Flora and fauna assessment: Carisbrook Solar PV Farm

FINAL REPORT

Prepared for ib vogt GmbH

5 July 2018

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- Department of the Environment and Energy for access to the Protected Matters Search Tool of the Australian Government

Biosis staff involved in this project were:

- Gareth Davies (mapping)

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Summary

Biosis Pty Ltd was commissioned by ib vogt GmbH to undertake a flora and fauna assessment of an area of land proposed for the development of a solar farm. The study area is located a rural environment approximately 65 kilometres north of Ballarat.

Ecological values

Key ecological values identified within the study area are as follows:

- 1.21 ha of native vegetation and two scattered trees.
- Some sections of the road reserve also contain native vegetation.
- Remnants of Plains Grassland which is considered an endangered ecological community within the Victorian Volcanic Plain bioregion.
- Patch of native vegetation present meets the definition of the nationally threatened ecological community: Natural Temperate Grasslands of the Victorian Volcanic Plain, and is a listed FFG Act community: Western (basalt) Plains Grasslands Community.
- Potential habitat for five EPBC listed (significant) species.
- Plantations of a mix of native and non-native tree species.
- Extensive areas of land depleted of native vegetation, currently used for cropping and grazing.

Government legislation and policy

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
EPBC Act	Plains Grassland EVC which is: - Nationally threatened ecological community - Striped Legless Lizard habitat - Potential habitat for Spiny Rice-flower, Trailing Hop-bush and Golden Sun Moth Eucalyptus trees, both remnant and planted, which provide potential habitat for Swift Parrot.	Referral recommended if native vegetation is to be impacted.	The current design does not affect areas of Plains Grassland EVC. If future designs impact these areas then targeted survey for Striped Legless Lizard and Golden Sun Moth will be required.
FFG Act	Listed species and one listed ecological community present	Protected Flora Permit not required.	Site is private land.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
Planning & Environment Act	All indigenous vegetation to be removed.	Planning permit not required for native vegetation removal under current design.	No native vegetation is to be removed, therefor no planning permit for the removal of native vegetation is required.
CaLP Act	Five noxious weeds	Not Applicable.	Comply with requirements to control/eradicate

Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines)

There is one patch of significant vegetation on site, and two scattered trees amounting to 1.241 hectares of native vegetation, from within location category 1. The removal of this native vegetation would be assessed in the detailed assessment pathway.

The current design avoids all areas of native vegetation (Figure 3), therefore no offsets will be required to compensate for the loss of native vegetation.

Recommendations

The results of this assessment have been incorporated into the project design. In doing this Ib vogt GmbH has minimised the loss of ecological values present by avoiding the following:

- Mapped area of natural temperate grassland which contains native grass and potentially provides habitat for four EPBC listed species
- Scattered trees which potentially provide habitat for the Swift Parrot
- Potential habitat for the Striped Legless Lizard

Future requirements for infrastructure and services must be forecast as much as possible at this time and allowance made outside any nominated reserves for all construction works. This includes road batters, footpaths, drainage and services (including optic fibre). All areas of vegetation/habitat nominated in the design plan as 'retained' are to be treated as no-go zones and are not to be encroached upon as development progresses.

Biosis has identified areas of potential habitat for Striped Legless Lizard, Spiny Rice-flower, Golden Sun Moth and Trailing Hop-bush, however the current design does not involve impacts to these areas.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by ib vogt GmbH to undertake a flora and fauna assessment of an area of farmland located in Carisbrook proposed for the development of a solar farm.

1.2 Scope of assessment

The objectives of this investigation are to:

- Describe the vascular flora (ferns, conifers, flowering plants), vertebrate fauna (mammals, birds, reptiles, frogs, fishes).
- Map native vegetation and other habitat features.
- Conduct a vegetation quality assessment.
- Review the implications of relevant biodiversity legislation and policy, including Victoria's Guidelines for the removal, destruction or lopping of native vegetation ('the Guidelines').
- Identify potential implications of the proposed development and provide recommendations to assist with development design.
- Recommend any further assessments of the site that may be required (such as a vegetation impact assessment or targeted searches for significant species).

1.3 Location of the study area

The study area is located approximately 65 kilometres north of Ballarat (Figure 1). It encompasses 342 hectares of private land. It is currently zoned Farming Zone.

The study area is within the:

- Victorian Volcanic Plain Bioregion
- Loddon River Basin
- North Central Catchment Management Authority (CMA)
- Shire of Central Goldfields.

