lacunarium*
										0.339	0.257	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-I	Patch	robp0103	Depleted	0	no	0.680	0.295	0.295	0.981	0.775	0.356	505252 Slender Love-grass *Eragrostis exigua*
										0.519	0.305	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.503	0.401	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.777	0.357	503180 Lagoon Nightshade *Solanum lacunarium*
										0.777	0.357	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-L	Patch	robp0103	Depleted	0	no	0.700	0.001	0.001	0.970	0.780	0.001	505252 Slender Love-grass *Eragrostis exigua*
										0.520	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.013	0.002	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.780	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.780	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-P	Patch	robp0103	Depleted	3	no	0.700	1.074	1.074	0.974	0.776	1.335	505252 Slender Love-grass *Eragrostis exigua*

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
										0.520	1.143	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.141	1.503	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.777	1.336	503180 Lagoon Nightshade *Solanum lacunarium*
										0.777	1.336	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-M	Patch	robp0103	Depleted	0	no	0.700	0.002	0.002	0.970	0.520	0.003	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.789	0.003	503180 Lagoon Nightshade *Solanum lacunarium*
										0.789	0.003	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-L	Patch	robp0103	Depleted	0	no	0.580	0.019	0.019	0.870	0.520	0.016	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-N	Patch	robp0103	Depleted	0	no	0.680	0.011	0.011	0.806	0.518	0.012	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-J	Patch	robp0103	Depleted	3	no	0.700	0.362	0.362	0.793	0.520	0.385	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-I	Patch	robp0103	Depleted	2	no	0.700	0.314	0.314	0.867	0.513	0.332	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
3-A	Patch	robp0103	Depleted	0	no	0.410	0.003	0.003	0.870	0.520	0.002	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-B	Patch	robp0103	Depleted	0	no	0.600	0.004	0.004	0.760		0.004	General
5-F	Patch	robp0103	Depleted	0	no	0.610	0.217	0.217	0.796	0.503	0.199	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-E	Patch	robp0103	Depleted	0	no	0.610	0.049	0.049	0.760		0.039	General
1-P	Patch	robp0103	Depleted	0	no	0.680	0.024	0.024	0.790	0.520	0.025	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-T	Patch	robp0103	Depleted	0	no	0.680	0.006	0.006	0.970	0.520	0.006	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.008	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.008	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
6-C	Patch	robp0103	Depleted	1	no	0.620	0.105	0.105	0.971	0.789	0.117	505252 Slender Love-grass *Eragrostis exigua*
										0.477	0.100	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.398	0.131	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.788	0.117	503180 Lagoon Nightshade *Solanum lacunarium*
										0.788	0.117	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
9-A	Patch	robp0106	Depleted	0	no	0.760	0.009	0.009	0.900	0.500	0.010	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.737	0.012	503180 Lagoon Nightshade *Solanum lacunarium*
										0.247	0.012	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-Z	Patch	robp0103	Depleted	0	no	0.590	0.044	0.044	0.821	0.506	0.039	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-AC	Patch	robp0103	Depleted	0	no	0.680	0.054	0.054	0.870	0.510	0.055	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
8-A	Patch	robp0813	Depleted	0	no	0.370	0.058	0.058	0.873	0.520	0.033	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.359	0.038	503180 Lagoon Nightshade *Solanum lacunarium*
										0.698	0.038	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
12-A	Patch	robp0820	Depleted	0	no	0.700	0.067	0.067	0.903	0.760	0.082	505252 Slender Love-grass *Eragrostis exigua*
										0.009	0.070	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.752	0.082	503180 Lagoon Nightshade *Solanum lacunarium*
										0.752	0.082	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
11-A	Patch	robp0808	Least Concern	0	no	0.670	0.000	0.000	0.980	0.770	0.000	505252 Slender Love-grass *Eragrostis exigua*
										0.770	0.000	503180 Lagoon Nightshade *Solanum lacunarium*
										0.770	0.000	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
11-B	Patch	robp0808	Least Concern	0	no	0.670	0.015	0.015	0.980	0.790	0.018	505252 Slender Love-grass *Eragrostis exigua*
										0.790	0.018	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.018	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
11-E	Patch	robp0808	Least Concern	0	no	0.670	0.030	0.030	0.970	0.780	0.036	505252 Slender Love-grass *Eragrostis exigua*
										0.396	0.031	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.780	0.036	503180 Lagoon Nightshade *Solanum lacunarium*
										0.780	0.036	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
11-C	Patch	robp0808	Least Concern	0	no	0.570	0.001	0.001	0.910	0.790	0.001	505252 Slender Love-grass *Eragrostis exigua*
										0.790	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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**
12-C	Patch	robp0820	Depleted	0	no	0.600	0.191	0.191	0.881	0.740	0.200	505252 Slender Love-grass *Eragrostis exigua*
										0.744	0.200	503180 Lagoon Nightshade *Solanum lacunarium*
										0.744	0.200	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
12-B	Patch	robp0820	Depleted	0	no	0.600	0.021	0.021	0.931	0.764	0.022	505252 Slender Love-grass *Eragrostis exigua*
										0.765	0.023	503180 Lagoon Nightshade *Solanum lacunarium*
										0.765	0.023	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
10-A	Patch	robp0823	Depleted	1	no	0.710	0.078	0.078	0.900	0.500	0.083	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.745	0.097	503180 Lagoon Nightshade *Solanum lacunarium*
										0.745	0.097	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
10-E	Patch	robp0823	Depleted	1	no	0.710	0.141	0.141	0.900	0.750	0.176	503180 Lagoon Nightshade *Solanum lacunarium*
										0.750	0.176	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-B	Patch	robp0103	Depleted	0	no	0.590	0.043	0.043	0.760	0.500	0.038	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-C	Patch	robp0103	Depleted	0	no	0.580	0.002	0.002	0.870	0.514	0.002	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
7-C	Patch	robp0813	Depleted	0	no	0.590	0.003	0.003	0.970	0.520	0.003	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.004	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.004	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
7-A	Patch	robp0813	Depleted	0	no	0.590	0.001	0.001	0.790	0.520	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
7-F	Patch	robp0813	Depleted	0	no	0.590	0.010	0.010	0.917	0.520	0.009	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.556	0.011	503180 Lagoon Nightshade *Solanum lacunarium*
										0.556	0.011	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
7-E	Patch	robp0813	Depleted	0	no	0.590	0.002	0.002	0.970	0.520	0.002	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.770	0.002	503180 Lagoon Nightshade *Solanum lacunarium*
										0.770	0.002	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-H	Patch	robp0103	Depleted	0	no	0.680	0.067	0.067	0.976	0.779	0.081	505252 Slender Love-grass *Eragrostis exigua*
										0.521	0.069	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.249	0.091	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.779	0.081	503180 Lagoon Nightshade *Solanum lacunarium*
										0.779	0.081	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-F	Patch	robp0103	Depleted	0	no	0.680	0.001	0.001	0.970	0.780	0.001	505252 Slender Love-grass *Eragrostis exigua*
										0.520	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.780	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.780	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-G	Patch	robp0103	Depleted	0	no	0.680	0.055	0.055	0.970	0.519	0.057	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.082	0.075	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.782	0.066	503180 Lagoon Nightshade *Solanum lacunarium*
