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Biodiversity impact assessment for a proposed solar farm at Mortlake

Urbis

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1. Introduction

1.1 Background

Urbis, on behalf of BrightNight, engaged Eco Logical Australia (ELA) to undertake a biodiversity impact assessment for a new solar farm located near Hamilton Highway, Mortlake, Victoria (study area). The project will consist of a photovoltaic solar farm installation and ancillary infrastructure. The study area is approximately 1,927 hectares and comprises a combination of agricultural land, plantations and native vegetation.

This report has been prepared to support an application for a planning permit under the Moyne Shire planning scheme in accordance with the *Solar Energy Facilities - Design and Development Guideline* (DELWP, 2019). This includes an assessment of the ecological values within the study area and a determination of the implications of solar farm development on these values, including consideration of the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning (DELWP, 2017)). Management recommendations for minimising impacts to ecological values and are also provided.

The assessment study area is based on plans provided by Urbis on behalf of BrightNight (Figure 1).

1.2 Legislative context

This project has been assessed with consideration of the following legislation policy and guidelines. A summary of legislation and an assessment of project legislative implications is presented in Section 6.

1.2.1 Commonwealth

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Weeds of National Significance (WoNS).

1.2.2 Victorian legislation

- *Environmental Effects Act 1978* (EE Act).
- *Planning and Environment Act 1987* (P&E Act).
- *Flora and Fauna Guarantee Act 1988* (FFG Act).
- *Wildlife Act 1975* (Wildlife Act).
- *Catchment and Land Protection Act 1994* (CaLP Act).

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1.3 Study area

The study area is in western Victoria, located near the townships of Hexham and Mortlake, is approximately 227 kms from Melbourne CBD within the Victorian Volcanic Plains Bioregion (Figure 1). Comprising multiple parcels of land and covering approximately 1,927 hectares the study area borders the Hamilton Highway and Mortlake Common Flora Reserve (Figure 1). Primarily zoned as farming land, current land use is grazing (sheep and cattle), with a native Blue Gum plantation adjacent to the Mortlake Terminal Station to the west (Figure 1). An existing high voltage electricity transmission easement transects the study area east to west. Salt Creek meanders through the north of the study area in the east.

Whilst the study area primarily falls within private land, public road reserves were also assessed where they directly abut property boundaries. Road reserves assessed and which fall within the study area boundary include the western side of Hamilton-Highway and portions of Hardy's Lane and Boonerah Estate Road.

In addition to the term study area the term project footprint is used within this report. The project footprint is the area within the study area in which construction is proposed and therefore impacts to ecological values have been assessed.

Table 1. Land administration details for study area.

Study area	
Location	Hexham (Figure 1)
Current Zones	Solar farm and associated infrastructure
Overlays	Farming Zone (FZ) and Principal Road Network (TRZ2)
Bushfire	Bushfire Management Overlay (BMO) and Environmental Significance Overlay (ESO3)
Local council	Moyne Shire
Bioregion	Victorian Volcanic Plain
Catchment	Glenelg Hopkins
Area	1,927 hectares (approximately)

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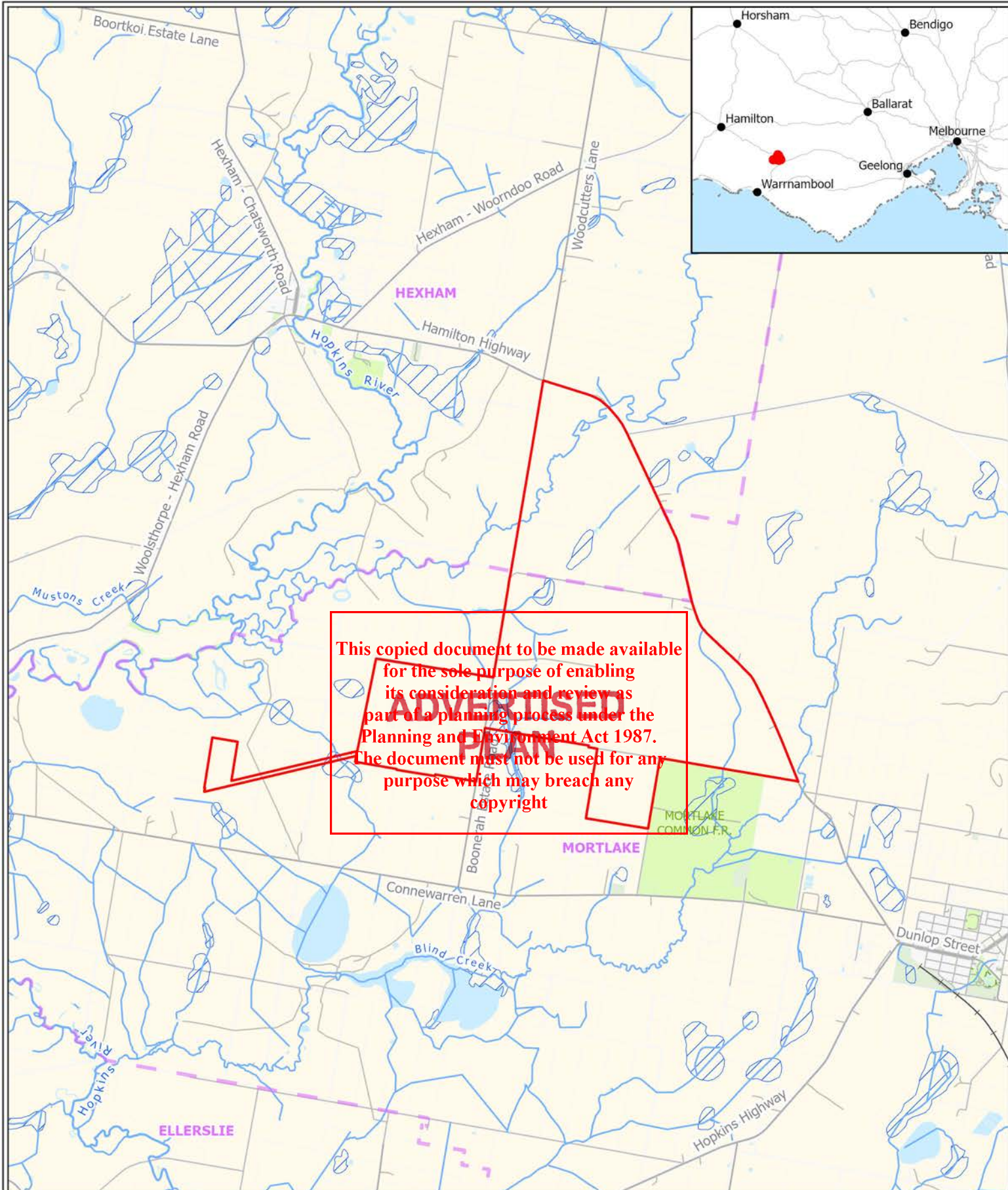
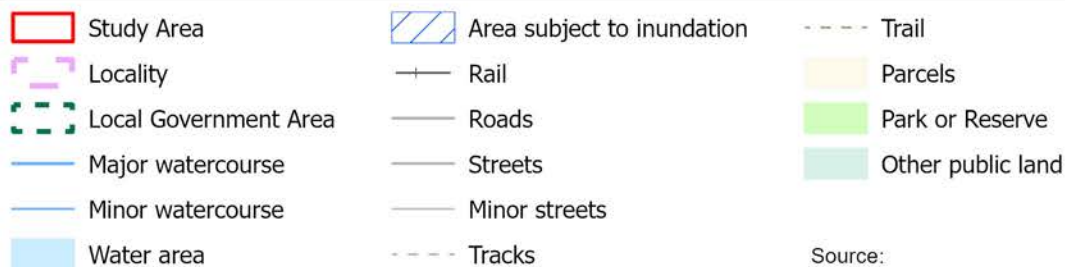


Figure 1: Location of the Study Area

Moyne Shire



Datum/Projection:
GDA 1994 MGA Zone 54
Project: 4927-RS Date: 24/07/2024

Source:
Basemap: VICMAP, 2023
Inset basemap: ESRI Topographic



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2. Methods

2.1 Desktop review

The following databases were accessed for records of significant species and ecological communities within the study area and surrounding landscape, and for other general environmental information:

- EPBC Act Protected Matters Search Tool (PMST) administered by the Australian Government Department of Climate Change Energy, Environment and Water (DCCEEW).
- The following online tools and databases administered by the Victorian Government Department Energy, Environment and Climate Action (DEECA):
 - o Victorian Biodiversity Atlas (VBA) for records of threatened flora and fauna and declared migratory species.
 - o NatureKit for information on Ecological Vegetation Classes (EVCs), Bioregions, Local Government Areas (LGAs), Catchment Management Authority (CMA) boundaries, and the maps that are used in the native vegetation removal regulations (native vegetation location map, native vegetation condition map, strategic biodiversity value map and habitat importance maps for Victoria's rare or threatened species).
 - o Mapshare Vic for location of mapped wetlands.
 - o Native Vegetation Information Management (NVIM) online tool for information related to native vegetation removal regulations.
 - o EVC Benchmarks to use in assessing native vegetation quality using the Vegetation Quality Assessment (VQA) method (<https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks>).
 - o Environmental Systems Modelling Platform Native Vegetation Regulations Tool (EnSym NVR tool) to test native vegetation removal scenarios and identify potential native vegetation offset requirements (if required).
- The following online tools and databases administered by the Victorian Department of Transport and Planning:
 - o VicPlan online for the location of and information to pertaining to planning zones and environmental overlays.

The review of the PMST and VBA databases was based on a 10-kilometre buffer from the study area boundary. The buffer was applied to capture highly mobile fauna species, and to account for the possible lack of historic survey effort for threatened species in the study area.

The following literature and project information was also reviewed as part of this assessment.

- Biosis 2017. Mount Fyans Wind Farm: Targeted surveys and impact assessment.
- Biosis 2022. Mount Fyans Wind Farm: Flora and Fauna existing conditions.

2.2 Field survey

Field surveys were undertaken in accordance with a two staged approach. Each of these stages was undertaken by a DEECA Vegetation Quality Assessment (VQA) accredited ELA ecologist.

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In the first stage, a rapid field assessment was undertaken to inform a preliminary constraints assessment. The assessment occurred over one day on 2 August 2023. The purpose of this assessment was to identify the broad quality and extent of ecological features in the study area, identify potential red flags, and inform the need for further ecological assessments. During this survey, the following information was collected in the field and supplemented by the analysis of aerial imagery as appropriate:

- Broad extent of EVC's.
- Broad extent of scattered trees, inclusive of their species and estimated size class. This was also informed by the analysis of aerial imagery.
- Broad habitat values and the study areas potential to support threatened species.

The second stage involved a detailed ecological field survey which was informed by the results of the constraints assessment and preliminary solar farm designs provided by Urbis in December of 2023. The detailed survey was undertaken between 4 – 6 December 2023 and 30 - 31 January 2024. This survey was focused on collecting detailed data for ecological features within and in close proximity to the then preliminary project footprint. As a minimum, the following information was recorded:

- The location and nature of remnant vegetation, including its origin, ecological vegetation class and vegetation condition score in accordance with the Vegetation Quality Assessment method (DSE, 2004).
- The location and nature of all scattered and large trees within patches. This will include the species, origin, size class (Diameter at Breast Height – (DBH)) and where applicable, the diameter at breast height of trees, for the purpose of calculating Tree Protection Zones (TPZ).
- Vascular flora species lists for Ecological Vegetation Classes identified within the study area.
- Presence of significant ecological communities.
- Noxious or high-threat weeds, including their population size and extent of infestation.

Any opportunities for avoiding and minimising the impacts of the planned work, or improving project outcomes, were also recorded during the assessments.

Results of field surveys as presented in this report are based on a combination of outcomes of the above outlined two stage approach.

2.3 Likelihood of occurrence

The likelihood of occurrence is a determination of the potential for threatened flora, fauna or ecological communities to be present and for threatened flora and fauna to make significant use of the survey area. The ranking of a species or ecological communities' likelihood of occurrence is determined by:

- Reviewing information contained in public biological datasets (e.g., past records and species distribution models).
- Assessing the suitability of study area to support the species based on the outcomes of the field survey.

Based on these assessments the species or ecological community was determined as one of the following:

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Table 2. Likelihood of occurrence criteria for threatened species

Likelihood of occurrence	Criteria
Present	The species/ecological community was recorded by ELA or by a recent assessment in the study area.
High	The flora species/ecological community was identified to have been recently recorded (~10 years) by the desktop assessment and suitable high quality species habitat exists or could exist in the study area following detailed ecological studies. For fauna, species recent records were identified by the desktop assessment, the study area is within the species known range and is likely to support a population of the species, or the species may be reliant on its habitat.
Moderate	The flora species/ecological community was identified to have been recently or historically recorded by the desktop assessment and suitable moderate quality species habitat exists or could exist in the study area following detailed ecological studies. For fauna, the species historical records were identified by the desktop assessment and the species may regularly visit the study area. Further assessment to determine the extent and nature of their habitat use is likely to be required.
Low	The flora species/ecological community was not identified to have been recently recorded by the desktop assessment and/or suitable species habitat does not exist in or adjacent to the study area. For fauna, the species recent or historical records were identified by the desktop assessment, however the species may have occurred on an infrequent and opportunistic basis when foraging but is unlikely to make significant use of the study area or to rely on its habitats.
Negligible	The species/community predicted distribution includes the study area but the desktop assessment did not identify records of the species and the study area is unlikely (or is not considered) to support species habitat.

The determinations of a species' likelihood provided are not absolute, rather they represent a species' potential to occur in the survey area. The following species were excluded from the assessment.

- Marine mammals and birds which occur exclusively in marine and offshore environments and are thus not of relevance to this assessment.
- Listed marine species unless otherwise listed under the EPBC Act or FFG Act.

The results of the likelihood of occurrence analysis are provided in **Appendix A**.

2.4 Targeted Surveys

Based on the results of the constraints assessment and consideration of preliminary project design, targeted surveys for survey Growling Grass Frog (*Litoria raniformis*) were recommended. This was due to the study area's proximity to recent VBA records and its location between two large areas of known habitat (Mortlake Common and Salt Creek). Potential habitat was identified for the species to be present within waterbodies and farm dams across the site, either as resident or when moving across the landscape between those environs. Determination of species presence therefore needed to inform the potential nature and extent of project impacts.

This targeted survey is the subject of a separate technical report and can be found in **Appendix B**. This report includes a detailed survey methodology.

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Results of these surveys are summarised in section 3.4.2 of this report and considered as part of the impact assessment.

2.5 Impact analysis

Based on the results of the desktop review, field surveys and the proposed project footprint and method, potential direct and indirect impacts to biodiversity were determined. The determination of potential impacts was informed by relevant standards, policies and guidelines were relevant to the assessment, including:

- the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017).
- *Australian Standard 4970-2009 Protection of trees on development sites* (Standards Australia Limited, 2009).
- *Significant impact guidelines - matters of national environmental significance* (DoE 2013).
- *Ministerial Guidelines for assessment of environmental effects under the Environmental Effects Act 1978, Eight edition (DTP, 2023).*

2.6 Study limitations

A common limitation of ecological surveys is the short duration and lack of sampling across seasons. The field assessments were undertaken during winter and summer, which is considered suboptimal timing for observing some flowering species and may be insufficient for detecting cryptic species e.g. orchids and lilies. However, based on habitat within the project footprint, which is generally degraded and accessible by stock, it is unlikely that any threatened flowering species would be present. Where impacts are not proposed, targeted surveys within suitable habitat have not been undertaken. Therefore, a conservative approach has been taken with the determination of species likelihood of occurrence whereby the species has been assumed present.

Vegetation outside of the project footprint has been broadly assessed and mapped as to inform detailed design. Only vegetation within the project footprint was subject to detailed vegetation quality assessment. Should the project footprint change, depending on the location and nature of this change additional field studies may be required. This is particularly true of vegetation along Spring Creek.

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3. Results

3.1 Local and regional setting

The study area occurs within an area of agricultural land use approximately 4.5 km north-east of the Mortlake city centre. The surrounding landscape comprises primarily of farming land used for grazing and cropping however timber plantations and the Mortlake gas fired power station also occur within close proximity to the study area. The power station is serviced by an existing high voltage electricity transmission easement. Most of the native vegetation within the broader landscape has been cleared with the remaining patches of remnant native vegetation and scattered trees occurring to the south at Mortlake Common Flora Reserve, along Salt Creek in the north and scattered occurrences within road reserves including Castle Carey Road to the east. Scattered trees also occur within grazing land. Multiple waterbodies occur within 5 km of the study area including Blind Creek, Lake Connewarren and the Hopkins River.