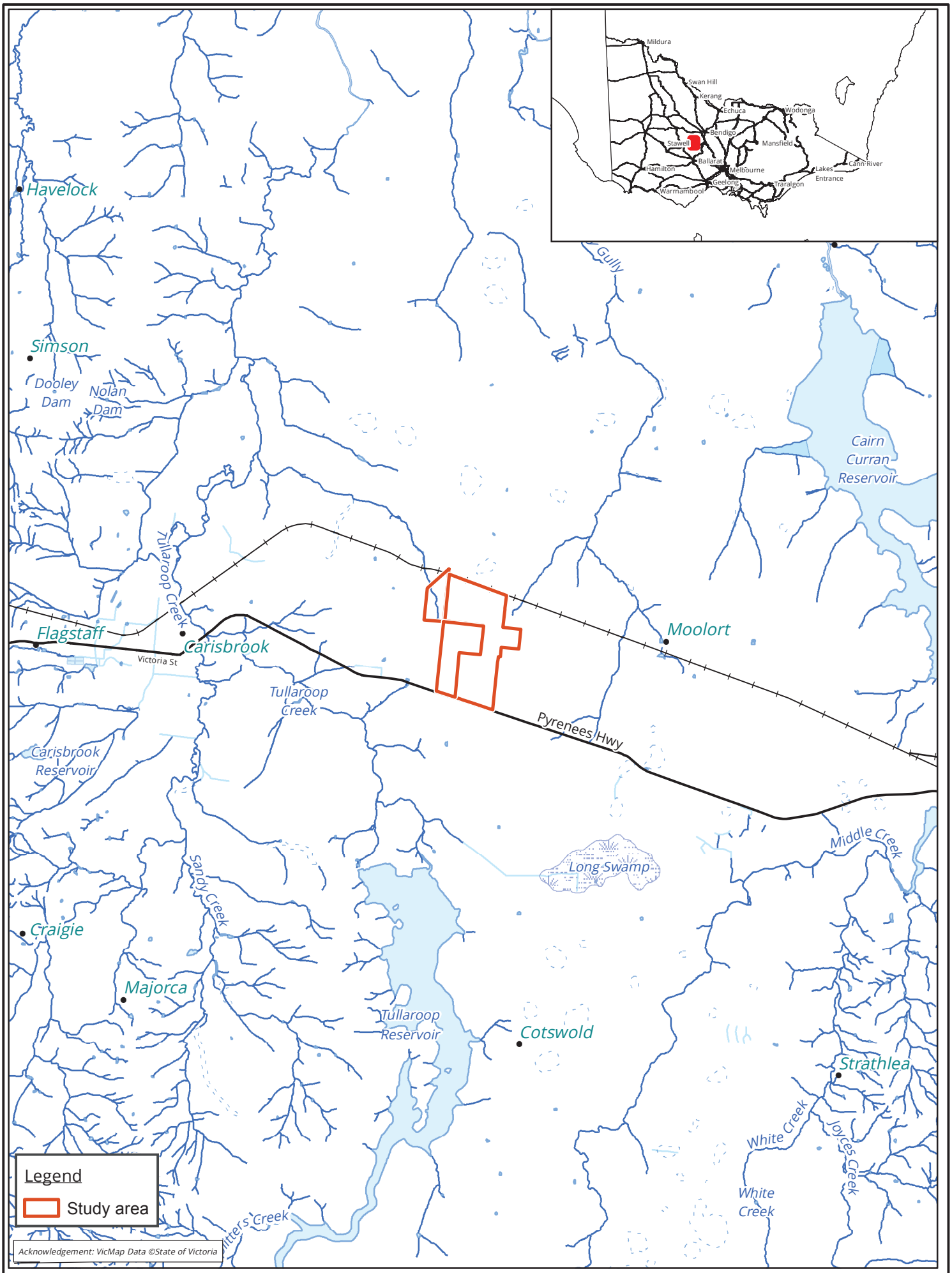

Figure 1: Location of the study area - Pyrenees Highway, Moolort, Victoria

Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 26774,
Date: 20 February 2018,
Checked by: CER, Drawn by: GD, Last edited by: gdavies
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2. Methods

2.1 Database review

In order to provide a context for the study area, information about flora and fauna from within five kilometres of the study area (the 'local area') was obtained from relevant biodiversity databases. Records from the following databases were collated and reviewed:

- Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' August 2015 © The State of Victoria, Department of Environment, Land, Water and Planning (DELWP).
- DELWP NatureKit mapping tool
- DELWP Habitat Importance maps
- Protected Matters Search Tool of the Australian Government Department of the Environment and Energy (DoEE) for matters protected by the EPBC Act.

Other sources of biodiversity information were examined including:

- DELWP Native Vegetation Information Management (NVIM) system
- DELWP NaturePrint; accessed through the Biodiversity Interactive Map
- DELWP's Native Vegetation Transitional Guidance team was provided with site-based spatial information in order to generate a Native Vegetation Removal Report for the study area.
- Planning Scheme overlays relevant to biodiversity based on http://planningschemes.dpcd.vic.gov.au.

2.2 Definitions of significance

The significance of a species or ecological community is determined by its listing status under Commonwealth or State legislation / policy (Table 1).

Table 1 Criteria for determining significance of species & ecological communities

Significance	
National	Listed as critically endangered, endangered or vulnerable under the EPBC Act
State	Listed as critically endangered, endangered or vulnerable in Victoria on a DELWP Advisory List (DSE 2009; DSE 2013; DEPI 2014a) Listed as threatened under the FFG Act

Lists of significant species generated from the databases are provided in Appendix 1 (flora) and Appendix 2 (fauna) and the species have been assessed to determine their likelihood of occurrence based on the process outlined below.

2.3 Determining likelihood of occurrence of significant species

Likelihood of occurrence indicates the potential for a species or ecological community to occur regularly within the study area. It is based on expert opinion, information in relevant biodiversity databases and reports, and an assessment of the habitats on site. Likelihood of occurrence is ranked as negligible, low, medium, high or recorded. The rationale for the rank assigned is provided for each species in Appendices 1

and 2. Those species for which there is little or no suitable habitat within the study area are assigned a likelihood of low or negligible and are not considered further.

Only those species listed under the EPBC Act or listed as threatened under the FFG Act (hereafter referred to as 'listed species') are assessed to determine their likelihood of occurrence. The habitat value for species listed on the DELWP Advisory Lists is calculated by the Habitat Importance Modelling produced by DELWP (DELWP 2017). Where DELWP Advisory List species are recorded in the study area this is noted in Appendix 1 and 2.

Species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered.

2.4 Site investigation

2.4.1 Flora assessment

The flora assessment was undertaken on 14 February 2018 and a list of flora species was collected. This list will be submitted to DELWP for incorporation into the Victorian Biodiversity Atlas.

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Clause 72).

The Guidelines classify native vegetation into two categories (DELWP 2017):

- A **patch** of native vegetation (measured in hectares) is either:
  - An area of native vegetation, with or without trees, where at least 25 percent of the total perennial understorey cover is native plants.
  - An area with three or more native canopy trees where the drip line (i.e. the outermost boundary of a tree canopy) of each tree touches the drip line of at least one other tree, forming a continuous canopy.
  - Any mapped wetland included in the *Current wetlands map,* available in DELWP systems and tools.

Patch vegetation is classified into ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are determined by DELWP.

- A **scattered tree** is defined as a native canopy tree that does not form part of a patch of native vegetation.

A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type. Ecological vegetation class descriptions provide a list of the typical canopy species. A scattered tree is defined as either small or large, and is determined using the large tree benchmark for the relevant EVC. The extent of a small scattered tree is the area of a circle with a 10 metre radius (i.e. 0.031 hectares), while the extent of a large scattered tree is a circle with a 15 metre radius (i.e. 0.070 hectares). A condition score is applied to each scattered tree based on information provided by DELWP's NVIM.