										0.782	0.066	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-J	Patch	robp0103	Depleted	0	no	0.580	0.006	0.006	0.760	0.500	0.005	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-A	Patch	robp0103	Depleted	0	no	0.610	0.036	0.036	0.970	0.800	0.040	505252 Slender Love-grass *Eragrostis exigua*
										0.530	0.034	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.044	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.800	0.040	503180 Lagoon Nightshade *Solanum lacunarium*
										0.800	0.040	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-N	Patch	robp0103	Depleted	3	no	0.700	0.249	0.249	0.970	0.785	0.311	505252 Slender Love-grass *Eragrostis exigua*
										0.519	0.266	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.275	0.349	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.785	0.311	503180 Lagoon Nightshade *Solanum lacunarium*
										0.785	0.311	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-O	Patch	robp0103	Depleted	1	no	0.700	0.271	0.271	0.970	0.520	0.289	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.778	0.338	503180 Lagoon Nightshade *Solanum lacunarium*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.778	0.338	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-S	Patch	robp0103	Depleted	0	no	0.710	0.015	0.015	0.980	0.790	0.019	505252 Slender Love-grass *Eragrostis exigua*
										0.032	0.016	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.060	0.021	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.781	0.019	503180 Lagoon Nightshade *Solanum lacunarium*
										0.781	0.019	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-R	Patch	robp0103	Depleted	0	no	0.710	0.001	0.001	0.970	0.800	0.001	505252 Slender Love-grass *Eragrostis exigua*
										0.530	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.001	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.800	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.800	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-Q	Patch	robp0103	Depleted	0	no	0.710	0.000	0.000	0.970	0.800	0.000	505252 Slender Love-grass *Eragrostis exigua*
										0.530	0.000	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.000	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.800	0.000	503180 Lagoon Nightshade *Solanum lacunarium*
										0.800	0.000	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-U	Patch	robp0103	Depleted	0	no	0.710	0.029	0.029	0.970	0.789	0.037	505252 Slender Love-grass *Eragrostis exigua*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.524	0.031	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.445	0.041	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.789	0.037	503180 Lagoon Nightshade *Solanum lacunarium*
										0.789	0.037	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-T	Patch	robp0103	Depleted	0	no	0.710	0.029	0.029	0.970	0.520	0.031	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.784	0.037	503180 Lagoon Nightshade *Solanum lacunarium*
										0.784	0.037	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-K	Patch	robp0103	Depleted	0	no	0.580	0.004	0.004	0.870	0.520	0.004	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-M	Patch	robp0103	Depleted	0	no	0.680	0.003	0.003	0.790	0.520	0.003	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-H	Patch	robp0103	Depleted	0	no	0.700	0.002	0.002	0.857	0.520	0.002	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
14-A	Patch	robp0098	Vulnerable	0	no	0.350	0.002	0.002	0.563		0.001	General
5-C	Patch	robp0103	Depleted	0	no	0.600	0.038	0.038	0.760	0.500	0.034	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-D	Patch	robp0103	Depleted	0	no	0.610	0.022	0.022	0.760	0.500	0.020	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
5-G	Patch	robp0103	Depleted	0	no	0.610	0.355	0.355	0.760	0.500	0.325	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-O	Patch	robp0103	Depleted	0	no	0.680	0.006	0.006	0.790	0.520	0.006	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-Q	Patch	robp0103	Depleted	0	no	0.680	0.065	0.065	0.970	0.520	0.067	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.786	0.078	503180 Lagoon Nightshade *Solanum lacunarium*
										0.786	0.078	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-D1	Patch	robp0103	Depleted	0	no	0.680	0.004	0.004	0.970	0.520	0.004	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.004	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.004	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-R	Patch	robp0103	Depleted	0	no	0.680	0.000	0.000	0.970	0.520	0.000	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-U	Patch	robp0103	Depleted	0	no	0.680	0.001	0.001	0.970	0.510	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.001	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.770	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.770	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-V	Patch	robp0103	Depleted	0	no	0.680	0.001	0.001	0.970	0.520	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.011	0.002	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.790	0.001	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.001	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-W	Patch	robp0103	Depleted	0	no	0.680	0.042	0.042	0.970	0.520	0.044	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.052	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.052	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-Y	Patch	robp0103	Depleted	0	no	0.690	0.021	0.021	0.970	0.784	0.026	505252 Slender Love-grass *Eragrostis exigua*
										0.522	0.022	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.196	0.029	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.784	0.026	503180 Lagoon Nightshade *Solanum lacunarium*
										0.784	0.026	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-X	Patch	robp0103	Depleted	0	no	0.690	0.008	0.008	1.000	0.770	0.010	505252 Slender Love-grass *Eragrostis exigua*
										0.520	0.009	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.012	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.772	0.010	503180 Lagoon Nightshade *Solanum lacunarium*
										0.772	0.010	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
6-B	Patch	robp0103	Depleted	0	no	0.620	0.016	0.016	0.976	0.795	0.018	505252 Slender Love-grass *Eragrostis exigua*
										0.402	0.015	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.759	0.020	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.791	0.018	503180 Lagoon Nightshade *Solanum lacunarium*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.791	0.018	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
6-A	Patch	robp0103	Depleted	0	no	0.620	0.007	0.007	0.970	0.800	0.008	505252 Slender Love-grass *Eragrostis exigua*
										0.530	0.007	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.009	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.800	0.008	503180 Lagoon Nightshade *Solanum lacunarium*
										0.800	0.008	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
2-A	Patch	robp0103	Depleted	0	no	0.320	0.002	0.002	0.810	0.490	0.001	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
2-B	Patch	robp0103	Depleted	0	no	0.320	0.003	0.003	0.810	0.491	0.002	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-AA	Patch	robp0103	Depleted	0	no	0.590	0.061	0.061	0.777	0.502	0.054	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
1-AB	Patch	robp0103	Depleted	0	no	0.680	0.011	0.011	0.870	0.510	0.011	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
12-D	Patch	robp0820	Depleted	0	no	0.700	0.003	0.003	0.840	0.730	0.004	505252 Slender Love-grass *Eragrostis exigua*
										0.730	0.004	503180 Lagoon Nightshade *Solanum lacunarium*
										0.730	0.004	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
5-K	Patch	robp0103	Depleted	0	no	0.700	0.000	0.000	1.000	0.770	0.000	505252 Slender Love-grass *Eragrostis exigua*
										0.520	0.000	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										1.000	0.000	501685 Low Hibiscus *Hibiscus brachysiphonius*
										0.770	0.000	503180 Lagoon Nightshade *Solanum lacunarium*