3.2 Desktop assessment

3.2.1 Protected Matters Search Tool

A search of the Protected Matters Search Tool was completed on 16 January 2024. A summary of the PMST search output is presented in Table 3 and a copy of the report is presented in **Appendix C**.

Table 3. Matters of National Environmental Significance (5 km radius)

Matters of National Environmental Significance	Number identified
World Heritage Properties	-
National Heritage Places	-
Wetlands of international importance	-
Commonwealth Marine Area	-
Threatened ecological communities	5 - Grassy Eucalypt Woodland of the Victorian Volcanic Plain - Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia - Natural Temperate Grassland of the Victorian Volcanic Plain - Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
Threatened flora	21
Threatened fauna	31
Migratory Species	11

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Matters of National Environmental Significance (MNES) identified are further considered by this report and when interpreting the findings of the field surveys. Threatened and migratory species identified by the PMST are tabulated and further considered as part of the likelihood of occurrence assessment presented in **Appendix A**.

3.2.2 Modelled Native Vegetation

The Department of Energy, Environment and Climate Action (DEECA) pre-1750 Ecological Vegetation Class (EVC) modelling indicates the study area would have once supported: Plains Grassy Woodland (EVC 55), Floodplain Riparian Woodland (EVC 56), Plains Grassy Wetland (EVC 125) and Plains Grassland (EVC 132). 2005 EVC modelling indicates that fragmented areas of all four of these EVC's persist across the study area. A summary of EVC modelling for the study area, along with the EVC's Bioregional Conservation Status (BCS) is presented in Table 4.

Table 4 Modelled EVC

EVC #	EVC Name	Bioregional conservation status (VVP)
55	Plains Grassy Woodland	Endangered
56	Floodplain Riparian Woodland	Endangered
125	Plains Grassy Wetland	Endangered
132	Plains Grassland	Endangered

3.2.3 Victorian Biodiversity Atlas

The extract of the VBA identified a total of 15 threatened flora and 40 threatened and/or EPBC Act migratory fauna to have been previously recorded within 10 km of the study area. A summary of threatened species records by legislation is presented in Table 5. It is noted that whilst most species listed under the Commonwealth EPBC Act are also listed under the Victorian FFG Act this is not true for all species. Similarly, some species listed as EPBC Act migratory are also listed as threatened species under the EPBC and or FFG Act.

Table 5. Summary of VBA species records (10 km radius)

Taxon	EPBC (threatened and or migratory)	FFG	Total species
Flora	3	15	15
Amphibians	1	3	3
Bats	1	3	3
Birds	12	14	21
Fish	1	2	2
Mammals	1	3	8
Invertebrates	-	1	1
Reptiles	1	2	2

Threatened fauna records are tabulated and further considered as part of the likelihood of occurrence assessment (**Appendix A**).

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3.2.4 Mapped Wetlands

One modelled wetland is located within the study area to the immediate south of Boonerah Estate Road (where it runs east to west) in the north of the study area (wetland ID 28276).

A further three wetlands occur just beyond the study area boundary, wetland ID 28282 located to the south-east of the study area (Mortlake Common) and wetland ID 2871 located to the west and wetland 28264 located in proximity to the Mortlake Power Station.

The location of Mapped Wetlands is shown in **Figure 2**.

3.2.5 Environmental Overlays

An Environmental Significance Overlay (ESO3) applies to the western portion of the study area (near the Mortlake Power Station). This ESO coincides with the location of a timber plantation.

Planning overlays are represented in **Figure 2** and further discussed in section 5.3.2.

3.3 Field survey

At the time of the assessments, remnant native vegetation was primarily identified in the north and south-east of the study area (**Figure 3**). Due to historical and ongoing agricultural land use, most of the remnant native vegetation has been cleared in the east of the study area and replaced with pasture, and in parts with planted exotic and native windrows (**Figure 3**). Ground cover across the study area was primarily improved pastures with some scattered native grassy species observed. In the west of the study area, near the Mortlake Power Station is a native *Eucalyptus globulus* sp. (Blue Gum) plantation. Toowoomba Canary Grass *Phalaris aquatica* was dominant in the road reserves except for a section near Woodcutters Lane.

Remnant native vegetation identified within the study area included the following:

- Floodplain Riparian Woodland (EVC 56) along Salt Creek.
- A patch of Plains Grassland (EVC 132) on Hamilton Highway northern road reserve.
- Two patches of Plains Grassy Wetland (EVC 125), which includes a DEECA mapped wetland adjacent to Boonerah Estate Road.
- Multiple patches of Plains Grassy Woodland (EVC 55) along Hardys Lane, Bonnerah Estate Road and a large area covering the south-east of the study area near Thulborns Lane.
- A total of 578 scattered River Red Gums trees were recorded across the study area. Tree densities were highest in the south-west portion of the study area.

Ecological features as recorded within the study area are further described below. A list of observed flora and fauna species is presented in **Appendix D**.

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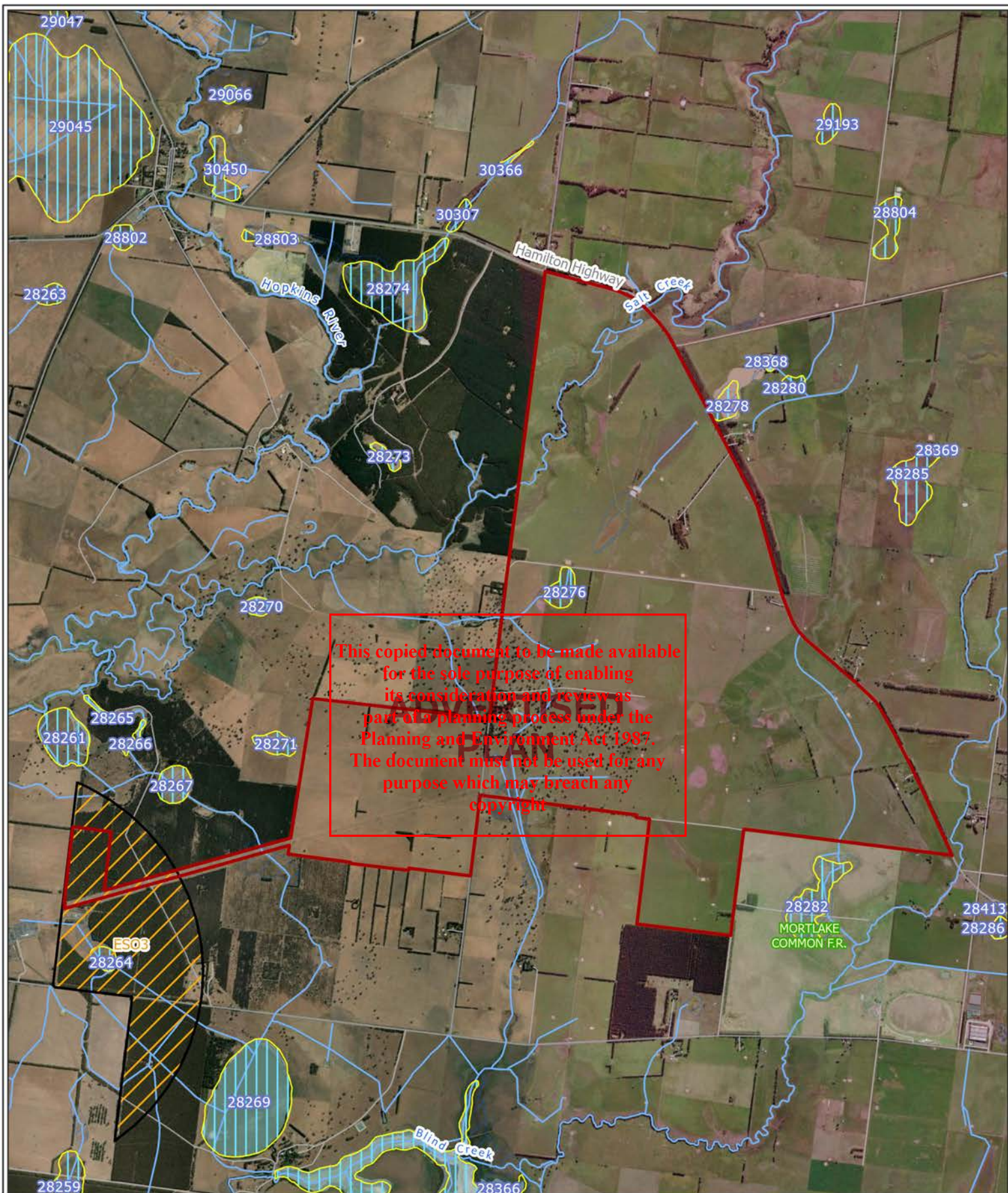


Figure 2: Mapped Wetlands and ESO3

Moyne Shire

- | | | | |
|--|---|---|----------------------------|
|  | Study area |  | Minor watercourse |
|  | Current wetland |  | Water area |
|  | ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 3 |  | Area subject to inundation |
|  | Major watercourse |  | Park or Reserve |
| | |  | Other public land |



Datum/Projection:
GDA 1994 VICGRID94
Project: 4927-RS Date: 24/07/2024

Source:
Basemap: VICMAP, 2023
Aerial: ESRI, 2024
Planning Overlay: DELWP, 2023



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3.3.1 Vegetation

Remnant vegetation is described by EVC below and is further documented in section **Error! Reference source not found.** Each discrete remnant patch has been identified as a Habitat Zone (HZ).

EVC 55: PLAINS GRASSY WOODLAND

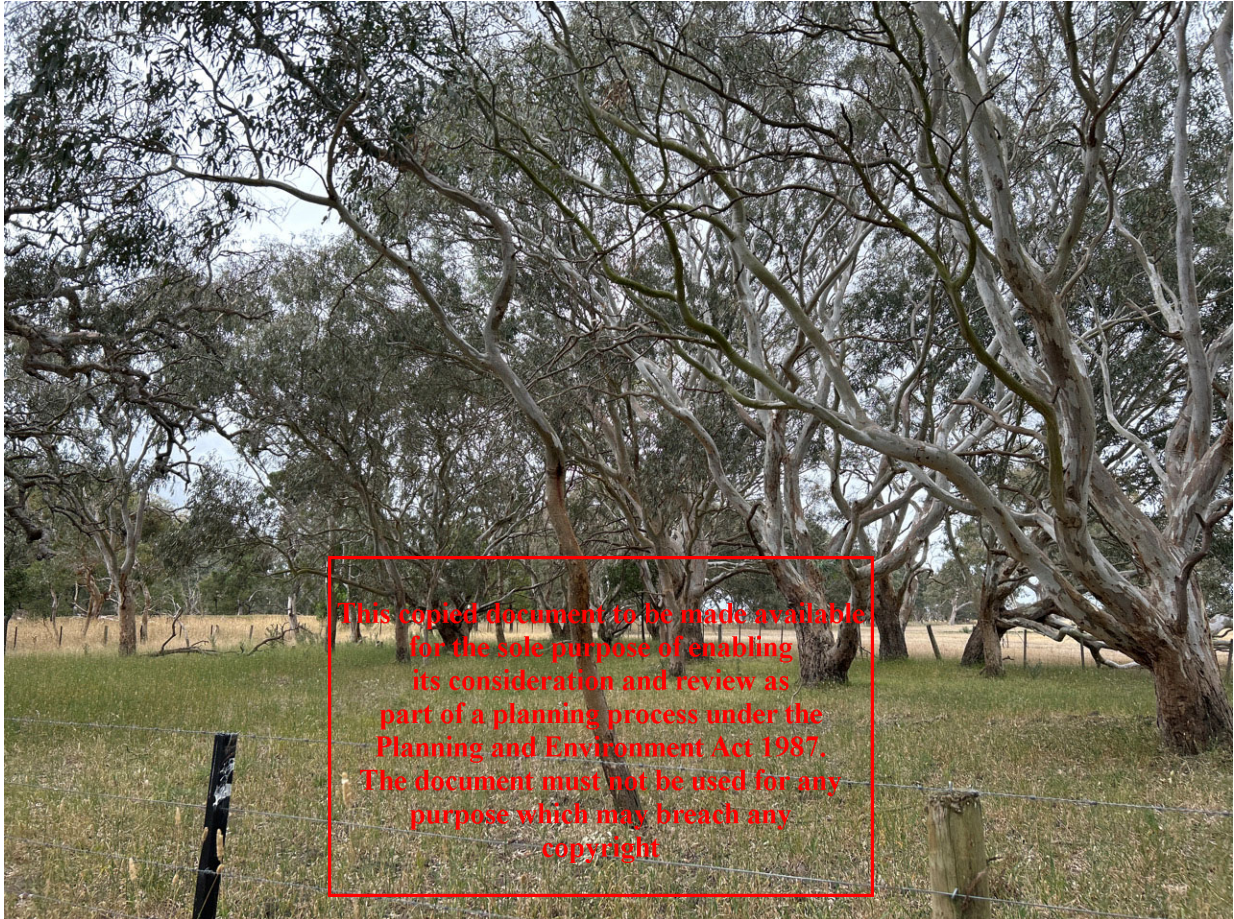


Plate 1. Plains Grassy Woodland within the study area

Patches of Plains Grassy Woodland (EVC 55_61) were primarily recorded in the southwestern portion of the study area near Boonerah Estate Road and Hardys Lane and typically consisted of a group of three or more canopy trees above a highly modified understory (**Plate 1; Figure 3**). Two larger patches of Plains Grassy Woodland occurred within the road reserve on Boonerah Estate Road extending into the adjacent property to the east. Numerous large old, scattered trees occupied the south-western corner of the site. The canopy within patches was dominated by large old *Eucalyptus camaldulensis* (River Red Gum). *Acacia mearnsii* (Blackwood) was occasionally found in the midstory, either by itself or in association with *E. camaldulensis*. Understory vegetation was almost entirely dominated by exotic pasture species such as *Lolium perrene* (Rye Grass) and *Hordeum* sp. (Barley), with occasional scattered native *Rytidosperma duttonianum* (Brown-back Wallaby Grass) occurring in some patches. Noxious and high-threat weed species including *Crataegus monogyna* (Hawthorn) and *Onopordum acanthium* (Scotch Thistle) were also recorded within many of the patches. All patches were generally of low-quality due to the lack of understorey species, however, tree canopy health was generally good (>70%) to fair (30-70%), with the latter towards the higher end of the health scale.