A Vegetation Quality Assessment was undertaken for all patches of native vegetation identified in the study area. This assessment is consistent with DELWP's Habitat hectare method (DSE 2004) and the Guidelines (DELWP 2017). For the purposes of this assessment the limit of the resolution for the Habitat hectare assessment process is taken to be 0.001 Habitat hectares (Hha). That is, if native vegetation is present with

sufficient cover but its condition and extent would not result in the identification of at least 0.001 Habitat hectares then that vegetation will not be mapped or assessed as a separate habitat zone.

Species nomenclature for flora follows the Victorian Biodiversity Atlas (VBA).

2.4.2 Fauna assessment

The study area was investigated on 14 February 2018 to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

2.5 Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by DELWP under the *Wildlife Act 1975, Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10007569).

2.6 Qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

There are no seasonal or other external factors which limit the results.

Native Vegetation Removal Reports are prepared through DELWP's NVIM system or requested through DELWP's Native Vegetation Transitional Guidance team. Biosis supplies relevant site-based spatial information as inputs to DELWP and we are entirely reliant on DELWP's output reports for all assessment pathway applications. Biosis makes every effort to ensure site and spatial information entered into the NVIM, or supplied to DELWP, is an accurate reflection of proposed native vegetation removal.

2.7 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), associated policy statements, significant impacts guidelines, listing advice and key threatening processes
- Threatened taxa, communities and threatening processes listed under Section 10 of the *Flora & Fauna Guarantee Act 1988* (FFG Act); associated action statements and listing advice
- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017)
- Native Vegetation Management Plans prepared by Catchment Management Authorities
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the Central Goldfields Planning Scheme
- Noxious weeds and pest animals lists under the *Catchment and Land Protection Act 1994* (CaLP Act).

2.8 Mapping

Mapping was conducted using hand-held GPS-enabled tablets and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the tablets (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

3. Results

The ecological features of the study area are described below and mapped in Figure 2.

Species recorded during the flora and fauna assessment are listed in Appendices 1 and 2. Unless of particular note, these species are not discussed further.

Those species recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1 Vegetation and fauna habitat

The majority of the study area has been highly modified due to past land use for cropping. Most of the study area has been significantly degraded and supports predominantly introduced vegetation that is of limited ecological value. Ecological features present within the study area are limited to areas of basalt rock that contain remnant patches of native grass, a few areas of planted trees which provide habitat for a range of birds and two remnant scattered trees. These features are described further in Table 2 and mapped in Figure 2.

Photos are provided in Appendix 3.

Table 2 Summary of vegetation and habitat types within the study area

Vegetation or habitat type	Description	Location	Significant values
Plains Grassland EVC	Characterised primarily by spear grasses and lower densities of wallaby grasses with occasional forbs in the ground layer. Trees and shrubs are absent.	One remnant patch in the south eastern section of the study area.	Patch meets the definition of the Natural Temperate Grassland of the Victorian Volcanic Plain Nationally Threatened Ecological Community. Includes areas of potential habitat for Striped Legless Lizard, Golden Sun Moth, Trailing Hop-bush, Hairy Tails and Spiny Rice-flower. This patch fits the description for the EPBC Act listed community 'Natural Temperate Grasslands of the Victorian Volcanic Plain'.
Scattered trees	Two scattered trees, both Yellow Box *Eucalyptus melliodora,* are present within the study area, which may provide a foraging resource for mobile fauna species. Neither tree contain hollows.	Both trees are located in the north central section of the study area.	Eucalypts in these areas offer possible foraging habitat for parrot species.
Predominantly introduced vegetation (cropping and grazing paddocks)	The majority of the study area supports degraded paddocks that have been cleared in the past and are currently used for cropping and grazing purposes. There is limited native vegetation in these areas.	Majority of the study area.	These areas have little to no habitat values for rare or threatened fauna. Some grassland birds may forage in the paddocks.
Rock piles	Three large piles of dumped basalt rocks are present in the southern section of the study area.	Southern section of study area.	There are many cracks and gaps between the rocks which serve as shelter for reptiles and mammal species. These rock piles are unlikely to provide habitat for any significant species.
Uncropped areas	Three small areas in the south eastern section of the study area that appear to have been excluded from cropping. All patches are dominated by exotic grasses	South eastern section of study area.	These patches offer potential habitat for the Striped Legless Lizard, despite consisting primarily of exotic vegetation. Areas of loose surface rock and dense

Vegetation or habitat type	Description	Location	Significant values
	with some scattered occurrences of native grass. Each is surrounded by a ring of basalt rock, with some scattered surface rocks across each patch.		grassland are known to provide habitat for Striped Legless Lizard in similar sites on the Volcanic Plain.
Planted vegetation	Areas of planted trees occur across the study area. There are two main plantations, and a series of wind breaks and smaller plantations, containing both local and non-local species.	Various locations across study area.	These areas generally contains few habitat values. However, these plantations may support a range of common native and introduced bird species, particularly when in flower.
Constructed dams	Three irrigation dams are located within the study area. Each is primarily surrounded by exotic vegetation. The most northern dam has a few scattered non-local trees.	Western side of study area	Each dam is of limited value to native fauna, however may be used on occasion by waterbirds. They do not provide a significant resource to native biodiversity.

3.2 Landscape context

The surrounding landscape has primarily undergone extensive modification for agricultural purposes, with the closest sizable patch of remnant native vegetation being a series of conservation reserves surrounding the township of Maryborough (approximately 7 km west). There is no apparent habitat corridor that links these remnant patches to the study area.

DELWPs NatureKit mapping of extant native vegetation identifies broad areas of Plains Woodland across the study site. The extent of native vegetation currently present is greatly reduced, with only one small remnant patch of the related EVC Plains Grassland identified within the survey area.

No areas of the property drain directly into any natural creeks or rivers. The only source of water present is located in three manmade dams, which are primarily used for irrigation and as a water source for stock. It appears that there are low lying areas of poor drainage on the property where it would become seasonally waterlogged, with exotic grasses taking advantage of the wetter periods.

3.3 Significant species and ecological communities

3.3.1 EPBC Act and FFG Act listed species

Lists of EPBC Act and FFG Act listed species recorded or predicted to occur within five kilometres of the study area or from the relevant catchment (aquatic species) are provided in Appendices 1 and 2. An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included. A summary of those species recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 3.