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**
										0.770	0.000	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*
1-E	Patch	robp0103	Depleted	0	no	0.680	0.000	0.000	0.970	0.520	0.000	10680 Spotted Bowerbird *Ptilonorhynchus maculatus*
										0.790	0.000	503180 Lagoon Nightshade *Solanum lacunarium*
										0.790	0.000	505775 Native Madder *Synaptantha tillaeacea var. tillaeacea*

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
Slender Love-grass	*Eragrostis exigua*	505252	Endangered	Dispersed	Top ranking map	0.0445
Slender Love-grass	*Eragrostis exigua*	505252	Endangered	Dispersed	Habitat importance map	0.0244
Low Hibiscus	*Hibiscus brachysiphonius*	501685	Endangered	Highly Localised Habitat	Habitat importance map	0.0234
Spotted Bowerbird	*Ptilonorhynchus maculatus*	10680	Critically endangered	Dispersed	Habitat importance map	0.0089
Native Madder	*Synaptantha tillaeacea var. tillaeacea*	505775	Vulnerable	Dispersed	Habitat importance map	0.0083
Lagoon Nightshade	*Solanum lacunarium*	503180	Vulnerable	Dispersed	Habitat importance map	0.0059
Plains Spurge	*Euphorbia planiticola*	501333	Endangered	Dispersed	Habitat importance map	0.0044
Eastern Wallaroo	*Macropus robustus robustus*	61266	Endangered	Dispersed	Habitat importance map	0.0042
Bignonia Emu-bush	*Eremophila bignoniiflora*	501198	Vulnerable	Dispersed	Habitat importance map	0.0038
Soda Bush	*Neobassia proceriflora*	503881	Endangered	Dispersed	Habitat importance map	0.0038
Poverty Bush	*Sclerolaena intricata*	503074	Vulnerable	Dispersed	Habitat importance map	0.0038
Small Pop Saltbush	*Atriplex spongiosa*	503700	Endangered	Dispersed	Habitat importance map	0.0037
Hairy Darling-pea	*Swainsona greyana*	503316	Endangered	Dispersed	Habitat importance map	0.0036
Darling Lily	*Crinum flaccidum*	500874	Vulnerable	Dispersed	Habitat importance map	0.0036
Twiggy Emu-bush	*Eremophila polyclada*	501206	Vulnerable	Dispersed	Habitat importance map	0.0035
Murray Hardyhead	*Craterocephalus fluviatilis*	4784	Critically endangered	Dispersed	Habitat importance map	0.0035
Narrow-leaf Emu-bush	*Eremophila sturtii*	501208	Endangered	Dispersed	Habitat importance map	0.0035
Veined Peppercress	*Lepidium phlebopetalum*	501907	Endangered	Dispersed	Habitat importance map	0.0034
Kneed Swainson-pea	*Swainsona reticulata*	504945	Vulnerable	Dispersed	Habitat importance map	0.0033