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EVC 56: FLOODPLAIN RIPARIAN WOODLAND

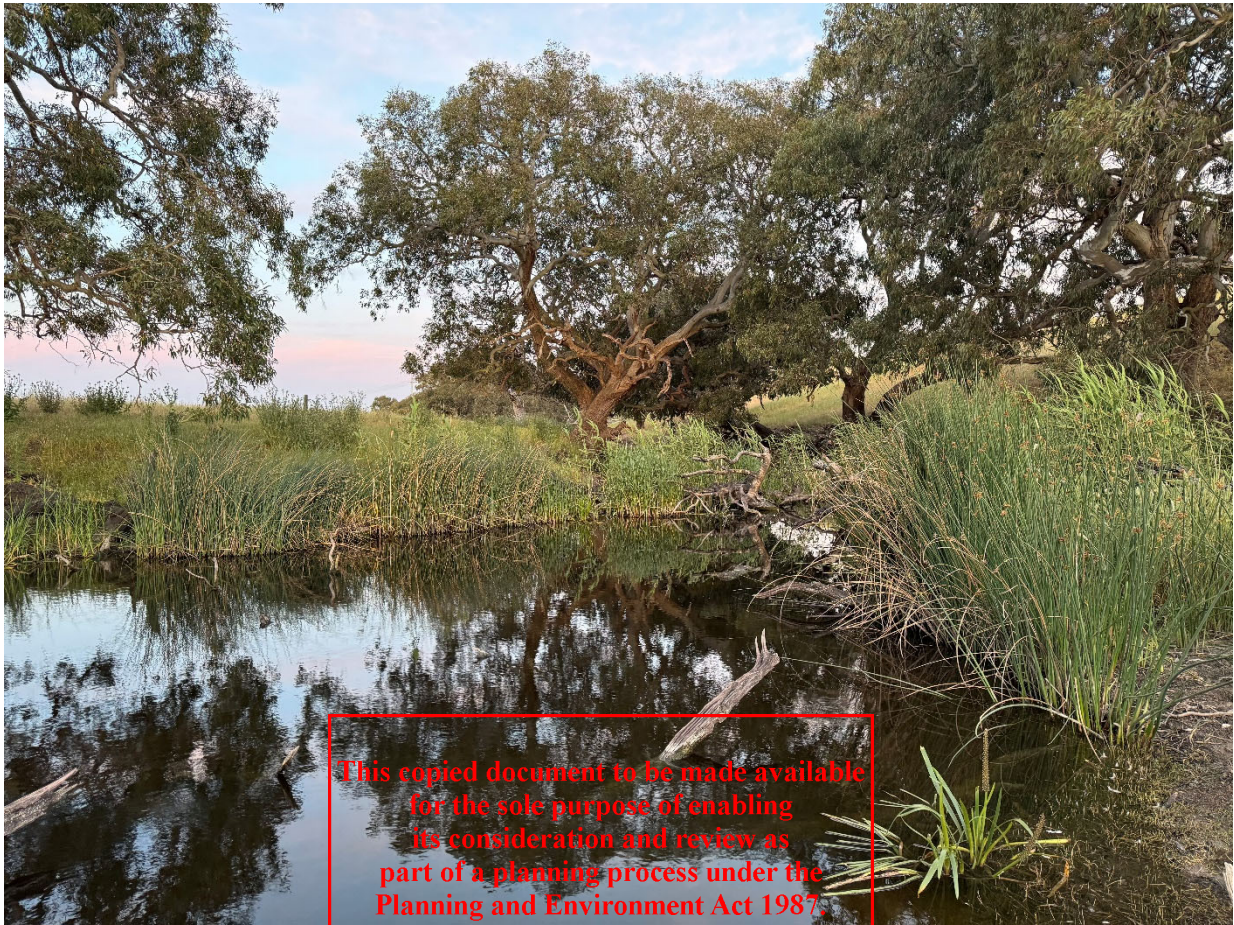


Plate 2. Floodplain Riparian Woodland within the study area

A remnant patch of Floodplain Riparian Woodland (EVC 56) was recorded in the north-east of the study area along Salt Creek (**Figure 3; Plate 2; HZ20**). This patch was variable in quality and likely comprises multiple discrete patches given the observed variance in quality and structure. The southernmost extent of the patch comprised a canopy of large old *E. camaldulensis* with fringing Cumbungi (*Typha domingensis*) and Giant Rush (*Juncus pallidus*) and an extensive cover of floating and emergent Water Ribbons (*Triglochin procera*). Banks showed some signs of stock access but were otherwise colonised by a mixture of pasture and native tussock grass species such as Common Tussock-grass (*Poa labillardierei*).

Canopy cover was primarily absent near the Hamilton Highway Road crossing (bridge). Here the EVC was characterised by a high instream cover of floating and emergent species such as Common Reed (*Phragmites australis*), *T. domingensis*, *T. procera* and Tall Spikerush (*Eleocharis sphacelata*). Extending into the floodplain, herbaceous species diversity increased, with a good cover of native species including *Selliera radicans* (Shiny Swamp-mat), *Samolus repens* (Creeping Brookweed), *Leptinella reptans* (Creeping Cotula), *Hydrocotyle hirta* (Hairy Pennywort) and *Lobelia pratioides* (Poison Lobelia). Grass and rush species included *Hemarthria uncinata* var. *uncinata* (Mat Grass) and *Juncus bufonius* (Toad Rush), with the latter tending to become dominant in disturbed environments. A moderate cover of the introduced *Cotula coronopifolia* (Water Buttons) was also noted.

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EVC 125: PLAINS GRASSY WETLAND



Plate 3: Plains Grassy Wetland HZ21

Two patches of Plains Grassy Wetland (EVC 125), which includes a DEECA mapped wetland (ID 28276) were recorded adjacent to Boonerah Estate Road (**Plate 3; Figure 3; HZ13 and HZ21**). These patches were dry at the time of the assessment and heavily pugged from stock access. Both patches were characterised by a mix of native grass, rush and sedge species including *Lachnagrostis filiformis* (Common Blown Grass), *Rytidosperma duttonianum* (Brown-back Wallaby Grass), *Juncus* sp. (Rush) and *Eleocharis* sp. (Spikerush) which form part of this EVC during sustained dry periods. These areas may become temporarily inundated during periods of high precipitation but on the basis of topography are unlikely to hold water for sustained periods of time. A high cover of improved pasture and naturalised species was observed within the patches including *Phalaris aquatica* (Toowoomba Canary Grass), *Hordeum* spp. (Barley) and *C. coronopifolia*. Due to the ephemeral nature of this EVC, dormant flora species including large and medium herbs which were absent at the time of the assessment may reappear following inundation.

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EVC 132: PLAINS GRASSLAND



Plate 4. Plains Grassland north-eastern boundary of study area

One patch of highly degraded Plains Grassland (EVC 132) was recorded within the roadside verge of the Hamilton Highway in the north eastern boundary of the study area (**Figure 3; Plate 4**; HZ19). This patch was assessed to inform potential access points to the study area as part of the phase 1 assessment and inform detailed design. Native ground cover comprised *Themeda triandra* (Kangaroo Grass) and *Rydidosperma* sp. (Wallaby Grass) which just bordered on the 25% cover threshold. The patch contained a high cover of introduced *P. aquatica* which occupied inter-tussock spaces.

PLANTED AND EXOTIC VEGETATION

Due to historical and ongoing agricultural land use native understory has been cleared across the study area and replaced with improved pasture, with some scattered native grassy species observed. Planted exotic and native windrows occur in the east of the study area and in the west, near the Mortlake Power Station is a native Blue Gum *Eucalyptus globulus* sp. plantation (**Figure 3**). Outside of small discrete areas mapped as remnant native vegetation *P. aquatica* was dominant in the road reserves.

3.3.2 Native vegetation

A total of 25 patches of native vegetation were recorded across the study area totalling 37.772 ha (**Figure 3**). Of these, 21 are Plains Grassy Woodland (EVC 55), two Plains Grassy Wetland (EVC 125) one Floodplain Riparian Woodland (EVC 56) and one Plains Grassland (EVC 132). All patches were highly

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modified and disturbed from agricultural land use and stock access. A total of 18 large canopy trees were recorded within patches.

In addition to these remnant patches and large trees in patches, a further 557 large and 21 small scattered trees were identified throughout the study area (**Figure 3**).

3.3.3 Habitat

Fauna habitat within the study area comprised of remnant *E. camaldulensis* woodland (discrete patches and scattered remnant trees), remnant grassland, waterbodies, drainage lines and the Salt Creek corridor.

Most of the study area comprised of cleared agricultural land subject to intensive grazing and historical pasture improvement. These areas were dominated by exotic pasture and for the most part highly trafficked by livestock making them of negligible faunal habitat for native species.

Habitat did, however, exist for fauna in the form of large old hollow bearing trees, present with the study area as a mixture of remnant patches and scattered remnant trees (**Plate 5** and **Plate 6; Figure 3**). This habitat type was most prevalent in the southwest of the study area and formed a large area of semi-contiguous to contiguous woodland habitat north of Thorburn's lane and east of Boonerah Estate Road (**Plate 6; Figure 3**). Trees within this woodland consisted of large old remnant *E. camaldulensis*, many of which contained a diversity of spout and trunk hollows of varying shapes and sizes. Hollows are likely to provide nesting and refuge opportunities to a diversity of birds, bats and arboreal mammals, whilst flowering material of these trees, some of which were noted as having expansive canopies are also likely to provide a valuable foraging resource for the same. Extensive tree scratching observed suggests the habitat is used by arboreal mammals. Woodland habitat was also present in a slightly more fragmented form in the far south-west of the study area within the road reserves of Hardy Lane, Boonerah Estate Road and as scattered paddock trees (**Figure 3**). Fauna species recorded utilising this habitat included Australian Magpie (*Gymnorhina tibicen*), Red-rumped Parrot (*Psephotus haematonotus*), Tree Martin (*Petrochelidon nigricans*), Willie Wag Tail (*Rhipidura leucophrys*), Eastern Rosella (*Platycercus eximius*), Whistling Kite (*Haliastur sphenurus*), and Koala (*Phascolarctos cinereus*) (**Plate 7**).

Remnant Plains Grassland (EVC 132) recorded to the north of the study area was noted to have a high cover of perennial pasture species, leading to a high biomass and reduced inter-tussock spacing. Other typical features of this habitat such as the presence of embedded surface rock and cracking soils were also not readily apparent. In its modified form and given its discrete location, this habitat is unlikely to be of high value for native fauna but may provide opportunities for ground dwelling species such as reptiles and small mammals. Remnant Plains Grassy Wetland (EVC 125) habitat were dry at the time of assessment (**Plate 4**). The ephemeral nature of these wetlands means that in their current form provide limited habitat but following inundation, dormant flora species may return and the wetlands may provide foraging habitat for wetland bird species inclusive of wetland birds and frogs. Areas of Plains Grassy Wetland were also noted to be accessible to sheep and cows with the presence of livestock causing degradation of the habitat and likely to reducing usage of these areas by native species.

The study area contained a diversity of discrete waterbodies and drainage lines (**Plate 7** and **Plate 8**). Detailed assessment of these waterbodies and to a lesser extent drainage lines was the subject of targeted assessments for Growling Grass Frog, the findings of which are summarised in section 3.4.2.

During the detailed field surveys, most waterbodies were noted to be heavily trafficked by livestock, their margins typically devoid of fringing vegetation and pugged. These waterbodies in most cases also lacked any floating, submerged or emergent macrophyte cover. Species observed utilising this habitat consisted of common aquatic avifauna species such as Australian Wood Duck (*Chenonetta jubata*), Pacific Black Duck (*Anas superciliosa*), Chestnut teal (*Anas castanea*) and Australasian Grebe (*Tachybaptus novaehollandiae*). Spotted Marsh Frog (*Limnodynastes tasmaniensis*) and Brown Tree Frog (*Littoria ewingii*) were also recorded. Drainage lines whilst evidenced in DEECA study area hydrology mapping and as low-lying areas, were dominated by exotic pasture species and were of negligible habitat at the time of the field survey (**Plate 8**). These areas may however, provide for dispersal habitats at times of heavy precipitation.

Salt Creek Corridor meanders through the north-eastern portion of the study area where it occurs within a highly modified landscape (**Plate 2, Plate 10; Figure 3**). Riparian vegetation within the creek corridor was heavily modified, especially within the northern reach near Hamilton Highway which was completely cleared of overstorey vegetation. Overstorey vegetation was however present further south where a thin corridor of *E. camaldulensis* shaded its banks. Signs of stock access were prevalent along the waterways grassy verge. Despite the waterways modified banks, instream vegetation consisted of extensive areas of floating and emergent macrophyte cover likely to provide habitat and refuge to a diversity of fauna species. Fauna recorded within the waterway included Pacific Black Duck, Australian Short finned Eel *Anguilla australis*, Dwarf Galaxias *Galaxias pusilla* (considered synonymous with Little Galaxias *Galaxiella toourtkoourt*), and Eastern Long-necked turtle (*Chelodina longicollis*) (**Plate 11**). Suitability of the above the above-described habitats to support threatened species is further discussed in section 3.4.2.



Plate 5: Modified Plains Grassy Woodland within large woodland area containing tree hollows



Plate 6: Modified Plains Grassy Woodland on Boonerah Estate Road and Hardys Lane containing tree hollows

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Plate 7: Koala on Hardys Lane



Plate 8: Drainage line linking study area and Mortlake Common



Plate 9: Wetland fringed by rock with extensive cover of submerged aquatic vegetation



Plate 10:: Salt Creek north-eastern reach



Plate 11:: Eastern Snake-necked Turtle on the bank on Salt Creek

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Figure 3: Ecological Values: 3.1

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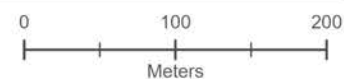
- Study area
- Powerlines existing

Vegetation
Ecological Vegetation
Class:

- EVC 56:
Floodplain
Riparian
Woodland

- EVC 132_61:
Plains Grassland -
Heavier-soils

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Figure 3: Ecological Values: 3.2

Moyne Shire

- Study area
- Powerlines existing
- Vegetation
- Vegetation:
- Native (exempt) - planted

- Ecological Vegetation Class:
- EVC 132_61: Plains Grassland - Heavier-soils
 - EVC 56: Floodplain Riparian Woodland

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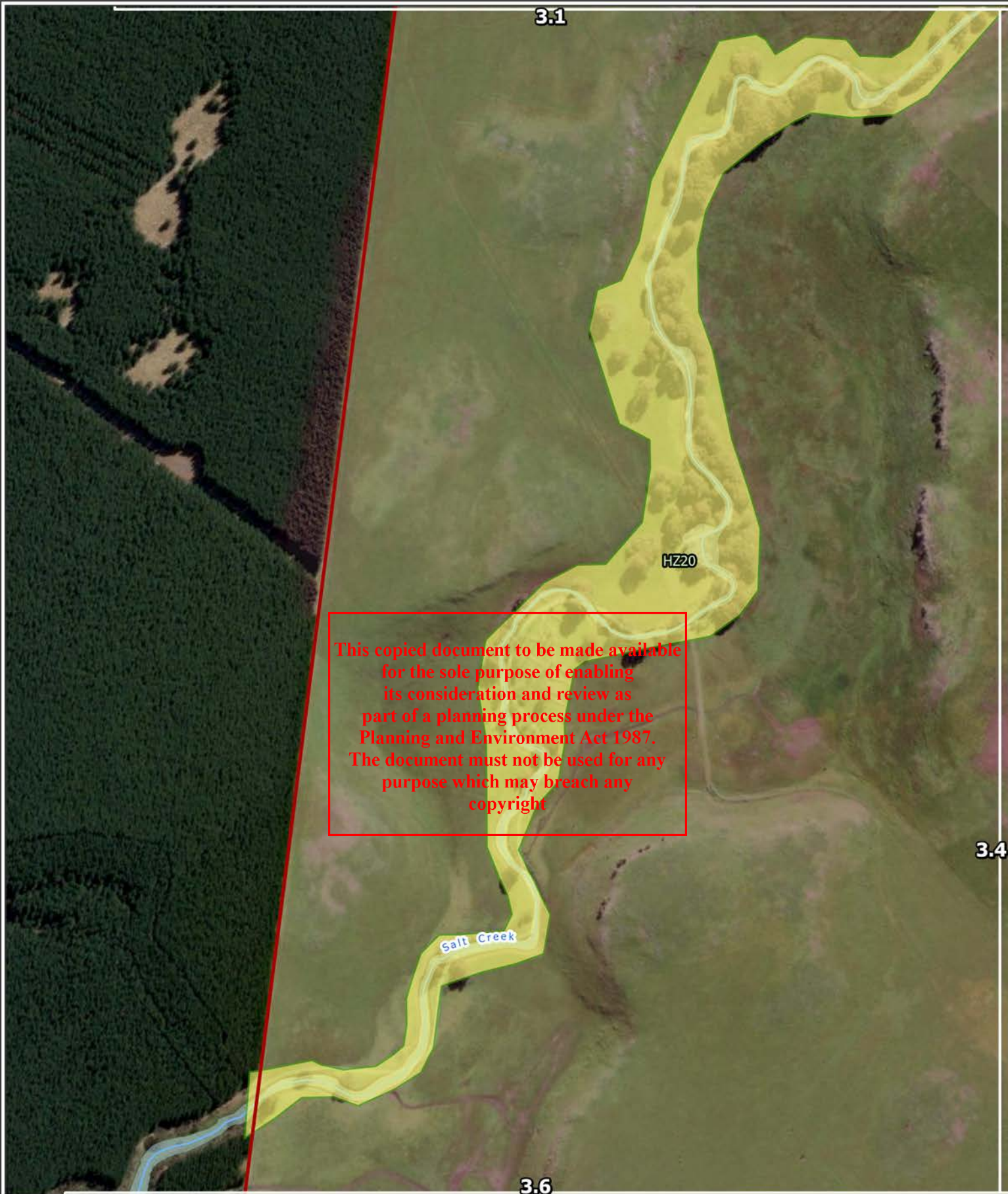


Figure 3: Ecological Values: 3.3

Moyne Shire

Study area

Vegetation

Ecological Vegetation Class:

EVC 56:
Floodplain
Riparian
Woodland

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Figure 3: Ecological Values: 3.4