Table 3 Summary of EPBC and FFG Act listed species most likely to occur in the study area

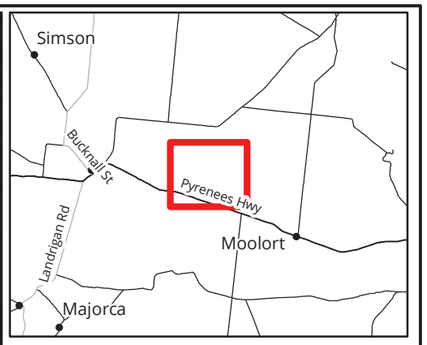
Species name	Listing status	Area of value within the study area
Golden Sun Moth	Critically Endangered under EPBC Act Listed under FFG Act	Plains Grassland EVC.
Spiny Rice-flower	Critically Endangered under EPBC Act Listed under FFG Act	Plains Grassland EVC.
Striped Legless Lizard	Vulnerable under EPBC Act Listed under FFG Act	Plains Grassland EVC and areas containing grasses and loose basalt rocks.
Swift Parrot	Critically Endangered under EPBC Act Listed under FFG Act	May make occasional use of eucalypt plantation areas.
Trailing Hop-bush	Vulnerable under EPBC Act	Low-lying areas, grasslands, rocky outcrops.
Brolga	Listed under FFG Act	Grassland, crop and pasture within study site.
Eastern Great Egret	Listed under FFG Act	Seasonally water-logged pasture paddocks and crops.
Hairy Tails	Listed under FFG Act	Plains Grassland.
Hooded Robin	Listed under FFG Act	Eucalypt plantations and scattered trees.
White-throated Needletail	Listed under FFG Act	Aerial space above Eucalyptus trees on site.

3.4 Further survey recommendations

It is recommended that, if possible, the area of Plains Grassland EVC, and the patches of uncropped rocky paddock in the south-eastern section of the study area be protected from any impacts. These areas are avoided in the current design plan.

If the plans change in the future, and impacts to these areas are required, we recommend targeted surveys for the following EPBC Act listed species:

- Striped Legless Lizard
- Golden Sun Moth
- Spiny Rice-flower
- Trailing Hop-bush



Legend

- Study area
- Plantation
- Basalt rock piles
- Potential habitat for Striped Legless Lizard

Ecological vegetation class

- (VVP_0132) Plains Grassland
- Scattered trees

Figure 2: Ecological features of the study area

0 100 200 300 400 500

Metres
Scale: 1:11,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

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Albury, Ballarat, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

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4. Biodiversity legislation and government policy

This section provides an assessment of the project in relation to key biodiversity legislation and government policy. This section does not describe the legislation and policy in detail. Where available, links to further information are provided.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (MNES) protected under the Act.

Link for further information including a guide to the referral process is available at: http://www.environment.gov.au/epbc/index.html.

MNES relevant to the project are summarised in Table 5. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 4 Assessment of project in relation to the EPBC Act

MNES	Project specifics	Assessment against significant impact guidelines
Threatened species and ecological communities	Eleven flora and 15 fauna species have been recorded or predicted to occur in the project search area. The likelihood of these species occurring in the study area is assessed in Appendix 1 (flora) and Appendix 2 (fauna).	Five listed species are considered to have a medium or higher likelihood of occurring within the study area – Golden Sun Moth, Spiny Rice-flower, Trailing Hop-bush, Striped Legless-lizard and Swift Parrot. The project is unlikely to constitute a significant impact to Swift Parrot. The project design does not impact on areas of Plains Grassland and uncropped areas in the south-east of the study area and so is unlikely to impact on the other four species. If the design changes and these areas can no longer be avoided, targeted surveys are recommended. The mapped areas of Plains Grassland EVC correspond with the definition of the listed community 'Natural Temperate Grasslands of the Victorian Volcanic Plain'. These areas have been avoided in the current design.
Migratory species	Twelve migratory species have been recorded or predicted to occur in the project search area (Appendix 2).	While some of these species would be expected to use the study area on occasions, and some of them may do so regularly or may be resident, it does not provide important habitat for an ecologically significant proportion of any of these

MNES	Project specifics	Assessment against significant impact guidelines
		species.
Wetlands of international importance (Ramsar sites).	The study area is identified as being within the catchment of five Ramsar sites.	The study area does not drain directly into any of the Ramsar sites and the development is not likely to result in a significant impact.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DELWP to 'take' protected flora species from public land. A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

Link for further information: http://www.depi.vic.gov.au/environment-and-wildlife/threatened-species-and-communities/flora-and-fauna-guarantee-act-1988.

The area of Plains Grassland corresponds with the Western (Basalt) Plains Grasslands Community, and contains habitat for several FFG Act listed species. One protected flora species is present, Drooping Cassinia *Cassinia arcuata.*

The land is privately owned, is not declared 'critical habitat' for the purposes of the FFG Act and the flora species are not being taken for the purpose of commercial sale. Therefore a protected flora permit is not required, however the presence of rare or threatened flora and habitat for threatened fauna will be considered by the Responsible Authority in determining its response to an application for vegetation removal under Clause 52.17 (see below).

4.2.2 Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals, and provides a system of controls on noxious species.

Declared noxious weeds identified in the study area are listed in Appendix 1 (Table 1.2).

The land owner must take all reasonable steps to eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds, and prevent the spread of and as far as possible eradicate established pest animals. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

Link for further information: http://www.depi.vic.gov.au/agriculture-and-food/pests-diseases-and-weeds/protecting-victoria-from-pest-animals-and-weeds/legislation-policy-and-permits/legislation.

4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities.

Of particular relevance to the development proposal are controls relating to the removal, destruction or lopping of native vegetation contained within the Central Goldfields Planning Scheme (the Scheme), including permit requirements. The Scheme (Clause 72) defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. It is an objective of Clause 12.01-2 of the State Planning Policy Framework (Native Vegetation Management) that removal of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity.

Clause 52.17 (Native Vegetation) requires a planning permit to remove, destroy or lop native vegetation including some dead native vegetation. Decision guidelines that must be considered by the referral or responsible authority are contained in Section 7 of the Guidelines, and referred to in Clause 52.17-4. Clause 52.17 does not apply if a Native Vegetation Precinct Plan corresponding to the land is incorporated in the Scheme. It should be noted that where native vegetation does not meet the definition of a patch or scattered tree, as described in Section 3.1, the Guidelines do not apply. However, a permit may still be required to remove, destroy or lop native vegetation under the provisions of the Scheme.