Desert Glasswort	*Tecticornia triandra*	502397	Rare	Dispersed	Habitat importance map	0.0033
Redthroat	*Pyrrholaemus brunneus*	10497	Endangered	Dispersed	Habitat importance map	0.0029
Sandhill Spurge	*Phyllanthus lacunellus*	503924	Rare	Dispersed	Habitat importance map	0.0028
De Vis' Banded Snake	*Denisonia devisi*	19001	Critically endangered	Dispersed	Habitat importance map	0.0027
Green Copperburr	*Sclerolaena decurrens*	503071	Vulnerable	Dispersed	Habitat importance map	0.0026
Lagoon Spurge	*Phyllanthus lacunarius*	502502	Vulnerable	Dispersed	Habitat importance map	0.0024
Black-fruit Daisy	*Brachyscome melanocarpa subsp. melanocarpa*	500464	Endangered	Dispersed	Habitat importance map	0.0024
Spiny-fruit Saltbush	*Atriplex spinibractea*	504608	Endangered	Dispersed	Habitat importance map	0.0023
Mallee Cucumber	*Austrobryonia micrantha*	502234	Rare	Dispersed	Habitat importance map	0.0022
Woolly Minuria	*Minuria denticulata*	502200	Rare	Dispersed	Habitat importance map	0.0022
Silver Saltbush	*Atriplex rhagodioides*	500331	Vulnerable	Dispersed	Habitat importance map	0.0021
Jerry-jerry	*Ammannia multiflora*	500202	Vulnerable	Dispersed	Habitat importance map	0.0021
Red-chested Button-quail	*Turnix pyrrhothorax*	10019	Vulnerable	Dispersed	Habitat importance map	0.0019
Yakka Grass	*Sporobolus caroli*	503227	Rare	Dispersed	Habitat importance map	0.0019
Goat Head	*Malacocera tricornis*	502117	Rare	Dispersed	Habitat importance map	0.0017
Wilga	*Geijera parviflora*	501419	Endangered	Dispersed	Habitat importance map	0.0017
Hooded Scaly-foot	*Pygopus schraderi*	12176	Critically endangered	Dispersed	Habitat importance map	0.0017
Spreading Emu-bush	*Eremophila divaricata subsp. divaricata*	501200	Rare	Dispersed	Habitat importance map ; special site	0.0016
Spreading Saltbush	*Atriplex limbata*	500322	Vulnerable	Dispersed	Habitat importance map	0.0016
Spotted Emu-bush	*Eremophila maculata subsp. maculata*	501204	Rare	Dispersed	Habitat importance map	0.0016
Pop Saltbush	*Atriplex holocarpa*	500333	Vulnerable	Dispersed	Habitat importance map	0.0015
Desert Lantern	*Abutilon otocarpum*	500003	Vulnerable	Dispersed	Habitat importance map	0.0015
Twin-flower Saltbush	*Dissocarpus biflorus var. biflorus*	501074	Rare	Dispersed	Habitat importance map	0.0015

Wires-and-wool	*Lemooria burkittii*	501477	Endangered	Dispersed	Habitat importance map	0.0014
Pale Plover-daisy	*Leiocarpa leptolepis*	503782	Endangered	Dispersed	Habitat importance map	0.0014
Squat Picris	*Picris squarrosa*	504827	Rare	Dispersed	Habitat importance map	0.0014
Bush Minuria	*Minuria cunninghamii*	502199	Rare	Dispersed	Habitat importance map	0.0014
Leafy Sea-heath	*Frankenia foliosa*	501373	Rare	Dispersed	Habitat importance map	0.0013
Pearl Bluebush	*Maireana sedifolia*	502113	Rare	Dispersed	Habitat importance map	0.0012
Bristly Sea-heath	*Frankenia serpyllifolia*	501374	Rare	Dispersed	Habitat importance map	0.0012
Silky Swainson-pea	*Swainsona sericea*	504946	Vulnerable	Dispersed	Habitat importance map	0.0012
Milkwort Sunray	*Rhodanthe polygalifolia*	501649	Rare	Dispersed	Habitat importance map	0.0012
Blue Burr-daisy	*Calotis cuneifolia*	500594	Rare	Dispersed	Habitat importance map ; special site	0.0011
Flat Spike-sedge	*Eleocharis plana*	501144	Vulnerable	Dispersed	Habitat importance map	0.0011
Smooth Elachanth	*Elachanthus glaber*	503702	Rare	Dispersed	Habitat importance map	0.0011
Spear-fruit Copperburr	*Sclerolaena patenticuspis*	503079	Vulnerable	Dispersed	Habitat importance map	0.0011
Dwarf Flat-sedge	*Cyperus pygmaeus*	500929	Vulnerable	Dispersed	Habitat importance map	0.0011
Small Water-fire	*Bergia trimera*	500387	Vulnerable	Dispersed	Habitat importance map	0.0011
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0011
Winged New Holland Daisy	*Vittadinia pterochaeta*	503542	Vulnerable	Dispersed	Habitat importance map	0.0010
Nealie	*Acacia loderi*	500052	Vulnerable	Dispersed	Habitat importance map	0.0010
Small-leaf Swainson-pea	*Swainsona microphylla*	503320	Rare	Dispersed	Habitat importance map ; special site	0.0010
Twin-leaf Bedstraw	*Asperula gemella*	500280	Rare	Dispersed	Habitat importance map	0.0010
Yarran	*Acacia melvillei*	500058	Vulnerable	Dispersed	Habitat importance map	0.0010
Woolly Copperburr	*Sclerolaena lanicuspis*	503075	Endangered	Dispersed	Habitat importance map	0.0009
Woolly Scurf-pea	*Cullen pallidum*	502772	Endangered	Dispersed	Habitat importance map ; special site	0.0009