Moyne Shire

- | | | |
|--|--|---|
| Study area | Solar panel 2 | Ecological Vegetation Class: |
| Firebreak | Vegetation Screening | |
| Powerlines existing | Vegetation | EVC 56: Floodplain Riparian Woodland |
| Roads | Vegetation: | Large native tree |
| Solar panel 1 | Native (exempt) - planted | |

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Figure 3: Ecological Values: 3.5

Moyne Shire

- Study area
- Roads
- Firebreak
- Solar panel 1
- Solar panel 2
- Powerlines existing
- Vegetation Screening
- Small native tree

0 100 200
Meters

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Figure 3: Ecological Values: 3.6

Moynes Shire

- Study area
- Firebreak
- Gates
- Roads
- Vegetation Screening
- Vegetation
- Vegetation:
- Native (exempt) - planted

- Ecological Vegetation Class:
- EVC 55_61: Plains Grassy Woodland
 - EVC 125: Plains Grassy Wetland

0 100 200
Meters

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Figure 3: Ecological Values: 3.7

Moyne Shire

 Study area Firebreak Gates Inverer pad Roads Solar panel 1	 Solar panel 2 Vegetation Screening Vegetation Vegetation: Native (exempt) - planted	Ecological Vegetation Class: EVC 55_61: Plains Grassy Woodland EVC 125: Plains Grassy Wetland
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0 100 200

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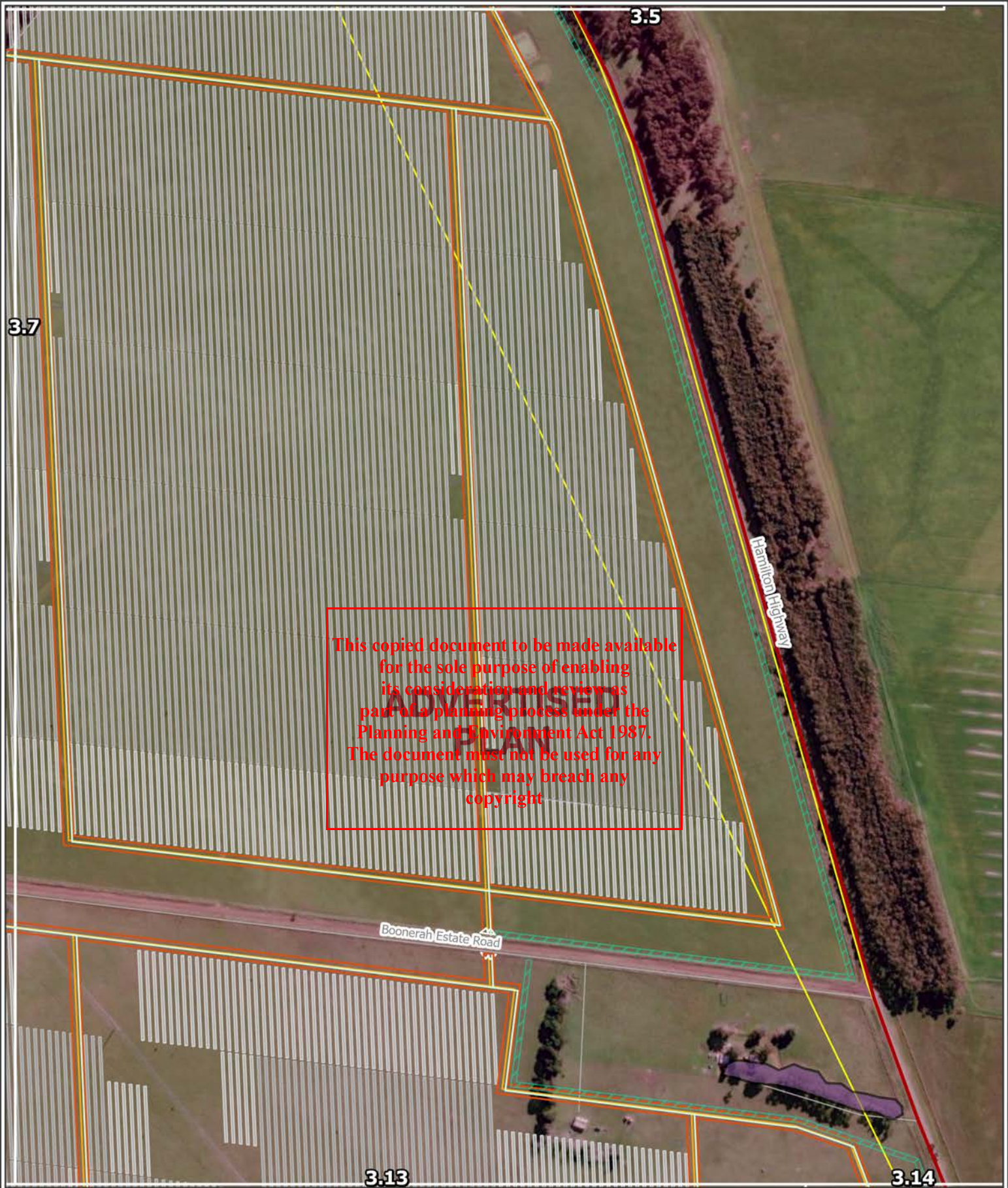


Figure 3: Ecological Values: 3.8

Moyne Shire

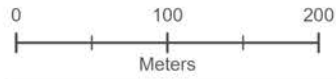
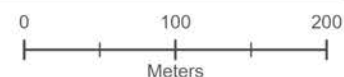
 Study area	 Powerlines existing	 Vegetation Screening	 Datum/Projection: GDA 1994 VICGRID94 Project: 4927 Date: 25/07/2024
 BESS	 Roads	 Vegetation	
 Firebreak	 Solar panel 1	 Vegetation:	 
 Gates	 Solar panel 2	 Native (exempt) - planted	
 Inverer pad			Source: Basemap: VICMAP, 2023



Figure 3: Ecological Values: 3.9

Moynes Shire

- | | | |
|--|--|--|
| Study area | Vegetation Screening | ● Small native tree |
| Firebreak | Vegetation | ● Large native tree |
| Inverer pad | Ecological Vegetation Class: | Native trees removed |
| Roads | EVC 55_61: Plains Grassy Woodland | ● Large |
| Solar panel 1 | | |
| Solar panel 2 | | |



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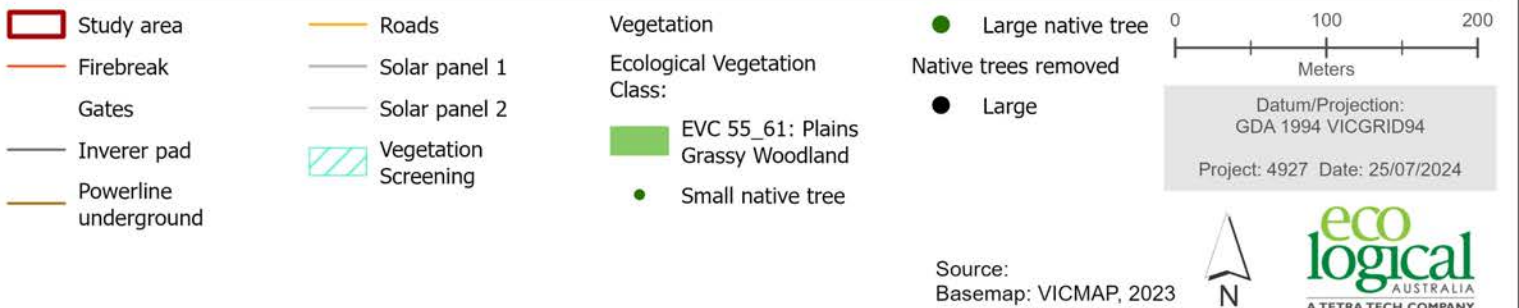


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Figure 3: Ecological Values: 3.10

Moyne Shire



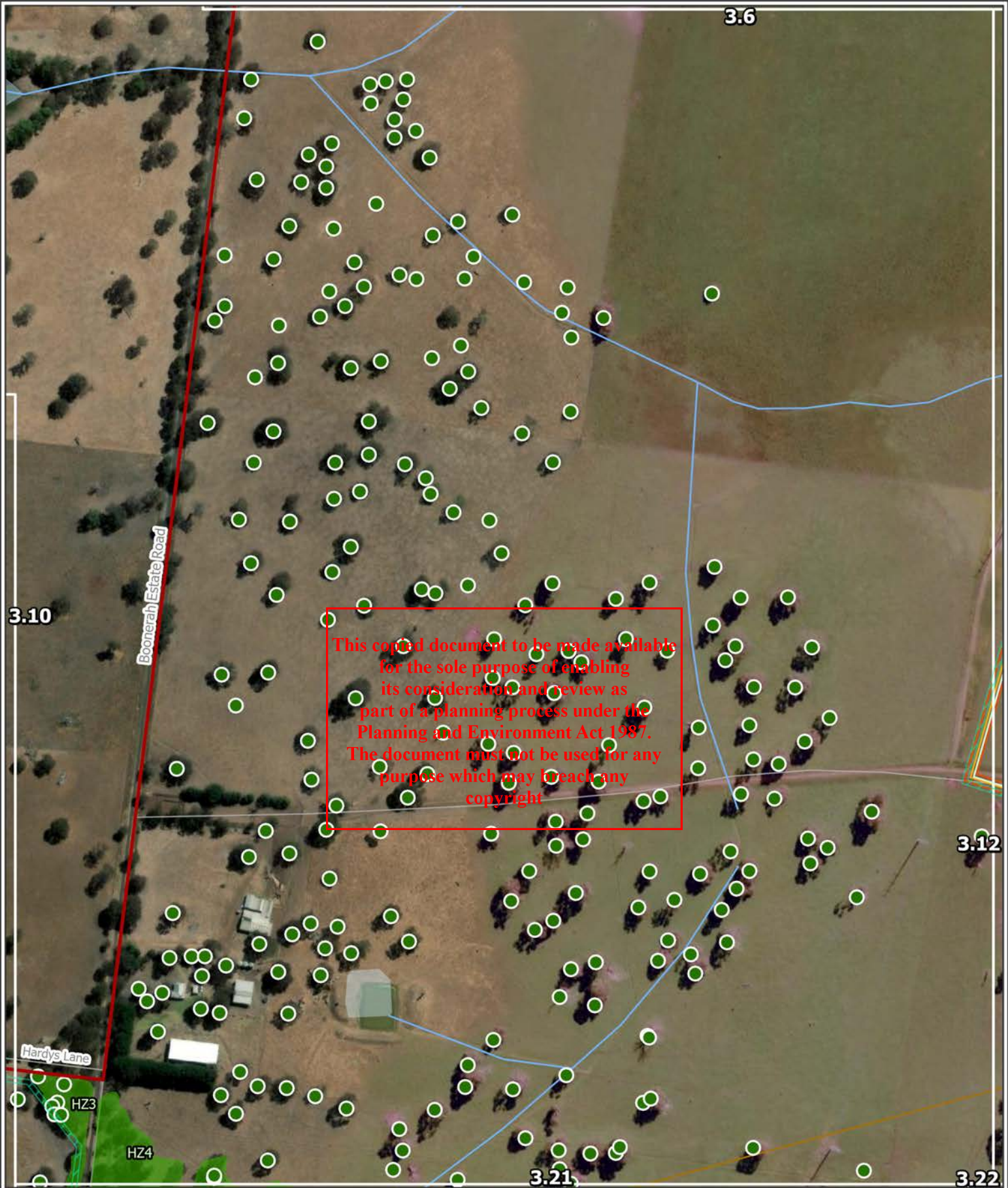


Figure 3: Ecological Values: 3.11

Moyne Shire

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 Study area Firebreak Powerline underground Roads	 Vegetation Screening	Vegetation Ecological Vegetation Class: EVC 55_61: Plains Grassy Woodland Large native tree	0 100 200 Meters Datum/Projection: GDA 1994 VICGRID94 Project: 4927 Date: 25/07/2024 Source: Basemap: VICMAP, 2023
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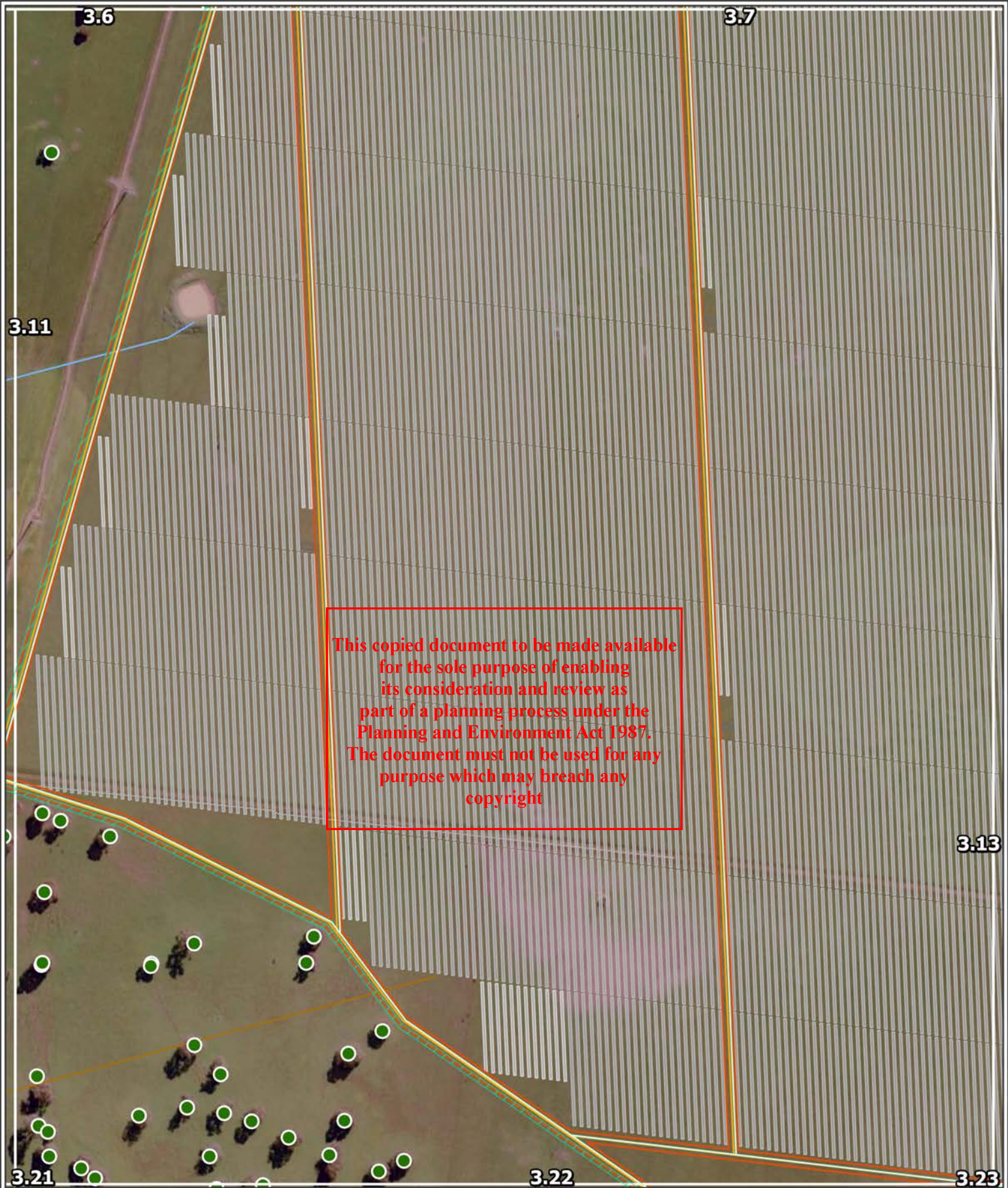
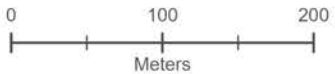


Figure 3: Ecological Values: 3.12

Moyne Shire

- Study area
- Firebreak
- Roads
- Inverer pad
- Powerline underground
- Solar panel 1
- Solar panel 2
- Vegetation Screening
- Large native tree