Clause 65.02 requires consideration of native vegetation retention in a subdivision application and siting of open space areas.

Under Clause 66.02 a permit application to remove, destroy or lop native vegetation is required to be referred to DELWP as a recommending referral authority if any of the following apply:

- the class of application is on the detailed assessment pathway
- a property vegetation precinct plan applies to the site or
- the native vegetation is on Crown land occupied or managed by the Responsible Authority.

The need for a permit to remove native vegetation may also be triggered by one overlay within the Scheme. The location of the overlay in relation to the study area can be determined via the following link: http://planningschemes.dpcd.vic.gov.au. The provisions of the following overlay apply to the study area:

Erosion Management Overlay (EMO) covers a small section in the north west corner of the study area.

A permit is required to remove, destroy or lop any vegetation. This does not apply:

- If a schedule to this overlay specifically states that a permit is not required.
- If the table to Clause 44.01-3 specifically states that a permit is not required.
- To the removal, destruction or lopping of native vegetation in accordance with a native vegetation precinct plan specified in the schedule to Clause 52.16.

Victoria's Guidelines for the removal, destruction or lopping of native vegetation

The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria (DELWP 2017). The Guidelines replaced the previous incorporated document titled *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (DEPI 2013) on 12 December 2017.

The purpose of the Guidelines is to guide how impacts to biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation. The objective for the guidelines in Victoria is 'No net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

As this project does not involve the removal of native vegetation (based on the current design), an assessment under the guidelines is not required. Further information, including vegetation quality assessment results are provided in Section 5.

5. Victoria's Guidelines for the removal, destruction or lopping of native vegetation

The Guidelines were introduced in December 2017. They set out and describe the application of Victoria's statewide policy in relation to assessing and compensating for the removal of native vegetation in order to achieve the objective of 'no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

This objective is to be achieved through Victoria's planning system using an assessment approach that relies on strategic planning and the permit and offset system. The key policy for achieving no net loss to biodiversity is the three-step approach of avoid, minimise and offset:

- **Avoid** the removal, destruction or lopping of native vegetation to ensure that the important biodiversity values of native vegetation continue to be delivered into the future.
- **Minimise** impacts resulting from the removal of native vegetation that cannot be avoided.
- Provide an **offset** to compensate for the biodiversity impact resulting from the removal of native vegetation.

DELWP has provided biodiversity information tools to assist with determining the assessment pathway associated with the removal of native vegetation and the contribution that native vegetation within the study area makes to Victoria's biodiversity.

All planning permit applications to remove native vegetation are assigned to an assessment pathway determined by the extent and location of proposed native vegetation removal. The assessment pathway will dictate the information to be provided in a planning permit application and the decision guidelines the responsible authority (e.g. Council) and/or DELWP as a referral authority will use to assess the permit application.

The biodiversity information tools have two components:

Site-based information

The site-based information is observable at a particular site. Biosis has collected the requisite site-based information for the assessment against the Guidelines.

Landscape scale information

Landscape scale information requires consideration of information beyond the site. This information is managed by DELWP and can be accessed via the NVIM.

5.1 Native vegetation present

The extent of native vegetation patches, the location of large trees within patches and any scattered trees were mapped within the study area (Figure 2) and the condition was assessed in relation to standard methods provided by DSE (2004) and pre-determined EVC benchmarks: https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks.

5.2 Habitat hectares

Areas of uniform quality for each EVC within the patches are termed 'habitat zones' and are assessed separately. The condition score of the habitat zone is multiplied by the extent of the zone to give a value in Habitat hectares. One habitat zone is identified (Table 6). The results of the condition assessment are provided in Table 4.

Table 5 Habitat hectares of native vegetation within the study area

Site ID			1
Habitat Zone ID			A
EVC #: Name			Plains Grassland
		Max Score	**Score**
Site Condition	Large Old Trees	10	na
	Canopy Cover	5	na
	Lack of Weeds	15	6
	Understorey	25	5
	Recruitment	10	6
	Organic Matter	5	5
	Logs	5	na
	Total Site Score		22
	EVC Standardiser (x75/55)		1.36
	Adjusted Site Score		30
Landscape Value	Patch Size	10	1
	Neighbourhood	10	1
	Distance to Core	5	0
	Total Landscape Score		2
HABITAT SCORE		100	32
Habitat points = #/100		1	0.32
Habitat Zone area (ha)			1.21
Habitat hectares (Hha)			0.39

There are two scattered small trees within the study area. For applications that propose to remove scattered trees, the extent of scattered trees is calculated using the standard extents described in Section 2.4.1. A condition score is applied to each scattered tree based on information provided by DELWP's NVIM. Scattered trees within the study area equate to 0.006 Habitat hectares (Table 7). The locations of scattered trees within the study area are shown in Figure 2.

Table 6 Habitat hectare conversion for scattered trees within the study area

	Number within study area	Condition score	Standard extent (ha)	Habitat hectares (Hha)
Small scattered trees	2	0.20	0.031 ha	0.006

Summary of Habitat hectares within the study area

In summary, the study area supports 0.396 Habitat hectares.

6. Key ecological values and recommendations

This section identifies the key ecological features of the study area, provides an outline of potential implications of proposed development on those values and includes recommendations to assist ib vogt GmbH to design a development to minimise impacts on biodiversity.

The primary measure to reduce impacts to biodiversity values within the study area is to avoid and minimise removal of native vegetation and terrestrial and aquatic habitat. It is critical that this be considered during the design phase of the project The results of this assessment should therefore be incorporated into the project design, by adding the flora and fauna mapping information into the planning maps and investigating options to retain as much of the mapped vegetation/habitats as possible.

A summary of potential implications of development of the study area and recommendations to minimise impacts during the **design phase** of the project is provided in Table 9.

Table 7 Summary of key ecological values, potential implications of developing the study area and recommendations to minimise ecological impacts during the design phase.

Ecological feature (Figure 2)	Implications of development	Recommendations
Native vegetation	The site contains a patch of Plains Grassland and two scattered trees.	The current design does not impact on any native vegetation. No offsets are required. Retained vegetation should be fenced off and treated as no-go zones.
Significant species and ecological communities	Areas of Plains Grassland and uncropped rocky patches provide potential habitat for several EPBC Act listed species (Spiny Rice-flower, Striped Legless Lizard, Trailing Hop Bush, Golden Sun Moth) and one EPBC Act listed community (Natural Temperate Grasslands of the Victorian Volcanic Plain).	The current design does not impact on these areas.
Other habitat features	Uncropped rocky areas within the south-eastern section of the study area.	The current design does not impact these areas.