Mealy Saltbush	*Atriplex pseudocampanulata*	500330	Rare	Dispersed	Habitat importance map	0.0009
Carpet Python	*Morelia spilota metcalfei*	62969	Endangered	Dispersed	Habitat importance map	0.0009
Dookie Daisy	*Brachyscome gracilis*	505494	Vulnerable	Dispersed	Habitat importance map	0.0009
Purple Love-grass	*Eragrostis lacunaria*	501190	Vulnerable	Dispersed	Habitat importance map	0.0009
Bramble Wattle	*Acacia victoriae subsp. victoriae*	500101	Rare	Dispersed	Habitat importance map	0.0009
Coral Saltbush	*Atriplex papillata*	500327	Rare	Dispersed	Habitat importance map	0.0008
Sand Sida	*Sida ammophila*	503140	Vulnerable	Dispersed	Habitat importance map	0.0008
Swamp Sheoak	*Casuarina obesa*	500682	Endangered	Dispersed	Habitat importance map	0.0008
Twiggy Sida	*Sida intricata*	503143	Vulnerable	Dispersed	Habitat importance map	0.0008
Three-wing Bluebush	*Maireana triptera*	502115	Rare	Dispersed	Habitat importance map	0.0008
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0008
Rye Beetle-grass	*Tripogon loliiformis*	503455	Rare	Dispersed	Habitat importance map	0.0008
Silky Umbrella-grass	*Digitaria ammophila*	501041	Vulnerable	Dispersed	Habitat importance map	0.0008
Riverina Bitter-cress	*Cardamine moirensis*	505032	Rare	Dispersed	Habitat importance map	0.0008
Dwarf Bitter-cress	*Rorippa eustylis*	502944	Rare	Dispersed	Habitat importance map	0.0008
Cane Grass	*Eragrostis australasica*	501184	Vulnerable	Dispersed	Habitat importance map	0.0007
Long Tails	*Ptilotus polystachyus*	502830	Endangered	Dispersed	Habitat importance map	0.0007
Red-naped Snake	*Furina diadema*	12669	Vulnerable	Dispersed	Habitat importance map	0.0007
Riverine Flax-lily	*Dianella porracea*	504266	Vulnerable	Dispersed	Habitat importance map ; special site	0.0007
Smooth Minuria	*Minuria integerrima*	502201	Rare	Dispersed	Habitat importance map	0.0007
White Twin-leaf	*Zygophyllum simile*	504116	Rare	Dispersed	Habitat importance map	0.0007
Bush Stone-curlew	*Burhinus grallarius*	10174	Endangered	Dispersed	Habitat importance map	0.0006
Pin Sida	*Sida fibulifera*	503142	Vulnerable	Dispersed	Habitat importance map ; special site	0.0006
Small Monkey-flower	*Elacholoma prostrata*	502196	Rare	Dispersed	Habitat importance map	0.0006

Slit-wing Bluebush	*Maireana georgei*	503863	Vulnerable	Dispersed	Habitat importance map	0.0006
Spiny Lignum	*Duma horrida subsp. horrida*	502230	Rare	Dispersed	Habitat importance map	0.0006
Pointed Saltbush	*Atriplex acutibractea subsp. karoniensis*	504228	Rare	Dispersed	Habitat importance map	0.0006
Samphire Skink	*Morethia adelaidensis*	12525	Endangered	Dispersed	Habitat importance map	0.0006
Bristly Love-grass	*Eragrostis setifolia*	501195	Vulnerable	Dispersed	Habitat importance map ; special site	0.0006
Burr-daisy	*Calotis cymbacantha*	500595	Rare	Dispersed	Habitat importance map	0.0005
Saltbush Striped Skink	*Ctenotus olympicus*	19008	Critically endangered	Dispersed	Habitat importance map	0.0005
Round Templetonia	*Templetonia egena*	503340	Vulnerable	Dispersed	Habitat importance map	0.0005
Hoary Scurf-pea	*Cullen cinereum*	502770	Endangered	Dispersed	Top ranking map	0.0005
Small-flower Tobacco	*Nicotiana goodspeedii*	502273	Rare	Dispersed	Habitat importance map	0.0005
Port Lincoln Snake	*Parasuta spectabilis*	12813	Vulnerable	Dispersed	Habitat importance map	0.0005
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0005
Spiny Goosefoot	*Rhagodia ulicina*	502931	Rare	Dispersed	Habitat importance map	0.0005
Sarcozona	*Sarcozona praecox*	503014	Rare	Dispersed	Habitat importance map ; special site	0.0005
Regent Parrot	*Polytelis anthopeplus monarchoides*	10278	Vulnerable	Dispersed	Habitat importance map	0.0004
Dwarf Lantern-flower	*Abutilon fraseri*	500002	Endangered	Dispersed	Habitat importance map	0.0004
Small Elachanth	*Elachanthus pusillus*	501135	Rare	Dispersed	Habitat importance map	0.0004
Twining Purslane	*Calandrinia volubilis*	500556	Rare	Dispersed	Habitat importance map	0.0004
Dwarf Burrowing Skink	*Lerista timida*	12492	Endangered	Dispersed	Habitat importance map	0.0004
Major Mitchell's Cockatoo	*Lophocroa leadbeateri*	10270	Vulnerable	Dispersed	Habitat importance map	0.0004
Slender Club-sedge	*Isolepis congrua*	501773	Vulnerable	Dispersed	Habitat importance map	0.0004
Dwarf Swainson-pea	*Swainsona phacoides*	503323	Endangered	Dispersed	Habitat importance map	0.0003