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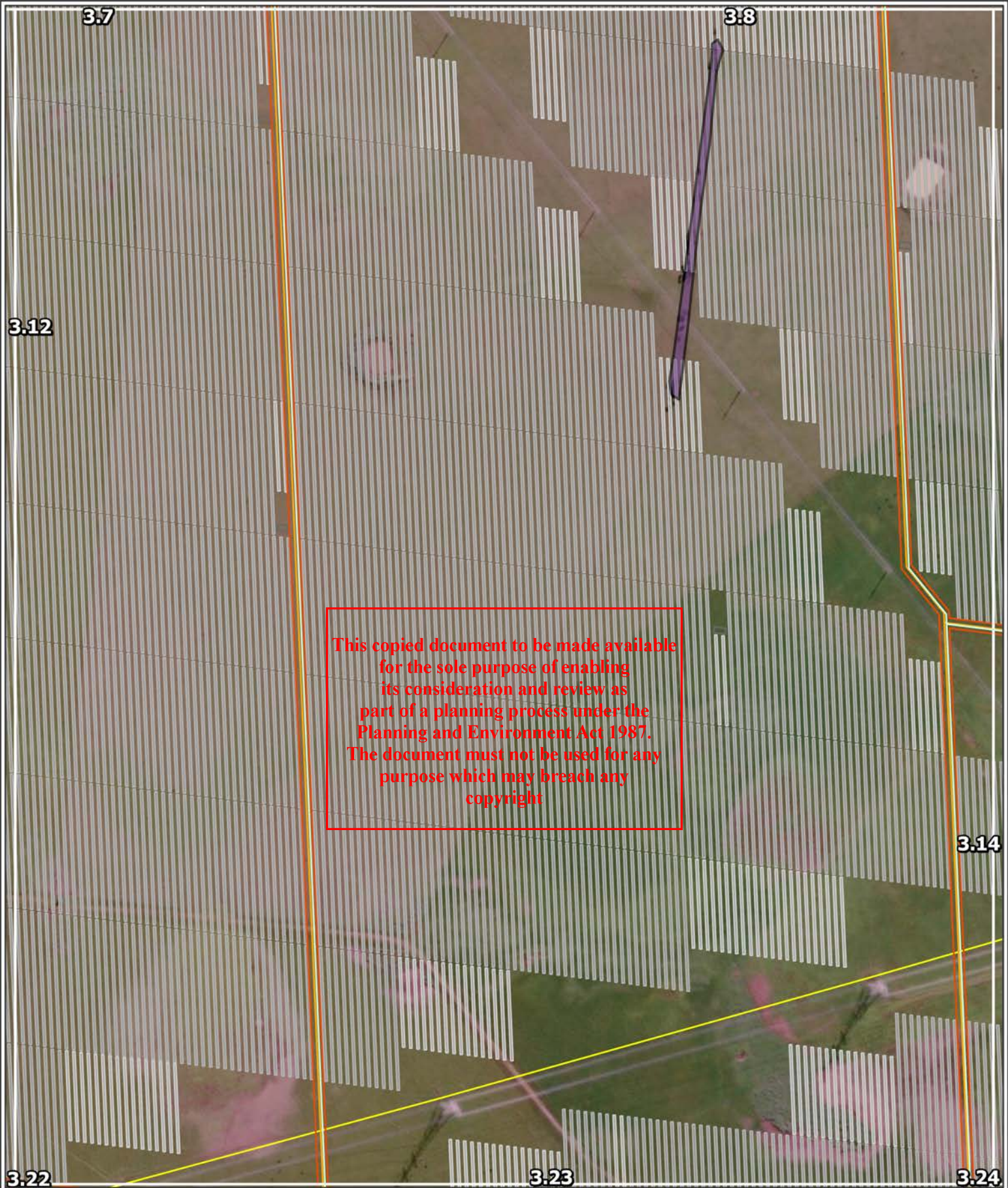
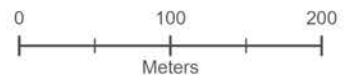


Figure 3: Ecological Values: 3.13

Moyne Shire

- Study area
- Firebreak
- Inverer pad
- Powerlines existing
- Roads
- Solar panel 1

- Solar panel 2
- Vegetation
- Vegetation:
- Native (exempt) - planted



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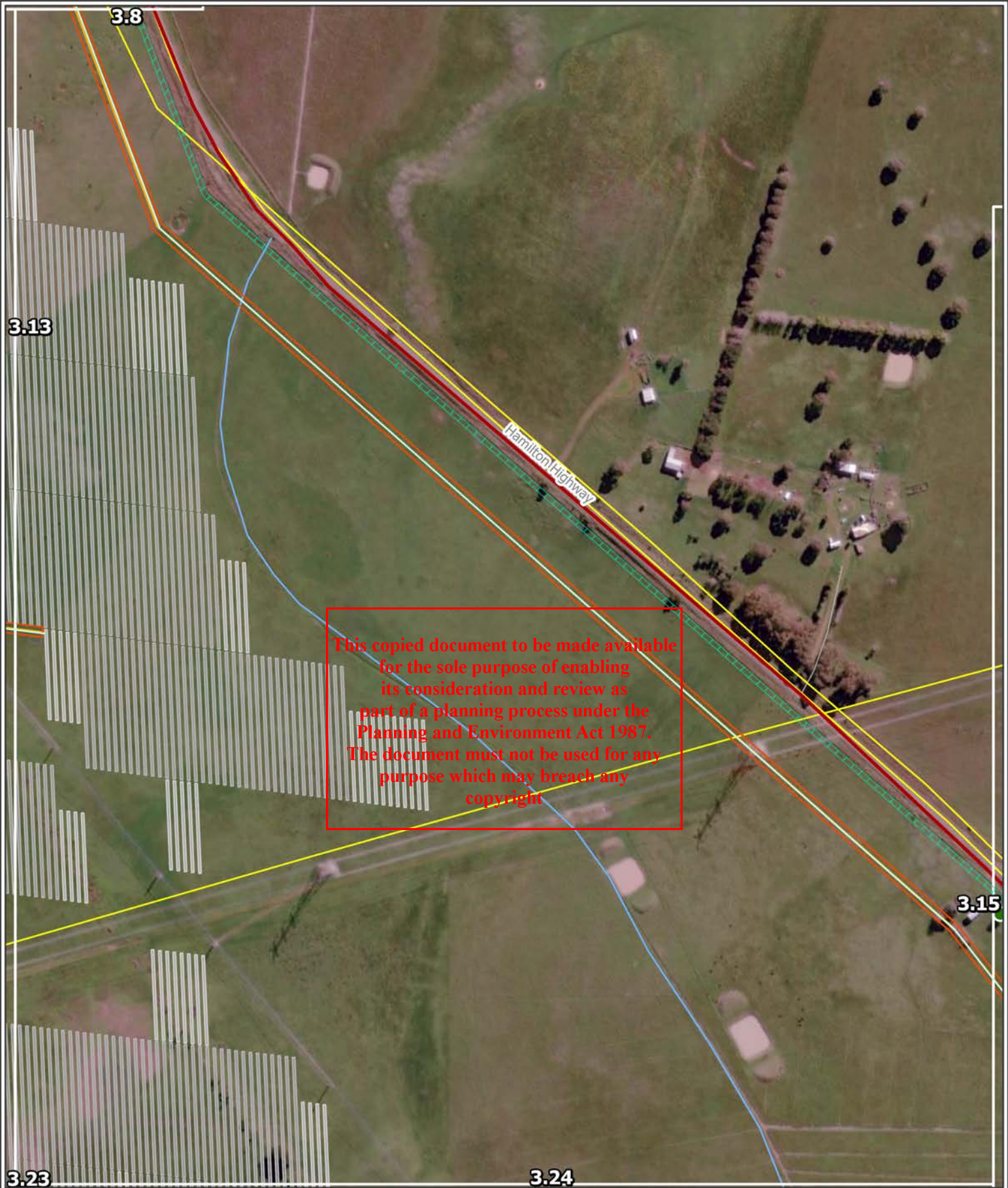


Figure 3: Ecological Values: 3.14

Moyne Shire

- | | | |
|---|---|--|
| Study area | — Powerlines existing | — Solar panel 2 |
| — Firebreak | — Roads | Vegetation Screening |
| — Inverer pad | — Solar panel 1 | ● Small native tree |

0 100 200
Meters

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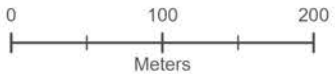


Figure 3: Ecological Values: 3.15

Moynesshire

- Study area
- Firebreak
- Powerlines existing
- Roads
- Vegetation Screening
- Small native tree

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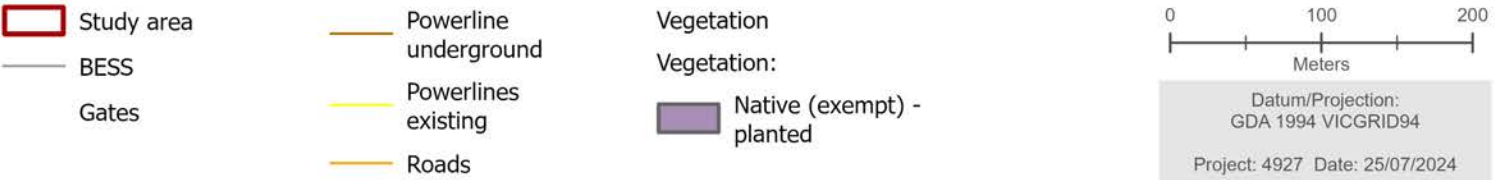
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Figure 3: Ecological Values: 3.16

Moyne Shire



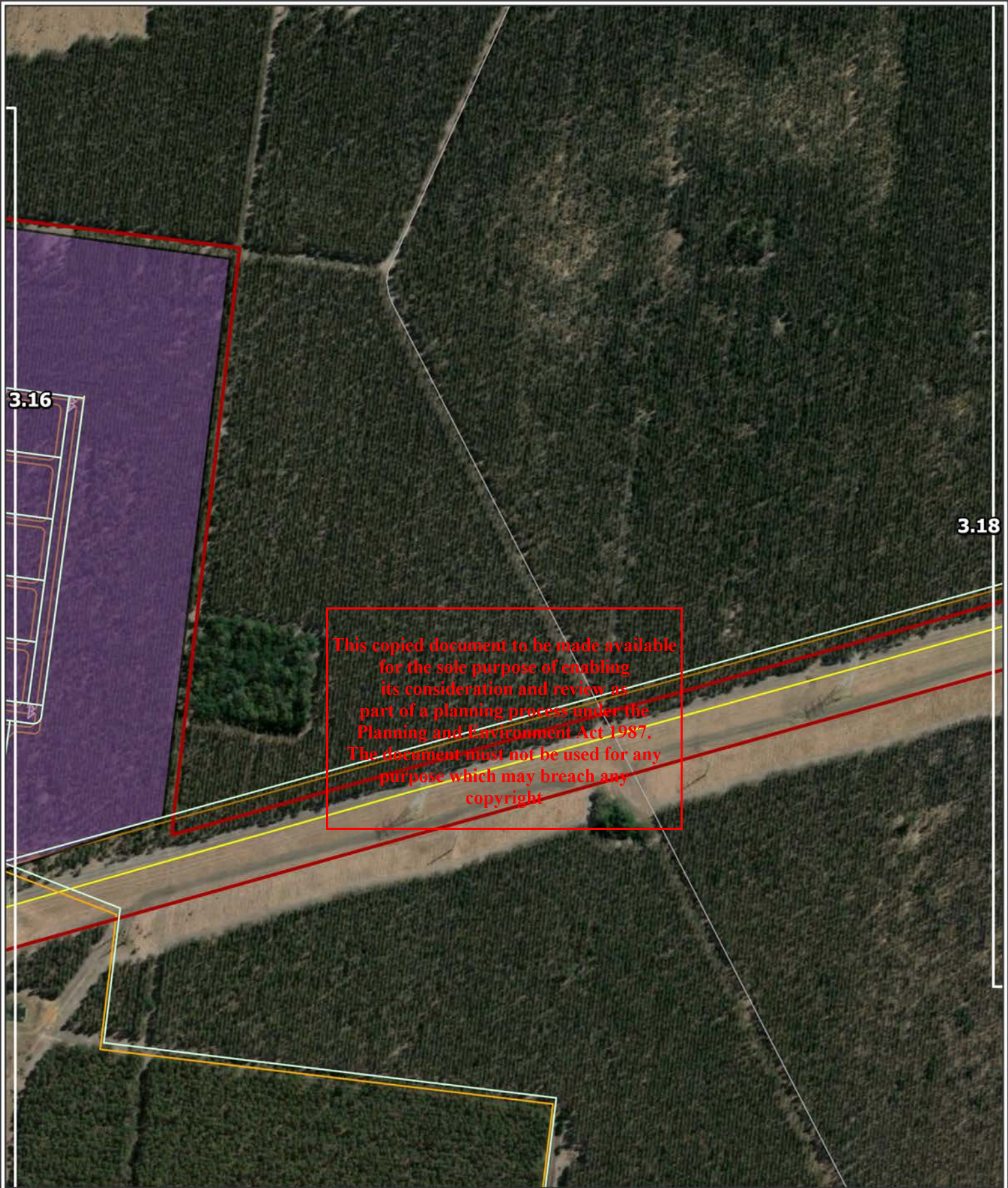
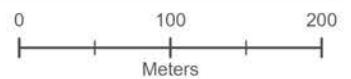


Figure 3: Ecological Values: 3.17

Moyne Shire

- | | | |
|-----------------------|---------------------|---------------------------|
| Study area | Powerlines existing | Vegetation |
| Gates | Roads | Vegetation: |
| Powerline underground | | Native (exempt) - planted |



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Figure 3: Ecological Values: 3.18

Moyne Shire

- Study area
- Powerline underground
- Powerlines existing
- Roads
- Vegetation**
- Ecological Vegetation Class:**
- EVC 55_61: Plains Grassy Woodland
- Small native tree
- Large native tree

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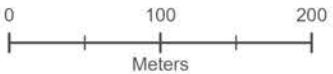
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Figure 3: Ecological Values: 3.19

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- Study area
- Firebreak
- Gates
- Inverer pad
- Powerline underground
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening
- Large native tree



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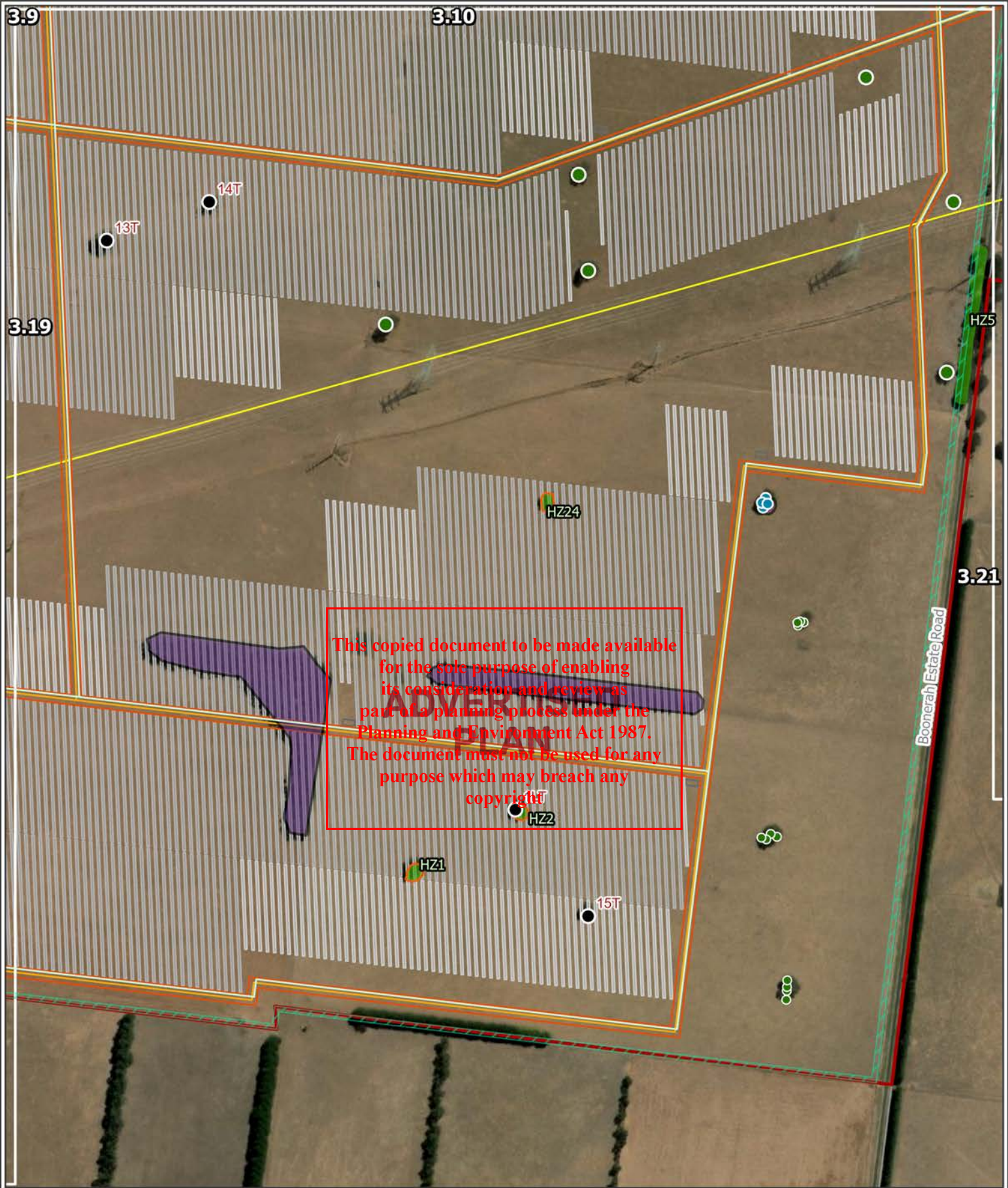