Construction and post-construction management

Specific detail relating to preventing impacts to retained native vegetation and aquatic and terrestrial habitat should be addressed in a site-specific Construction Environmental Management Plan. This will include issues relating to contractors such as environmental inductions, installation of temporary fencing/signage, drainage and sediment control.

An Ecological Management Plan should be prepared by an ecological consultant to provide detailed advice on the ongoing protection and long-term management of retained vegetation/ habitat, creation of linkages and other habitat features such as wetlands, if proposed.

scale 1:4000

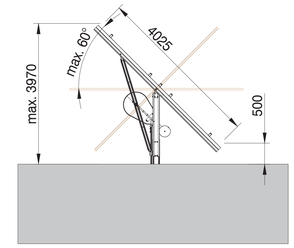
100 m 200 m 300 m 400 m 500 m 600 m

Location			Coordinates			
Country:	Australia		WGS 84		Projected	
Address:	Victoria		Latitude:	37.03° S	Eastings:	
	Carisbrook		Longitude:	143.90° E	Northings:	

Areas						
	Fenced Area		Length		Area	Length
	[m²]	[ha]	[m]		[m²]	[m]
Total	2.987.911,4	298,8	7.853	Access Road		
				Maintenance Road		
				Construction Compound		

System Configuration System Voltage @1500V							
Modules		Strings		Inverter		Substructure	
	Allocation						
[Wp]	350	Mdls/String	28	Type	Central	Type	Tracker
No.		No.	9.180	Model AC [kVA]	3600	Config	2P
Total No.	257.040			No.	27	Azimuth [°]	6°East
DC [kWp]	89.964 MWp			Total AC [kVA]	75000 kVA	Pitch [m]	17.00

2 Tracker Cross Section



Legend			
	Planing Boundary		Single Axis Tracker for Panels
	Fence		Solar Farm Switching Station
	Access Gate		Point of Connection
	Access Roads [Width of 4m / 6m]		Construction Compound = 30,000m²
	PV Panel Area		40ft Battery Container plus spacing for DC/DC converters
	Bushfire Buffer [3m / 10m]		Inverter Transformer Station
	Ecological Constraints		Drainage System
	Landscaping Buffer [20m]		Water Storage Tank [2 x 45,000 l]

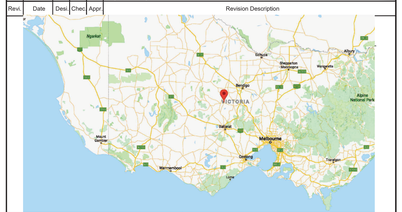
Used Xrefs of external planners in the current drawing

Revi.	Date	Xrefs(DWG) - File name / Planning expert

Please note that all drawing contents have to be checked on the contractor's own responsibility prior to construction start. Discrepancies have to be communicated to the contractual partner or to the responsible technical planners. Drawing numbers and index have to be observed. With release of new drawing, previous drawings lose their validity and will not be withdrawn.

Document-no.:
2512 M2.001.0.F
Project-No. | Descr. | Serial-No. | Size | Rev.

Revi.	Date	Desi.	Chec.	Appr.	Revision Description
F	02 Jul 18	MAB			Number of inverter station increased (27 stations instead of 22)
E	25 Jun 18	MAB			Approval Drawing; EW-pitch changed to 17.00m
D	06 Jun 18	MAB			Drawing updated
C	31 May 18	MAB			Drawing updated
B	24 May 18	MAB			Drawing updated
A	15 May 18	MAB			Drawing updated
0	25 Jan 18	PUD			Original drawing



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Supplier:

Version:	Metric	European Proj.			
	Date		Page:		Drawing Scale:
Designed by	29 Jan 2018	PUD	1	Of:	1:4000
Checked by				1	Size: A0 1189x841
Approved by					

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CarisbrookSolar Farm
Module Array Layout

Planning Phase: A0_1189x841
Approval
Status: 02 Jul 18

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Project-No. | Descr. | Serial-No. | Size | Rev.
Revision Index: F

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Appendices

Appendix 1 Flora

Notes to tables:

EPBC Act: CR - Critically Endangered EN - Endangered VU - Vulnerable PMST – Protected Matters Search Tool	**DEPI 2014a:** e - endangered v - vulnerable r - rare k - poorly known
FFG Act: L - listed as threatened under FFG Act P - protected under the FFG Act (public land only)	**Noxious weed status:** SP - State prohibited species RP - Regionally prohibited species RC - Regionally controlled species RR - Regionally restricted species # - Native species outside natural range

A1.1 Flora species recorded from the study area

Table 1.1 Flora species recorded from the study area

Status	Scientific Name	Common Name
Indigenous species		
	Acacia implexa	Lightwood
	Acaena echinata	Sheep's Burr
	Allocasuarina spp.	Sheoak
	Austrostipa spp.	Spear Grass
P	*Cassinia arcuata*	Drooping Cassinia
	Corymbia spp.	Bloodwood
	Dysphania spp.	Pigweed
	Epilobium hirtigerum	Hairy Willow-herb
	Eucalyptus camaldulensis	River Red-gum
	Eucalyptus melliodora	Yellow Box
	Eucalyptus spp.	Eucalypt
	Juncus subsecundus	Finger Rush
	Lobelia concolor	Poison Pratia
	Oxalis perennans	Grassland Wood-sorrel
	Rumex spp.	Dock
	Rytidosperma setaceum	Bristly Wallaby-grass
	Sida corrugata	Variable Sida
	Solanum spp.	Nightshade
	Typha domingensis	Narrow-leaf Cumbungi