Woolly Mantle	*Eriochlamys behrii s.s.*	505666	Rare	Dispersed	Habitat importance map	0.0003
Scrambling Twin-leaf	*Zygophyllum angustifolium*	504117	Rare	Dispersed	Habitat importance map	0.0003
Umbrella Wattle	*Acacia oswaldii*	500070	Vulnerable	Dispersed	Habitat importance map	0.0003
Dwarf Brooklime	*Gratiola pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0003
White-browed Treecreeper	*Climacteris affinis*	10561	Vulnerable	Dispersed	Habitat importance map ; special site	0.0003
Prickly Cudweed	*Stuartina hamata*	503299	Rare	Dispersed	Habitat importance map	0.0003
Waterbush	*Myoporum montanum*	502240	Rare	Dispersed	Habitat importance map	0.0003
Mallee Tussock-grass	*Poa lowanensis*	503890	Rare	Dispersed	Habitat importance map	0.0003
Mallee Annual-bluebell	*Wahlenbergia tumidifructa*	504060	Rare	Dispersed	Habitat importance map	0.0003
Sand Brome	*Bromus arenarius*	500497	Rare	Dispersed	Habitat importance map	0.0003
Desert Jasmine	*Jasminum didymum subsp. lineare*	501801	Vulnerable	Dispersed	Habitat importance map	0.0002
Spear-grass	*Austrostipa trichophylla*	504512	Rare	Dispersed	Habitat importance map	0.0002
Spreading Angianthus	*Angianthus brachypappus*	500227	Vulnerable	Dispersed	Habitat importance map	0.0002
Hoary Scurf-pea	*Cullen cinereum*	502770	Endangered	Dispersed	Habitat importance map	0.0002
Baldoo	*Atriplex lindleyi subsp. conduplicata*	504231	Rare	Dispersed	Habitat importance map	0.0001
Club-hair New Holland Daisy	*Vittadinia condyloides*	503536	Rare	Dispersed	Habitat importance map	0.0001
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0001
Northern Sandalwood	*Santalum lanceolatum*	503005	Endangered	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0001
Frosted Goosefoot	*Chenopodium desertorum subsp. desertorum*	504380	Rare	Dispersed	Habitat importance map	0.0000
Pale Flax-lily	*Dianella sp. aff. longifolia (Riverina)*	507399	Vulnerable	Dispersed	Habitat importance map	0.0000

Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000
Buloke Mistletoe	*Amyema linophylla subsp. orientalis*	500217	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

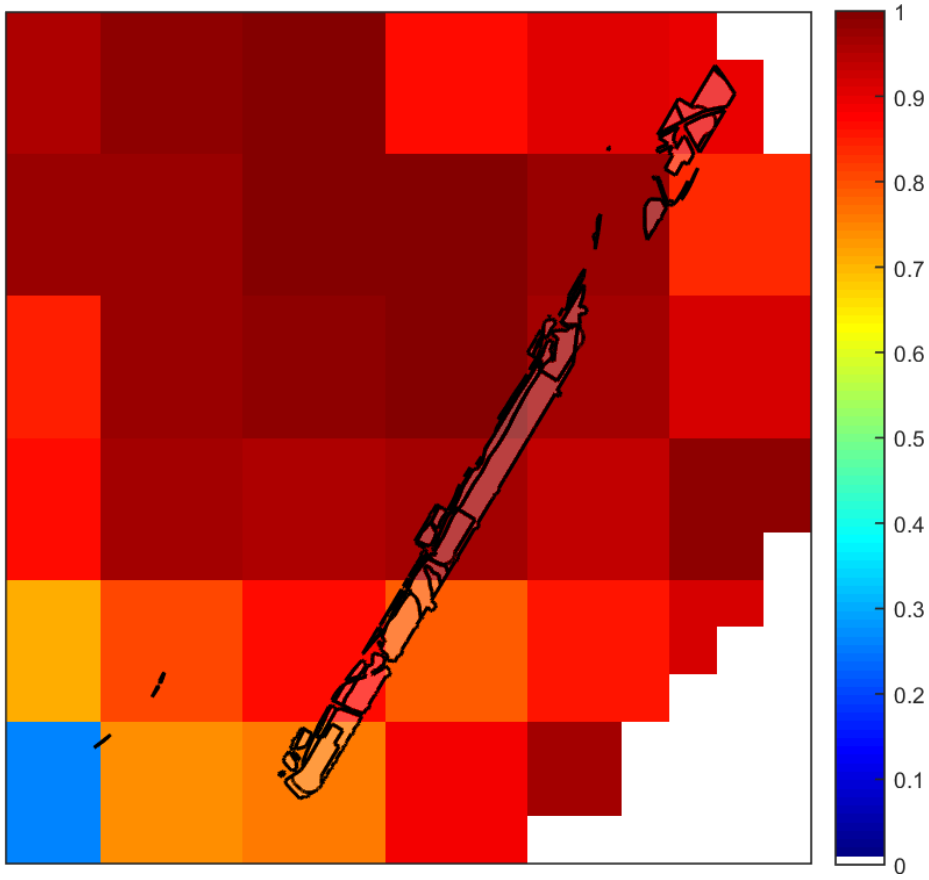
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

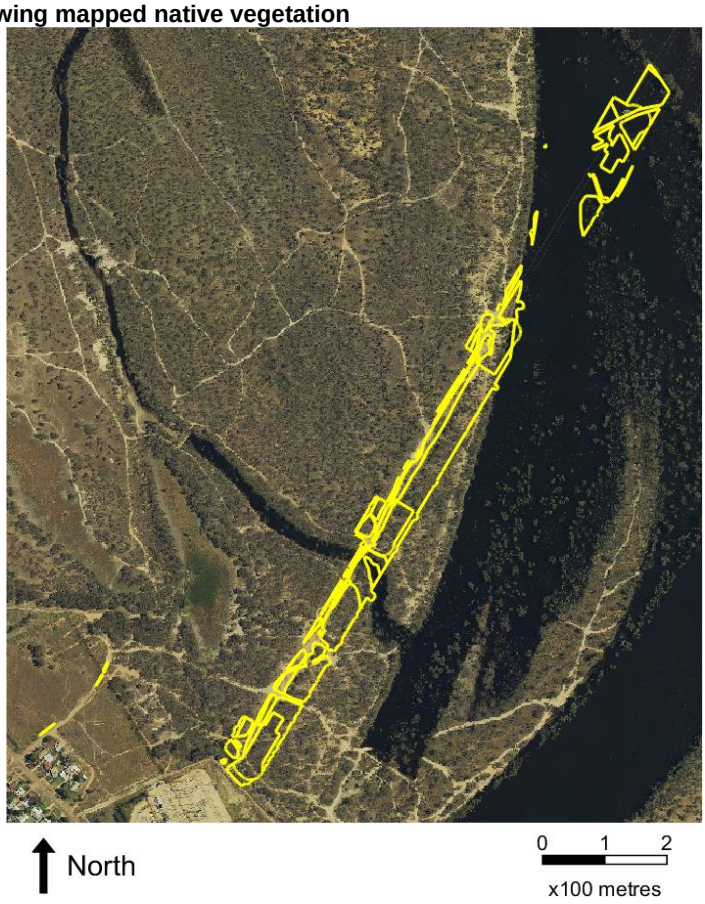
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance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