Figure 3: Ecological Values: 3.20

Moyne Shire



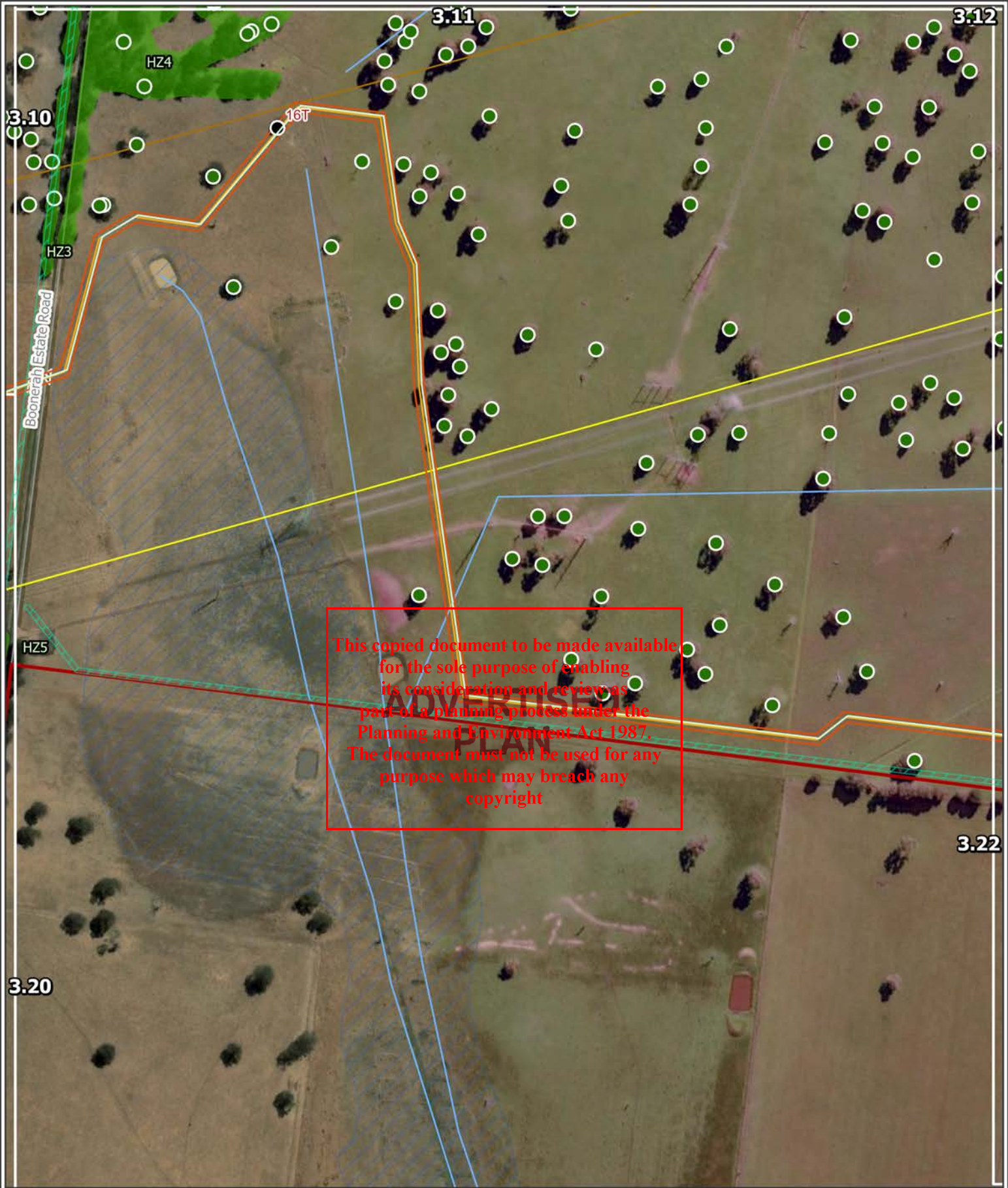
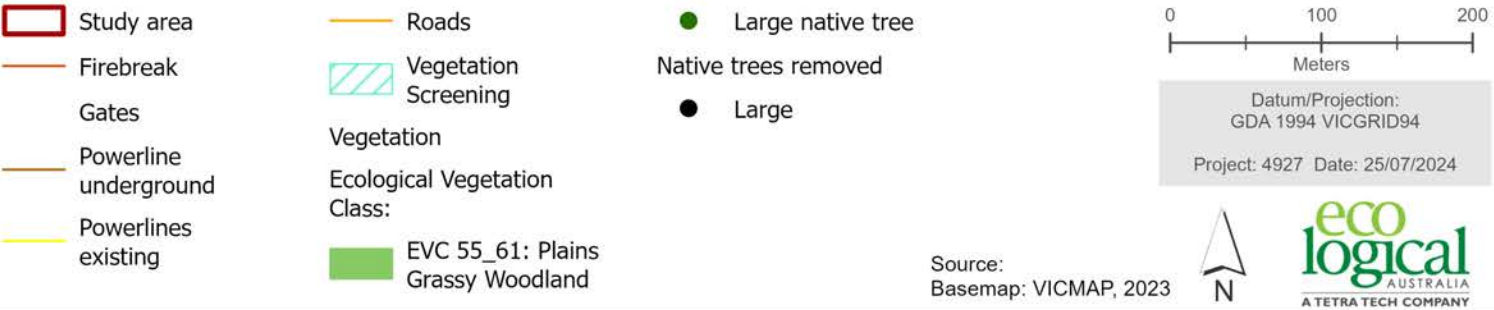


Figure 3: Ecological Values: 3.21

Moyne Shire



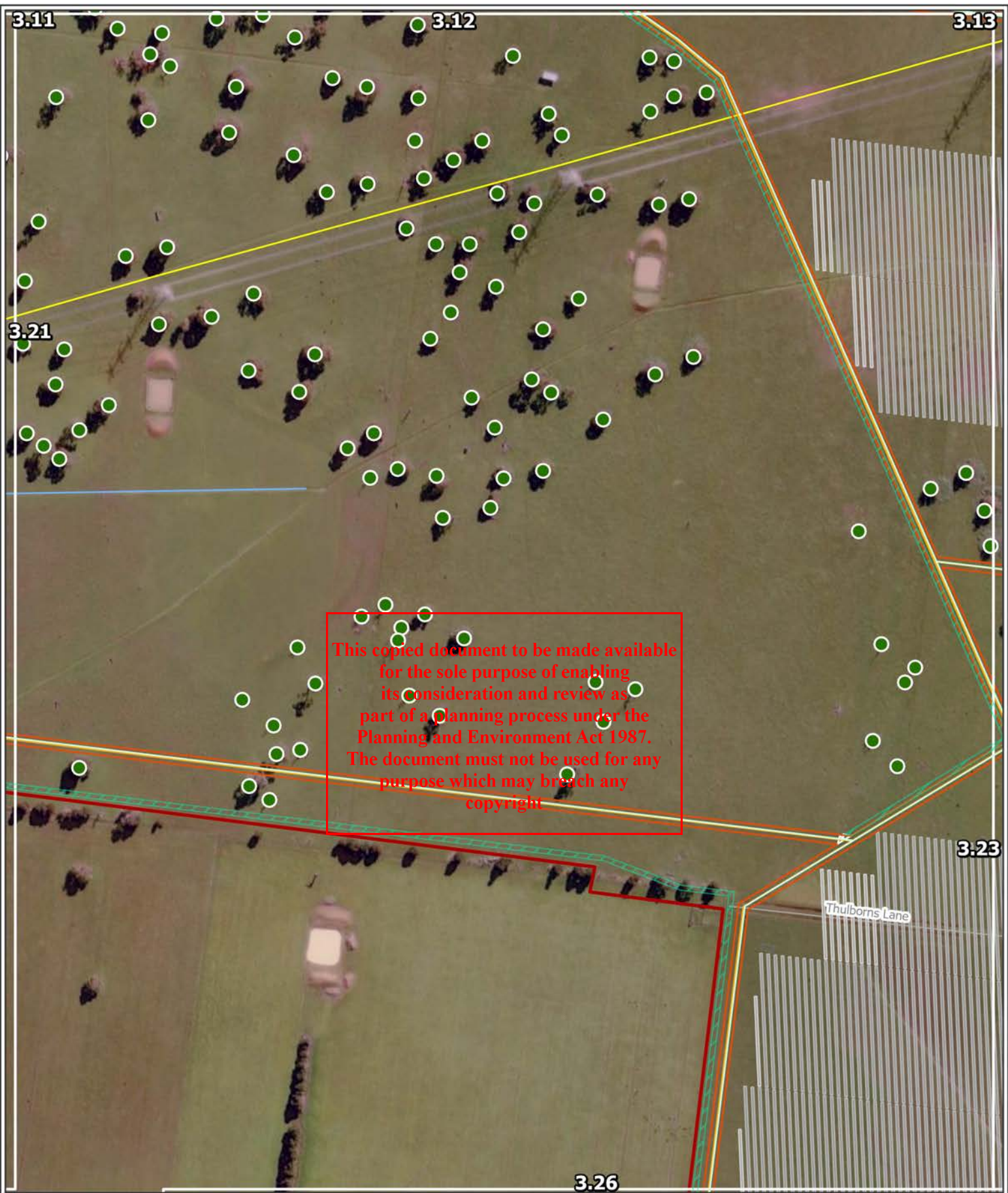


Figure 3: Ecological Values: 3.22

Moyne Shire

- | | | |
|---|---|--|
| Study area | Powerlines existing | Solar panel 2 |
| Firebreak | Roads | Vegetation Screening |
| Gates | Solar panel 1 | ● Large native tree |
| Inverer pad | | |

0 100 200
Meters

Datum/Projection:
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Figure 3: Ecological Values: 3.23

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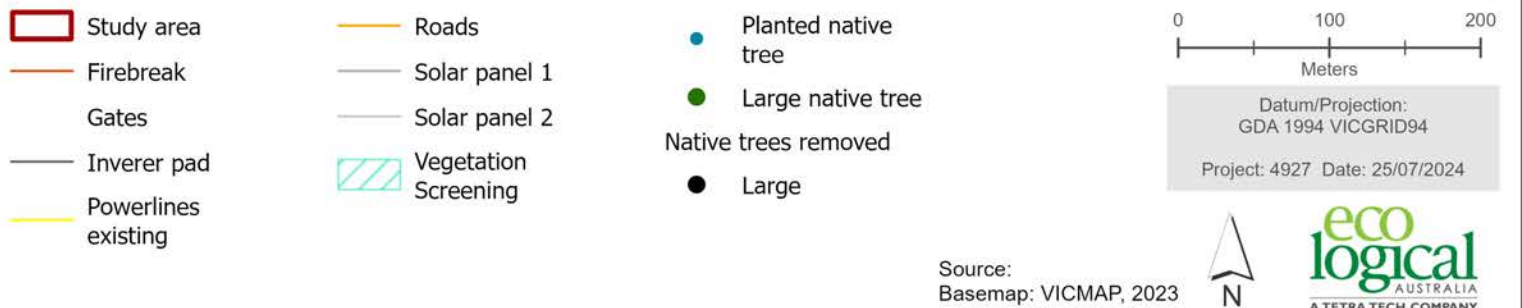




Figure 3: Ecological Values: 3.24

Moyne Shire

- Study area - Firebreak - Inverer pad - Roads - Solar panel 1	- Solar panel 2 - Vegetation Screening	Vegetation Ecological Vegetation Class: - EVC 55_61: Plains Grassy Woodland - Small native tree	- Large native tree - Native vegetation removed - Native trees removed - Small - Large	0 100 200 Meters Datum/Projection: GDA 1994 VICGRID94 Project: 4927 Date: 25/07/2024
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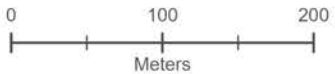
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Figure 3: Ecological Values: 3.25

Moyne Shire

- Study area
- Firebreak
- Inverer pad
- Powerlines existing
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening
- Planted native tree



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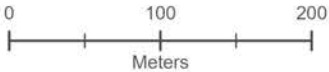


Figure 3: Ecological Values: 3.26

Moyne Shire

- Study area
- Firebreak
- Inverer pad
- Roads
- Vegetation Screening
- Large native tree
- Solar panel 1
- Solar panel 2

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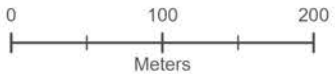


Figure 3: Ecological Values: 3.27

Moyne Shire

- Study area
- Firebreak
- Inverer pad
- Roads
- Solar panel 1
- Solar panel 2
- Vegetation Screening

- Vegetation
- Vegetation:
- Native (exempt) - planted
 - Planted native tree



Datum/Projection:
GDA 1994 VICGRID94

Project: 4927 Date: 25/07/2024

Source:
Basemap: VICMAP, 2023



3.4 Significant ecological values

3.4.1 Significant fauna

One threatened fauna as listed under the EPBC Act and FFG Act was recorded within the study area. This species, Little Galaxias was incidentally recorded incidentally during targeted Growling Grass Frog surveys. A number of species were also identified as having a moderate or above likelihood of occurrence. These species are summarised in **Table 8** and furthered discussed below. VBA records of fauna species with a moderate or above likelihood of occurrence are shown in **Figure 4**.

Table 6: Threatened fauna with a moderate or above likelihood of occurrence within the study area.

Scientific name	Common name	FFG	EPBC	Number of records	Last record
<i>Litoria raniformis</i>	Growling Grass Frog	VU	VU	12	2018
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail Bat	VU		12	2011
<i>Antigone rubicunda</i>	Brolga	EN		107	2020
<i>Ardea alba modesta</i>	Eastern Great Egret	VU	Ma	5	2018
<i>Gallinago hardwickii</i>	Latham's Snipe		VU, Ma, Mi	3	2018
<i>Hieraaetus morphnoides</i>	Little Eagle	VU		4	2018
<i>Galaxiella toourtkoourt</i>	Little Galaxias	EN	VU		
<i>Galaxiella pusilla</i>	Galaxias			2	2008
<i>Engaeus sericatus</i>	Hairy Burrowing Crayfish	VU		4	2021
<i>Delma impar</i>	Striped Legless Lizard	EN	VU	13	2013
<i>Eulamprus tympanum marnieae</i>	Corangamite Water Skink	EN	EN	-	-
<i>Pseudemoia pagenstecheri</i>	Tussock Skink	EN		65	2013
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	VU	VU	9	2021

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GROWLING GRASS FROG

As described in section 3.4, Growling Grass Frog was the subject of a targeted assessment (**Appendix B**). Targeted surveys for the species were initially scoped on the basis of the species potential to disperse across the study area between the species known habitats of Salt Creek, which transects the study area in the north and Mortlake Common which occurs just beyond the study areas southern boundary. Targeted surveys did not detect the species. Wetlands (farm dams) and drainage lines within the study area determined during the surveys to be of low habitat value. The targeted survey report concluding that that species dispersal across the site, linking the habitats of Salt Creek and Mortlake is unlikely, with connectivity between these habitats likely supported by other waterways and bodies within the surrounding landscape. Due to the suitability of habitat and past records of the species downstream, the species is however considered to have a residual likelihood of moderate along the section of Salt Creek that transects the study area.