Status	Scientific Name	Common Name
Introduced species		
	Avena fatua	Wild Oat
	Bromus catharticus	Prairie Grass
RR	*Cirsium vulgare*	Spear Thistle
	Cucumis myriocarpus subsp. *leptodermis*	Paddy Melon
#	*Eucalyptus leucoxylon*	Yellow Gum
#	*Euphorbia drummondii*	Flat Spurge
	Heliotropium europaeum	Common Heliotrope
	Helminthotheca echioides	Ox-tongue
	Hordeum leporinum	Barley-grass
	Hypochaeris radicata	Flatweed
	Lactuca serriola	Prickly Lettuce
	Lolium perenne	Perennial Rye-grass
	Malva parviflora	Small-flower Mallow
RC	*Marrubium vulgare*	Horehound
	Phalaris aquatica	Toowoomba Canary-grass
	Polygonum aviculare s.s.	Hogweed
	Rumex crispus	Curled Dock
RR	*Silybum marianum*	Variegated Thistle
	Solanum nigrum s.s.	Black Nightshade
	Sonchus oleraceus	Common Sow-thistle
RC	*Tribulus terrestris*	Caltrop
	Trifolium spp.	Clover
	Vulpia muralis	Wall Fescue
RC	*Xanthium spinosum*	Bathurst Burr

A1.1 Listed flora species

The following table includes the listed flora species that have potential to occur within the study area. The list of species is sourced from the Victorian Flora Information System and the Protected Matters Search Tool (DoE; accessed on 01.02.18).

Table A1.2 Listed flora species recorded / predicted to occur within 5 km of the study area

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
National significance									
Amphibromus fluitans	River Swamp Wallaby-grass	VU				PMST	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	**Negligible**	Unsuitable habitat
Caladenia audasii	McIvor Spider-orchid	EN	e	L		PMST	Dry Box Ironbark Forest; thought to persist at only three sites in central Victoria, between Bendigo and Stawell.	**Negligible**	Unsuitable habitat
Caladenia tensa	Rigid Spider-orchid	EN	v	L		PMST	Woodland dominated by Yellow Gum and Cypress-pine, heathy woodland and mallee.	**Negligible**	Unsuitable habitat
Caladenia versicolor	Candy Spider-orchid	VU	e	L		PMST	Herb-rich Yellow Box woodland on sandy loam soils.	**Negligible**	Unsuitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
Dianella amoena	Matted Flax-lily	EN	e	L		PMST	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	**Low**	Habitat partially suitable but species not observed on site
Dodonaea procumbens	Trailing Hop-bush	VU	v			PMST	Sandy or clay soils in low-lying, winter-wet areas in grasslands, woodlands, and low-open forest.	**Medium**	Species recorded in close proximity to study area
Glycine latrobeana	Clover Glycine	VU	v	L		PMST	Grasslands and grassy woodlands, particularly those dominated by Kangaroo Grass.	**Low**	Habitat generally unsuitable
Leucochrysum albicans var. *tricolor*	White Sunray	EN	e	L		PMST	Grasslands of the Victorian Volcanic Plains, primarily on acidic clay soils derived from basalt, with occasional occurrences on adjacent sedimentary, sandy-clay soils.	**Low**	No nearby previous records, habitat generally unsuitable

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	e	L		PMST	Primarily grasslands featuring a moderate diversity of other native species and inter-tussock spaces, although also recorded in grassland dominated by introduced perennial grasses.	**Medium**	Suitable habitat and species recorded in close proximity to study area.
Rutidosis leptorrhynchoides	Button Wrinklewort	EN	e	L		PMST	Higher quality Plains Grassland and Grassy Woodland in Western Victoria, particularly those with fertile soil and light timber cover.	**Low**	Habitat generally unsuitable
Ballantinia antipoda	Southern Shepherd's Purse	EN		L	1770		Restricted to granite rockplates or moist moss mats, and occasionally shallow soil pockets.	**Low**	Unsuitable habitat
State significance									
Ptilotus erubescens	Hairy Tails			L	2012		Grasslands and woodlands on relatively fertile soils.	**Medium**	Some suitable habitat within study area, and species recorded nearby.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
Allocasuarina luehmannii	Buloke			L	2012		Non-calcareous soils in drier areas on slopes and plains; often in woodlands associated with Grey Box.	**Negligible**	Unsuitable habitat
Dianella sp. aff. *longifolia* (Benambra)	Arching Flax-lily		v		2012		The habitat requirements of this species are poorly known.	**Low**	Species not observed on site
Dianella tarda	Late-flower Flax-lily		v		2012		Heavy soils in grassy woodland environments dominated by River Red-gum Eucalyptus camaldulensis and Yellow Box E. melliodora.	**Low**	Habitat generally unsuitable on site although species recorded nearby
Eucalyptus camaldulensis var. *obtusa*	River Red-gum		v		2012		Distributed west and north-west of the Murray-Darling basin of south-eastern Australia through most of arid central Australia and the drier parts of the wet/dry tropics. Typically located along rivers and floodplains.	**Low**	Habitat generally unsuitable

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
Cheilanthes lasiophylla	Woolly Cloak-fern		e		1997		Endemic to Australia and more common in the drier western and central regions of the country. Restricted in Victoria to the north-west near the South Australian border and at two isolated localities in north-central Victoria.	**Negligible**	Unsuitable habitat

Appendix 2 Fauna

Notes to tables:

EPBC Act:	**DSE 2009, DSE 2013:**
EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent	ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct
FFG Act:	**Introduced species**
L - listed as threatened under FFG Act N - nominated for listing as threatened I - determined ineligible for listing	PS - pest species listed under the CaLP Act * - introduced species
Most recent database records are from the Victorian Biodiversity Atlas unless otherwise specified as follows PMST – Protected Matters Search Tool BA – Birds Australia	

A2.1 Fauna species recorded from the study area

Table A2.1 Vertebrate fauna recorded from the study area (present assessment)

Scientific Name	Common Name
Indigenous species	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Acanthiza nana	Yellow Thornbill
Anthus novaeseelandiae	Australasian Pipit
Coturnix pectoralis	Stubble Quail
Gymnorhina tibicen	None
Melithreptus brevirostris	Brown-headed Honeyeater
Phalacrocorax sulcirostris	Little Black Cormorant
Rhipidura leucophrys	Willie Wagtail
Exotic species	
Carduelis carduelis	European Goldfinch
Sturnus vulgaris	Common Starling

A2.2 Listed fauna species

The following table includes a list of the listed fauna species that have potential to occur within the study area. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DoE; accessed on 01.02.18).