Appendix 3 – Images of mapped native vegetation

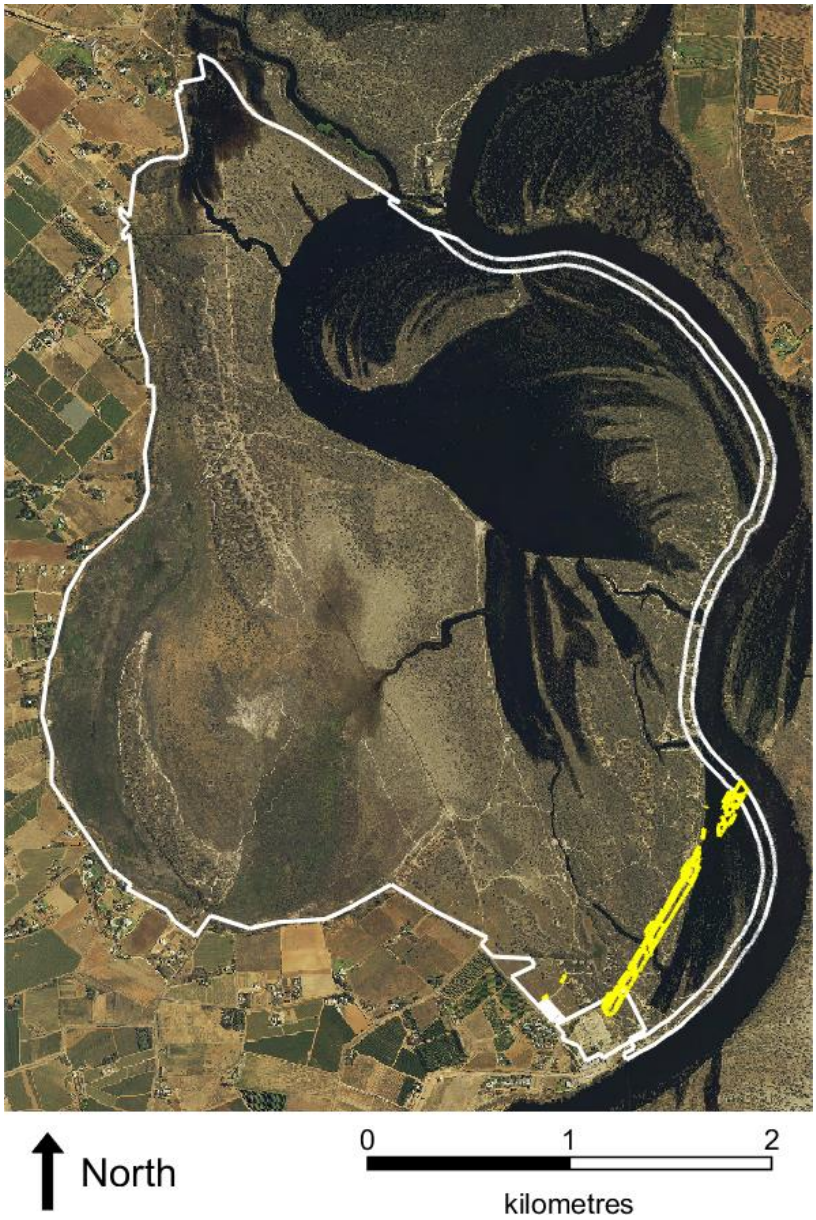
2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation