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Since the completion of the targeted surveys in December of 2023 and the issue of targeted Growling Grass Frog report in February of 2024 a separate hydrology assessment of the study area was undertaken (ELA, 2024). As part of this assessment existing conditions under Annual Exceedance Probability (AEP) flood events were modelled (ELA, 2024). When looking at the results of this assessment it can be seen that under all AEP events connectivity of seasonally inundated habitat between Salt Creek and Mortlake Common north to south is limited with noticeably greater overland connectivity between Mortlake Common and the catchments of Blind Creek and Salt Creek to the south (refer appendix C ELA, 2024). This is consistent with the findings of the targeted assessment and suggests that species movement between Salt Creek and Mortlake Common is unlikely to be occurring across the study area. Populations of Growling Grass Frog more likely to be using habitat to the south of the study area when dispersing across the landscape.

It is therefore considered that whilst Salt Creek provides habitat for Growling Grass Frog, elsewhere within the study area the species has a low likelihood of occurrence and if present is likely only likely to use the study area on a rare and opportunistic basis.

YELLOW-BELLIED SHEATHTAIL BAT

Yellow Bellied Sheathtail-bat (*Saccolaimus flaviventris*) is known from a wide variety of habitats but is most often associated with wooded habitats as present in the study areas south-west. A total of 12 records of the species were identified within 10 km of the study area with the most recent record dating back to 2011. The species may be present foraging aerially within study area and as the species may roost within hollows of large old *Eucalyptus* trees. The species distribution and habits are poorly understood, but the species is thought to be a seasonal visitor to the study area (OEH, 2022).

BROLGA

Brolga (*Antigone rubicunda*) is listed as an endangered under the FFG Act and is a species of regional significance in western Victoria. As a result the species was considered in detail as part of the desktop assessment and field surveys. 107 records of the species occur within 10 km of the site with the most recent record from 2020.

Due to the regional significance of Brolga and their potential interaction with Windfarm projects in the western Victoria a clear rationale has been determined for identifying species habitat. This includes the declaration of No Go Flocking Areas, the use of DEECA mapped wetlands to identify species breeding habitat and records within the VBA been specified as general and breeding records. The study area is not located within a No Go flocking area. Flocking areas in closest proximity to the site include Darlington located approximately 25 km to the north- east and Hamilton approximately 35 km to the north-west.

With the study area one mapped wetland was identified (Section 4.2.4, **Figure 2**). This mapped wetland (ID 28276) is characterised by the mapping as unknown, was dry at the time of assessment and based on a combination of topography and observed floristic composition appears unlikely to hold sufficient water to support the species. This mapped wetland is described in further detail in 4.3.1. Just beyond the boundary of the study area two mapped wetlands were identified that contain breeding records for the species. These mapped wetlands include wetland ID 28282 located to the south-east of the study area (Mortlake Common) and wetland ID 28264 located to the south-west.

Wetland ID 28282 (Mortlake Common) is located within the Mortlake Common Flora Reserve and is a habitat of significance to the species within the locality. Based on a review of the VBA the species was most recently recorded in the common in 2020 and the most recent breeding record was taken in 2007. Two separate breeding locations within the wetland identified. It is likely the species is intermittently present within the wetland each year, utilising the area either for the purpose of breeding or foraging depending on water availability.

Wetland ID 28264 is located in proximity to the Mortlake Power Station. The last breeding record at the wetland ID also dates back to 2007. This record represents the only record of the species at that location. It is noted that location of the wetland coincides with ESO3 of the Moyne Planning Scheme that identifies land development restrictions on the basis of noise disturbance produced by the existing gas fired Mortlake Power Station. Given this source of noise disturbance, surrounding land use as a plantation and the proximity of the wetland to an existing overhead transmission line the extent to which the species still utilises this habitat is unclear.

EASTERN GREAT EGRET

Eastern Great Egret (*Ardea alba modesta*) is a relatively widespread species that is at times encountered in modified agricultural landscapes in association with watercourse, wetlands, inundated grasslands and dams. Five records of the species were identified the most recent of which dates back to 2018. Highest quality habitat for the species was identified along Salt Creek with the waterway having the potential to form an important foraging and refuge habitat within the landscape. Here the species is considered to have a moderate likelihood of occurrence. Elsewhere in the study area Eastern Great Egret may occasionally and opportunistically forage in fair dams (particularly those with vegetated margins), in inundated grassland habitats and drainage lines but would not be anticipated to make significant use of the study area or to be reliant on its habitat and is considered to have a low likelihood of occurrence.

HAIRY BURROWING CRAYFISH

Hairy Burrowing Crayfish (*Engaeus sericatus*) is a poorly understood species thought to be limited in its distribution to Western Victoria. Little is understood of the species-specific distribution and habitat requirements. Members of the genus *Engaeus* are known as burrowing or terrestrial crayfish and are typically associated with wet muddy areas and seepages such as those associated with swamps, floodplains of small streams and rainforests (Dooran, 2000). A review of VBA records for Hairy Burrowing Crayfish identifies four records within 10 km of the study area the most recent of which was recorded in 2010. Records of this species are restricted (**Figure 4**). Looking at species distribution more broadly the majority of records of the species are noted to be located to the south of Mortlake with a cluster of records associated with the Great Otway National Park and therefore presumably rainforest habitat (ALA, 2025). Within the study area potential habitat is considered to be limited by high stock rates and the pugging of damp and wetland habitats, however given how little is known about the species its presence cannot be ruled out. If present the species is most likely to occur in association within identified mapped wetlands, within the floodplain of Salt Creek and in areas of mapped Plains Grassy Wetland (EVC 125). Within these habitats the species is considered to have a moderate likelihood of occurrence. Beyond the floodplain of Salt Creek and Plains Grassy Wetland (EVC 125) the species is considered to have a low likelihood of occurrence.

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LATHAM'S SNIPE

Latham's Snipe (*Gallinago hardwickii*) is a migratory shorebird species and was recently (January 2023) listed as vulnerable under the EPBC Act. This notoriously cryptic species has a preference for densely vegetated wetlands and watercourses when visiting Australia during its non-breeding period (DCCEEW, 2024b). Such habitats within the study area are considered to be restricted to the Salt Creek corridor, where thick beds of emergent macrophyte cover such as *Phragmites australis* and *Typha sp* provide foraging and refuge opportunities. Suitable habitat for the species is also considered to be present just beyond the study areas southern boundary in association with Mortlake Common.

LITTLE EAGLE

Little Eagle (*Hieraaetus morphnoides*) is commonly associated with timbered farmland (Morcombe, 2003). Whilst not incidentally recorded during the field survey the species is considered to have a moderate likelihood of occurrence within the study area, with *E. camaldulensis* woodland and scattered trees within the south-western portion of the study area potentially providing nesting and foraging habitat for the species.

LITTLE GALAXIAS / DWARF GALAXIAS

Little Galaxias (*Galaxiella toourtkoourt*) which is listed under the EPBC Act as Dwarf Galaxias (*Galaxiella pusilla*) was incidentally recorded in Salt Creek during targeted Growling Grass Frog surveys. The species was also recorded during targeted assessments undertaken for the Latham's Snipe as part of the Mount Fyans Windfarm project, with a location of detection corresponding with an area of study area common to the two projects (Biosis, 2017). This location is in the far north-east of the study area (of this assessment) where Salt Creek passes under the Hamilton Highway. The species was also recorded in Salt Creek upstream of this location (Biosis, 2017). Whilst the species is also often associated with offline habitat and found in well vegetated wetlands, drainage lines and areas subject to inundation no such habitat with connectivity to Salt Creek was identified. Species habitat is therefore considered to be confined to Salt Creek.

STRIPED LEGLESS LIZARD AND TUSSOCK SKINK

Striped Legless Lizard (*Delma impar*) and Tussock Skink (*Pseudemoiapagenstecheri*) are discussed together due to the similarity in their habitat requirements, although Tussock Skink is generally considered to be more widespread and better able to persist in modified habitats. Suitable habitat for these species occurs within the study area in association with mapped patches of Plains Grassland (EVC 132). Plains Grassland (EVC 132) is located along the Hamilton Highway (HZ19) with this is considered as having a moderate potential of supporting Tussock Skink and Striped Legless Lizard. HZ19 forms a tussock grassland although its habitat somewhat limited by its discrete size, lack of rock and limited cracking soils and the presence of perennial weed species. In the absence of targeted survey a precautionary approach to species presence in this area has been adopted. Both species were recorded in close proximity to the study area during surveys completed for the Mt Fyans Windfarm (Biosis, 2017).

In relation to Striped Legless Lizard, the species was recorded in 2013 along Castle Cary Road near its junction with Hamilton Highway (Biosis, 2017) which is located just beyond the study areas north-east boundary. It is however noted that vegetation within which detection of Striped Legless Lizard occurred was considered to constitute the EPBC Act listed threatened ecological community Natural Temperate Grassland Victorian Volcanic Plain (Biosis, 2022). Plains Grassland (EVC 132) vegetation within the

project study area was not considered to meet the condition thresholds of the community (further details, section 4.4.3) and is therefore likely to be of lower habitat value than habitat provided by Castle Cary Road.

CORANGAMITE WATER SKINK

No records of Corangamite Water Skink (*Eulamprus tympanum marnieae*) were identified via a search of the VBA within 10 km of the study area, however, the species was the subject of detailed assessment during surveys completed for the Mt Fyans Windfarm during which the species was recorded (Biosis, 2022). These records occurred outside the study area (of this assessment) in association with wetlands near the locality of Woorndoo (approximately 15km north of the study area). However suitable habitat for the species was also identified along the Salt Creek with habitat identified in the section of Salt Creek just north of Hamilton Highway and therefore in proximity to the study area. Habitat with the potential to support Corangamite Water Skink is therefore considered to occur where Salt Creek meanders through the northern portion of the study area. No other habitat for the species was however identified, with all other waterbodies in the study area considered too degraded, isolated, small in extent and / or modified to support the species.

GREY-HEADED FLYING FOX

The Grey-headed Flying Fox (*Pteropus poliocephalus*) is a wide ranging and highly mobile species that uses a range of habitats where flowering eucalyptus trees, fruit crops and urban gardens are present. A search of the VBA identified nine records of the species with the most recent recorded in 2021. The species National Recovery Plan (DWE, 2022) does not identify or define important populations of the species. The plan does however, identify nationally important camps for the species. Of these camps the camp in the Geelong Botanic Gardens is the nearest nationally significant camp and is approximately 140 kilometres east of the study area. Minor camps identified in the National Flying Fox Monitoring Viewer occur approximately 1.5 km to the west of the study area in Hexham, 41 km to the south in Warrnambool and 81 km to the east in Colac (DCCEE, 2024c). The minor camp closest to the study area in Hexham (**Figure 4**), was first identified in August 2021 with between 2,500 – 9,999 individuals occurring (DCCEE, 2024c). The number of individuals declined to between 500 -2,499 in February 2022 and is the last known monitoring undertaken for the camp (DCCEE, 2024c). Grey-headed Flying-fox have also been recorded at Salt Creek Wind Farm approximately 10 km north of the study area as part of the bat monitoring undertaken for the wind farm in 2020 (Biosis, 2020).

Suitable foraging habitat occurs within the study area in the form of large scattered paddock trees, trees within patches and large remnant trees associated with Salt Creek (**Figure 3**). When in flower, these trees are likely to provide foraging habitat which forms part of a broader foraging area.

KOALA

Whilst Koala populations in Victoria are not considered to be threatened this iconic species is often considered of local significance. A Koala was incidentally observed within a scattered paddock tree near the corner of Boonerah Estate Road and Hardy's Lane in proximity to HZ3. Whilst all Eucalyptus trees in the study area have the potential to provide habitat for Koala areas likely to be of greatest importance to the species is likely to be near where the species was observed in the study areas south-west. The species considered likely to utilise treed vegetation along Hardys Lane, Boonerah Estate Road and in

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particular the large are of contiguous and semi contiguous woodland habitat north of Thorburn's lane and east of Boonerah Estate Road.

SOUTHERN BENT-WING BAT

In addition to the above listed species impacts to bats were also identified as being subject to community concern during community consultation sessions. In addition to the Yellow-bellied Sheath-tail Bat and Grey-headed Flying-fox (discussed above) the additional species of Southern Bent-winged Bat (*Miniopterus orianae bassanii*) was identified by the desktop assessment. The species is listed as critically endangered under the EPBC Act but was assessed as having a low likelihood of occurrence.

Southern Bent-winged Bat was a species of interest during targeted surveys completed for the Mount Fyans Wind Farm (Biosis, 2017). The species is an obligate cave-dwelling bat with a restricted distribution (DELWP, 2020). No caves are located within the study area and unlike other micro-bat species it is not known to utilise hollows. The Mount Fyans assessment did not detect the species and did not identify the presence of suitable roosting sites within their study area or the surrounding locality (Biosis, 2017). However, this species was detected during targeted surveys at Salt Creek Wind Farm (Biosis, 2020). Given that this species was not detected during targeted surveys within the study area but occurs north of the study area, there is the potential to utilise the site for foraging (on an opportunistic basis) but is not considered likely to be reliant on the habitat within the study area.

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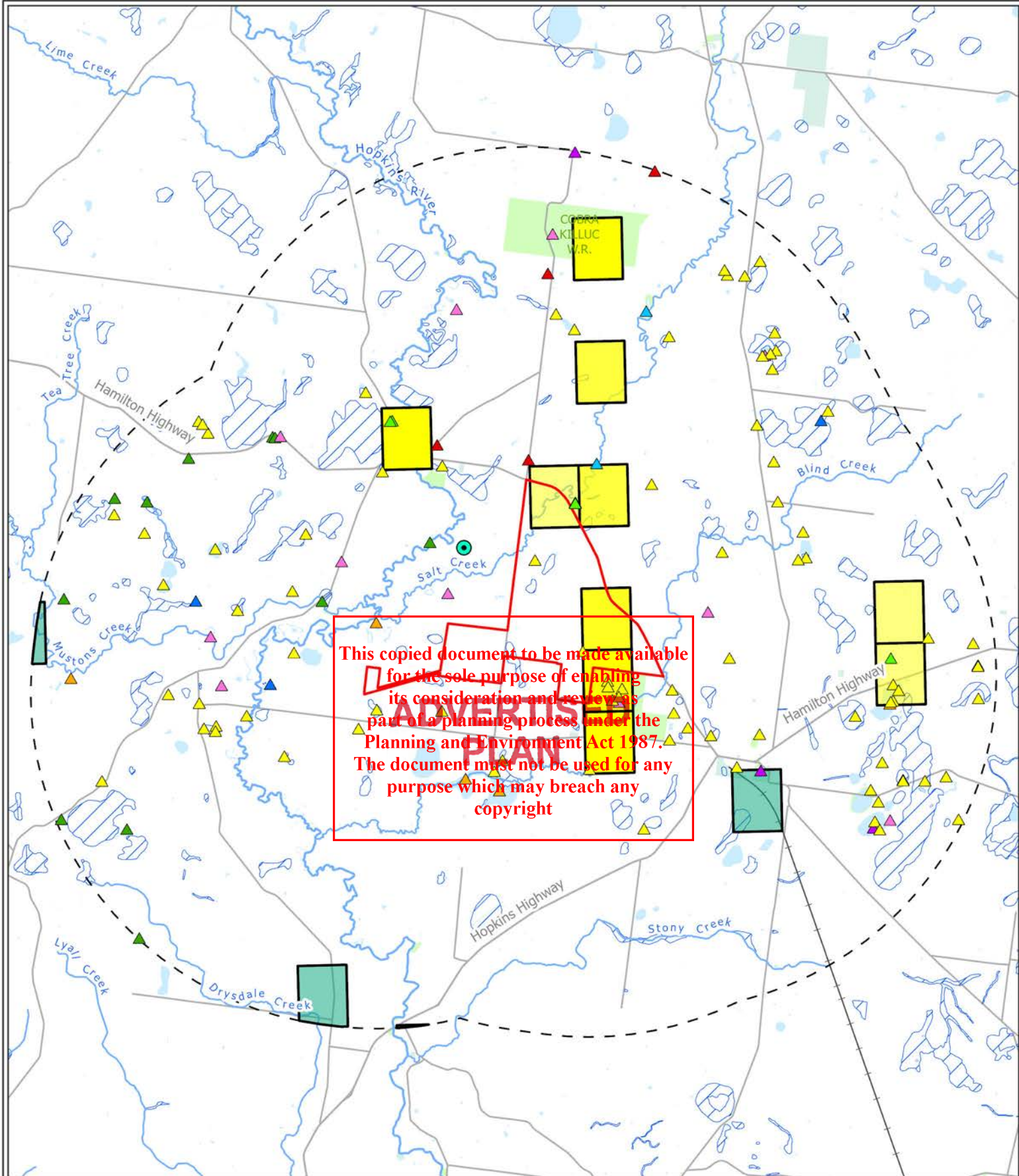
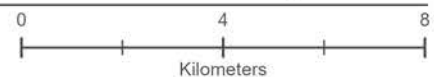


Figure 4: Threatened Fauna with a Moderate or Above Likelihood of Occurrence within 10km of the Study Area



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3.4.2 Significant Flora

No threatened flora species listed under the EPBC Act or FFG Act were recorded within the study area. However, a total of four species were identified as having a moderate likelihood of occurrence. These species are summarised in Table 9 and furthered discussed below. VBA records of flora species with a moderate or above likelihood of occurrence are shown in **Figure 5**.