Table A2.2 Listed fauna species recorded, or predicted to occur, within 5 km of the study area

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
National significance									
Pedionomus torquatus	Plains-wanderer	CR	cr	L		PMST	Native grassland with a sparse, open structure.	**Low**	Habitat generally unsuitable
Numenius madagascariensis	Eastern Curlew	CR	vu	L		PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	**Negligible**	No suitable habitat
Calidris ferruginea	Curlew Sandpiper	CR	en	L		PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	**Negligible**	No suitable habitat
Rostratula australis	Australian Painted Snipe	EN	cr	L		PMST	Shallows of well-vegetated freshwater wetlands.	**Negligible**	No suitable habitat
Botaurus poiciloptilus	Australasian Bittern	EN	en	L		PMST	Shallow freshwater and brackish wetlands with abundant emergent aquatic vegetation.	**Negligible**	No suitable habitat
Lathamus discolor	Swift Parrot	CR	en	L		PMST	A range of forests and woodlands, especially those supporting nectar-producing tree species. Also well-treed urban areas.	**Medium**	Areas of suitable habitat within study site where eucalyptus are present.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
Grantiella picta	Painted Honeyeater	VU	vu	L		PMST	Dry open woodlands and forests. Typically forages for fruit and nectar in mistletoes and in tree canopies.	**Low**	Habitat generally unsuitable
Anthochaera phrygia	Regent Honeyeater	CR	cr	L		PMST	A range of dry woodlands and forests dominated by nectar-producing tree species.	**Low**	Habitat generally unsuitable.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	vu	L	1970	PMST	Rainforest, wet and dry sclerophyll forest, woodland and urban areas.	**Negligible**	No suitable habitat
Aprasia parapulchella	Pink-tailed Worm-Lizard	VU	en	L		PMST	Woodland and grassland with partially buried rocks.	**Low**	Habitat generally unsuitable and species not recorded in area
Delma impar	Striped Legless Lizard	VU	en	L	1997	PMST	Natural temperate grassland, grassy woodland and exotic grassland.	**Medium**	Areas within study area of remnant and exotic grassland with surface rock provide suitable habitat.
Litoria raniformis	Growling Grass Frog	VU	en	L		PMST	Still or slow-flowing waterbodies and surrounding terrestrial vegetation.	**Low**	No suitable habitat
Galaxias rostratus	Flat-headed Galaxias	CR	vu	L			Still or slow-moving waters of rivers, billabongs, lakes and swamps.	**Negligible**	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
Maccullochella peelii peelii	Murray Cod	VU	vu	L	1935	PMST	A diverse range of stream habitats in the Murray-Darling basin; principally the main channels of rivers and their major tributaries.	**Negligible**	No suitable habitat
Synemon plana	Golden Sun Moth	CR	cr	L		PMST	Natural temperate grassland, grassy woodland and pasture supporting spear grasses and wallaby grasses and exotic grassland dominated by Chilean needle grass.	**Medium**	Potential habitat with Plains Grassland patches.
State significance									
Tringa nebularia	Common Greenshank		vu			PMST	A variety of ephemeral and permanent inland wetlands and sheltered coastal wetlands.	**Negligible**	No suitable habitat
Grus rubicunda	Brolga		vu	L	2000		Shallow freshwater and brackish wetlands, crops, grassland and pasture.	**Medium**	Suitable foraging habitat
Ardea modesta	Eastern Great Egret		vu	L	1981		Flooded crops, pasture, swamps, lagoons, saltmarsh, sewage ponds, estuaries, dams, roadside ditches. Breeds in trees standing in water.	**Medium**	Suitable foraging habitat (Farm dams)
Oxyura australis	Blue-billed Duck		en	L	2009		Open or densely vegetated wetlands.	**Negligible**	No suitable habitat
Hirundapus caudacutus	White-throated Needletail		vu	L	1978	PMST	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas.	**Medium**	Areas of suitable habitat within study site.
Melanodryas cucullata	Hooded Robin		nt	L	2009		Woodlands of eucalypt, mallee, semi-cleared farmland.	**Medium**	Areas of suitable habitat within

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	VIC	FFG					
									study site and species known to occur in area.
Stagonopleura guttata	Diamond Firetail		nt	L	2015		Open forests and woodlands with a grassy ground layer.	**Low**	No suitable habitat

A2.3 Migratory species (EPBC Act listed)

Table A2.3 Migratory fauna species recorded or predicted to occur within 5 km of the study area

Scientific name	Common name	Most recent record
Charadrius bicinctus	Double-banded Plover	1978
Numenius madagascariensis	Eastern Curlew	PMST
Actitis hypoleucos	Common Sandpiper	PMST
Tringa nebularia	Common Greenshank	PMST
Calidris ferruginea	Curlew Sandpiper	PMST
Calidris ruficollis	Red-necked Stint	1981
Calidris acuminata	Sharp-tailed Sandpiper	PMST
Gallinago hardwickii	Latham's Snipe	PMST
Plegadis falcinellus	Glossy Ibis	2011
Ardea modesta	Eastern Great Egret	1981
Merops ornatus	Rainbow Bee-eater	1981
Hirundapus caudacutus	White-throated Needletail	1978
Apus pacificus	Fork-tailed Swift	PMST
Rhipidura rufifrons	Rufous Fantail	PMST
Myiagra cyanoleuca	Satin Flycatcher	PMST
Monarcha melanopsis	Black-faced Monarch	PMST
Acrocephalus stentoreus	Clamorous Reed Warbler	2009
Motacilla flava	Yellow Wagtail	PMST
Calidris melanotos	Pectoral Sandpiper	PMST

Appendix 3 Photos of the study area

Photo 1 Crop paddock within study area, no native vegetation present. Majority of study area is used either for crop or grazing purposes.

Photo 2 Low-lying seasonally waterlogged area within study site dominated by exotic Tall Wheat-grass

Photo 3 Tree plantation within study area with no native understory present and limited ecological value.

Photo 4 Plains Woodland EVC dominated by native Spear-grass located within the study area. Patch meets criteria listing as Nationally Threatened Ecological Community – 'Natural Temperature Grassland of the Victorian Volcanic Plain'.

Photo 5 Loose surface basalt rocks located within the Plains Woodland EVC, creating suitable habitat for Striped Legless Lizard.

Photo 6 Exotic dominated grassland with loose basalt rock, creating suitable habitat for Striped Legless Lizard.