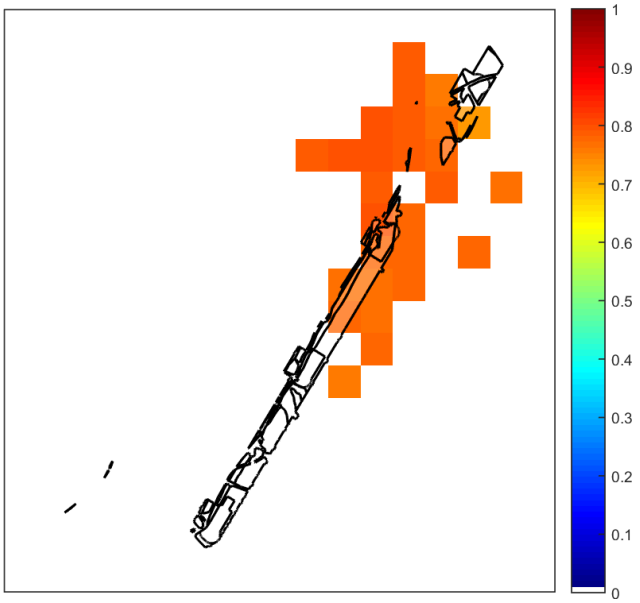
4. Map of the property in context



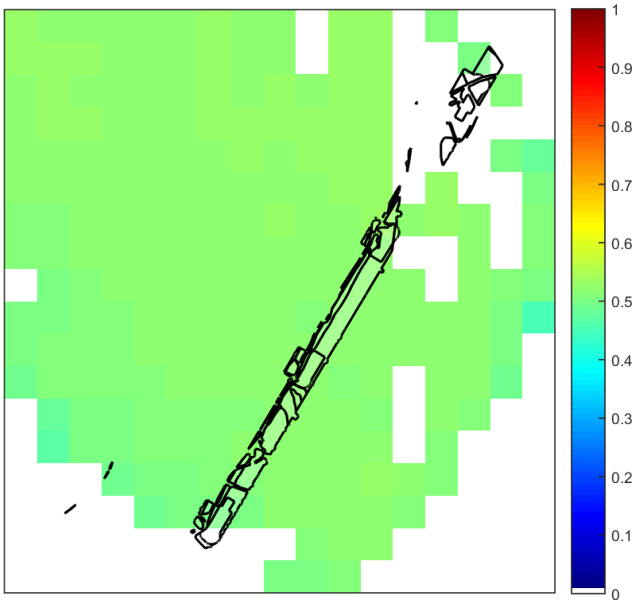
Yellow boundaries denote areas of proposed native vegetation removal.

4. Habitat importance maps

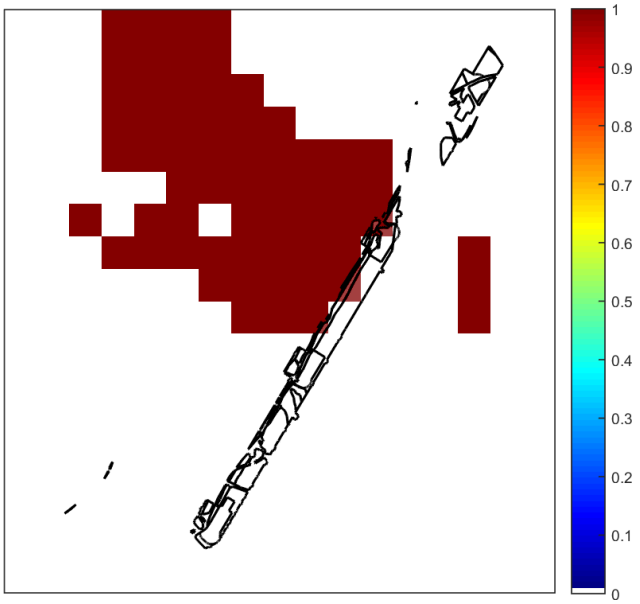
Slender Love-grass
Eragrostis exigua
505252



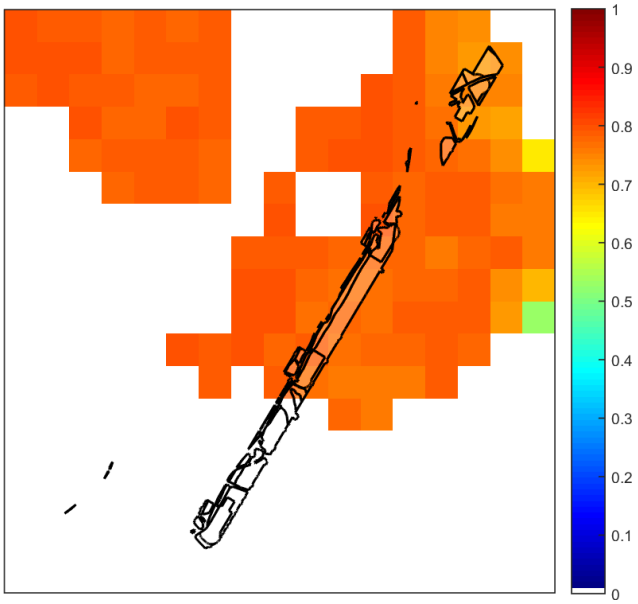
Spotted Bowerbird
Ptilonorhynchus maculatus
10680



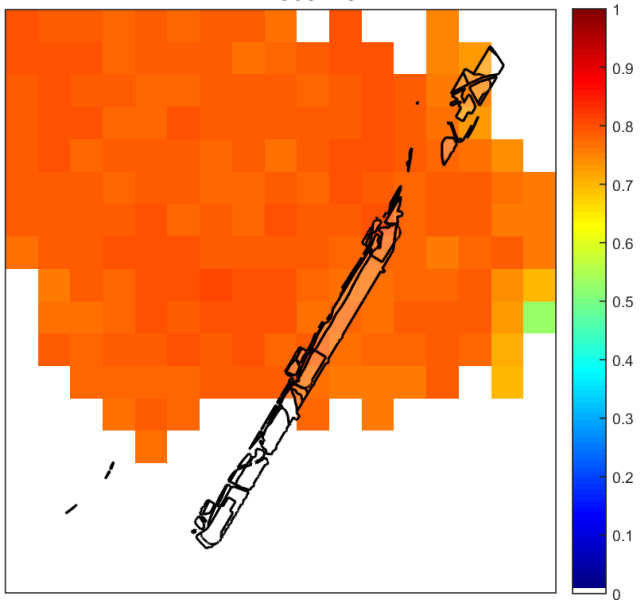
Low Hibiscus
Hibiscus brachysiphonius
501685



Lagoon Nightshade
Solanum lacunarium
503180



Native Madder
Synaptantha tillaeacea var. tillaeacea
505775



ABOUT US

WSP is one of the world's leading engineering professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, planners, surveyors, environmental specialists, as well as other design, program and construction management professionals. We design lasting Property & Buildings, Transportation & Infrastructure, Resources (including Mining and Industry), Water, Power and Environmental solutions, as well as provide project delivery and strategic consulting services. With approximately 50,000 talented people globally, we engineer projects that will help societies grow for lifetimes to come.