Table 7: Threatened flora with a moderate or above likelihood of occurrence within the study area.

Scientific name	Common name	FFG	EPBC	Number of records	Last record
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass		VU	PMST	NA
<i>Coronidium gunnianum</i>	Pale Swamp Everlasting	CR		4	2013
<i>Dianelle amoena</i>	Matted Flax-lily	CR	EN	PMST	NA
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	CR	CE	PMST	NA

AMPHIBROMUS FLUITANS

Amphibromus fluitans (River Swamp Wallaby-grass) grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (Royal Botanic Gardens, 2024). Suitable habitat is present for this species on Salt Creek despite not being observed as part of the field assessments. However, it is noted that key threats to this species include grazing and trampling by livestock, hydrological changes and invasion of remnant habitats by exotic grasses and weeds (DEWHA 2008). The section of Salt Creek within the study area is subject to all of these threats which may reduce the suitability of habitat for this species. Given the avoidance of Salt Creek as part of detailed design and targeted surveys to determine presence were not undertaken. The species is considered to have moderate likelihood of occurrence in proximity to Salt Creek but is not likely to occur elsewhere in the study area. No records of the species occur within 10 km of the study area.

CORONIDIUM GUNNIANUM

Coronidium gunnianum (Pale Swamp Everlasting) occurs at low elevations (under c. 100 m) in grasslands and riverine *E. camaldulensis* woodland on soils that are prone to inundation (Royal Botanic Gardens, 2024). This species has been recorded in Mortlake Common to the south of the study area in 2013 (VBA, 2024) and a further three records occur within 10 km of the study area. Low to moderate quality habitat for this species occurs in patches of Plains Grassy Wetland (EVC 125) and when areas supporting the EVC become inundated, this species may occur.

DIANELLA AMOENA

Dianella amoena (Matted Flax-lily) is found in association with lowland grasslands, grassy woodlands, valley grassy forest and creeklines of herb-rich woodland (Royal Botanic Gardens, 2024). The species occurs on well drained to seasonally wet fertile sandy loams to heavy cracking clays derived from Silurian or Tertiary sediments, or from volcanic geology (Royal Botanic Gardens, 2024). Plains Grassland in the north is highly degraded, however, this species has the potential to occur within degraded Plains Grassland on Hamilton Highway. No records of the species occur within 10 km of the study area.

PIMELEA SPINESCENS SUBSP. SPINESCENS

Pimelea spinescens subsp. *spinescens* (Spiny Rice-flower) grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Plants from more northerly populations occur on red clay complexes, while plants from southern populations occur on heavy grey-black clay loams (Royal Botanic Gardens, 2024). Topography is generally flat but populations may occur on slight rises or in slightly wettish depressions. Vegetation is often dominated by *Themeda triandra*, with *Austrostipa* spp. or *Rytidosperma* spp. co-dominant (Royal Botanic Gardens, 2024). Plains Grassland in the north is highly degraded, however, this species has been recorded on Castle-Carey Road to the west of the study area (Biosis, 2017). Therefore, this species has the potential to occur within degraded Plains Grassland on Hamilton Highway. No records of the species occur within 10 km of the study area.

GLYCINE LATROBEANA

In addition to the above listed flora species *Glycine latrobeana* (Clover Glycine) was also subject to detailed consideration as part of the field assessment. A total of 10 records of the species occur within 10 km of the study area, the most recent of which dates back to 1998. The majority of these records are associated with Cobra Killuc Wildlife Reserve which is located approximately 7 km north of the study area boundary. This species was initially considered to have a moderate likelihood of occurrence during preliminary assessments was downgraded to low following the completion of the field survey. The highly degraded and modified nature of remnant grassland and grassy woodland which the species is typically associated limiting species likelihood. All such vegetation mapped within the study area is highly modified by agricultural land use. Intensive grazing is identified as a major threat to the species in its National Recovery Plan (Carter & Sutter, 2010).

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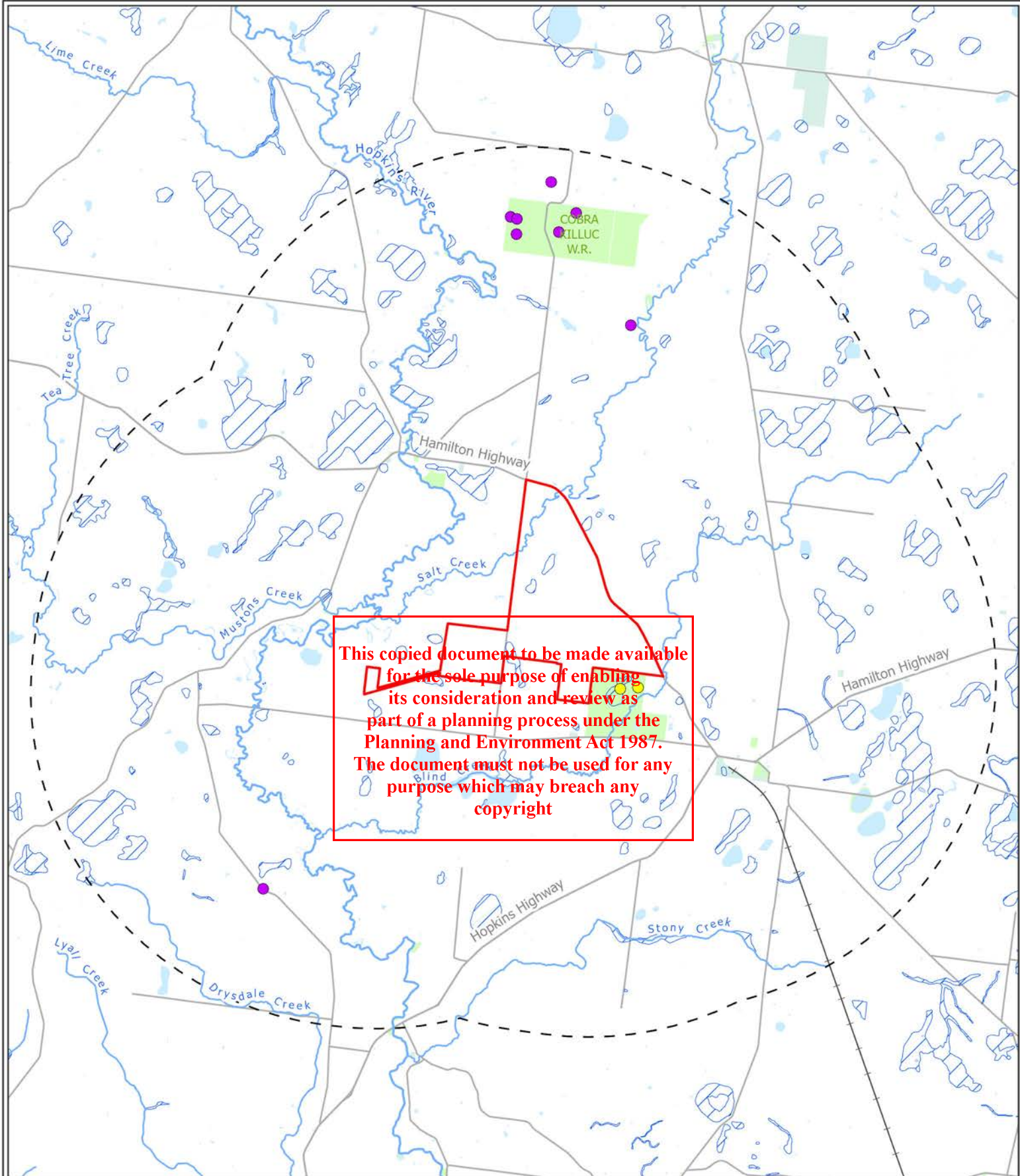


Figure 5: Threatened Flora with a Moderate or Above Likelihood of Occurrence within 10km of the Study Area

- Study Area**
- Study Area
 - 10km buffer on Study Area
- Threatened flora:**
- *Coronidium gunnianum*
 - *Glycine latrobeana*

0 4 8
Kilometers

Datum/Projection:
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3.4.3 Threatened ecological communities

The desktop review identified the following threatened communities with a natural or modelled distribution covering the project area:

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain (EPBC Act).
- Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act).
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (EPBC Act).
- Natural Temperate Grassland of the Victorian Volcanic Plain ecological community (EPBC Act).
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act).
- Western (Basalt) Plains Grassland Community (FFG Act).

Patches of Plains Grassy Wetland (EVC 56; HZ13 and HZ21) were assessed against the criteria for both the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (EPBC Act) community and the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community (EPBC Act), noting that the latter has been previously identified within the DEECA mapped wetland and by Biosis as part of the Mount Fyans Wind Farm; flora and fauna existing conditions assessment (2022).

At the time of the ELA assessment in early December 2023, Rush *Juncus* sp. was noted to be the dominant ground cover species, with a low cover of Brown Backed Wallaby Grass *Rytidosperma duttonianum* and Common Blown Grass *Lachnagrostis filiformis*. While both grass species form part of the Seasonal Herbaceous Wetlands community, patches are excluded if taller native graminoids i.e. *Juncus* sp. occur (DSEWPC 2012). The former, these patches do not meet the listing criteria for the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (EPBC Act) community at this time.

Since the assessment was undertaken by Biosis, which may have been as early as 2013 (Biosis, 2022), it is possible that grazing and other climactic conditions have altered the composition of these two patches, reducing native graminoid cover which may have been present at the time of their assessment, resulting in the patch previously qualifying as Natural Temperate Grassland of the Victorian Volcanic Plain. At the time of our assessment, native grasses including Wallaby, Spear, Tussock or Kangaroo Grass which characterise this community were not the dominant species recorded. Of these, only *Rytidosperma duttonianum* was recorded in low cover with *Juncus* sp. and *Lachnagrostis filiformis* the most dominant native species. Therefore, at the time of this assessment, patches of Plains Grassy Wetland do not qualify as the Natural Temperate Grassland of the Victorian Volcanic Plain EPBC Act community.

The patch of Plains Grassland (EVC 132) recorded along Hamilton Highway (HZ19) is also not considered to meet the condition thresholds for Natural Temperate Grassland of the Victorian Volcanic Plain. Cover of perennial native grasses within this patch was less than 50%, native forb cover was absent. The area was also assessed as likely to have a cover non grass weeds in excess of 30%, with the patch containing a high cover of Ribwort Plantain (*Plantago lanceolata*).

Whilst Plains Grassy Woodland (EVC 55) is considered synonymous with the EPBC Act Threatened Ecological Community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* and the FFG Act *Western Basalt Plains (River Red Gum) Grassy Eucalypt Woodland* vegetation present is not considered

to be representative either of these communities. For the EPBC Act Threatened Ecological Community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* vegetation is not considered to meet the condition thresholds for the community. Native grass sparse and not accounting for 50% of the perennial ground layer cover, wildflowers absent and perennial weed species accounting for greater than 70% of the ground layer vegetation. Furthermore, whilst there was noted to be a high prevalence of large trees the diversity of perennial native species was poor (less than 10 species per 100 m²).

In relation to the FFG Act *Western Basalt Plains (River Red Gum) Grassy Eucalypt Woodland* no specific condition thresholds exist. However, a key characteristic of the community is a ground layer dominated by native grassland species with a diversity of forbs. All patches of Plains Grassy Woodland (EVC 55) within the study area were identified to have highly degraded understorey values with native grass cover sparse to absent and never accounting for more than 20% cover of the perennial understorey.

No vegetation consistent with Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act) or White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act) was mapped by the assessment.

3.4.4 Hollow bearing trees

A total of 170 trees were assessed for the presence of hollows as part of the detailed field assessment. Of those, 103 trees were hollow bearing. This equates to 60% of remnant trees containing tree hollows.

A further 426 trees were identified within the study area as part of the constraints assessment for which tree hollow data was not collected. However, based on the ratio of hollow bearing trees collected as part of the detailed assessment, it is estimated that approximately 256 of these trees would be anticipated to contain hollows. On this basis an estimated total of 359 hollow bearing trees occur within the study area.

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3.4.5 Weeds

The field assessment identified the presence of five noxious weed species as listed under the CaLP Act within the study area. These species along with their status in the Glenelg Hopkins Catchment Management Authority are summarised in Table 10.

Table 10. Weeds

Common Name	Scientific name	CaLP status
African Box-thorn	<i>Lycium ferocissimum</i>	Controlled
Hawthorn	<i>Crataegus monogyna</i>	Restricted
Spear Thistle	<i>Cirsium vulgare</i>	Restricted
Scotch Thistle	<i>Onopordum acanthium</i>	Controlled
Variegated Thistle	<i>Silybum marianum</i>	Restricted

In addition to those species listed under the CaLP Act a further four high risk weeds as identified by the *Advisory list of Environmental Weeds in Victoria* (White *et al.* 2022) were also recorded in varying densities including *Dactylis glomerata* (Cocksfoot), *Hordeum* spp. (Barley) *Holcus lanatus* (Yorkshire Fog), and *Phalaris aquatica* (Canary Toowoomba Grass).

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4. Project impacts

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4.1 Project description

The proposed Mortlake Solar Farm (the project) is a renewable energy project that 360MW solar energy facility and a utility installation (300MW BESS facility) including solar panel arrays across 1060 hectares, substation, 300 MW BESS, 500 kV transmission line traversing the site, and associated solar farm infrastructure. The project is located approximately 8 km north-west of Mortlake adjacent to Hamilton Highway.

Transmission lines will consist of an underground cable between sites A and B and to the BESS (**Appendix E**). The cable will be Horizontal Direct Drilled (HDD) to a minimum depth of 600 mm to avoid impacts to tree protection and structural root zones in accordance with the Australian Tree Standards (AS 4970-2009).

The location of project impacts is overlaid with the location of mapped ecological impacts in **Figure 3**. All access to the solar farm during construction and operation is proposed to occur via existing farm access points off Hamilton Highway and Boonerah Estate Road (**Appendix E**)

4.2 Avoid and minimisation

Through and iterative detailed design process the project has worked to avoid and minimize impacts to ecological values as identified by the desktop assessment, constraint field surveys. These avoid and minimisation measures were first informed by the findings of the initial constraints assessment and then again by the findings of the detailed vegetation assessment and targeted surveys / assessment. Avoid and minimise measures are summarised by significant ecological value below.

4.2.1 Native vegetation

Revisions in project design have led to the following avoidance a minimisation of impacts to native vegetation:

- Avoidance of floodplain Riparian Woodland (EVC 56) vegetation is association with Salt Creek. Works buffered from the creek corridor by minimum of 1.3 km.
- Avoidance of Plains Grassland (EVC 132) vegetation located along Hamilton Highway, with no infrastructure to be built in the north portion of the study area and access to be achieved by existing roads, tracks and farm access points.
- Avoidance of Plains Grassy Wetland (EVC 125) vegetation associated with HZ 13 and HZ21 (mapped Wetland 28276).
- Avoidance of Plains Grassy Woodland (EVC 55) vegetation and associated scattered trees within the south west of the study area. This includes no installation of photovoltaic panels in the area of woodland north of north of Thorburn's lane and east of Boonerah Estate Road and the retention of scattered trees and patches of native vegetation where feasibly possible along Hardy's Lane, Boonerah Estate Road within the paddock to the south and west.
- Avoidance of EVC 55 vegetation in road reserves via the utilisation of existing driveways and access gates during project construction and operation.
- Minimisation, through the use of an underground transmission cable to connect photovoltaic panels to be constructed in the east of the study area to the west and then to from the west to

connect with the Mortlake Power Station. This will minimise impacts to the area of woodland north of north of Thorburn's lane and east of Boonerah Estate Road with HDD to be used to avoid and minimise impacts to TPZ's.

Combined these measures will avoid 37.695 ha of remnant vegetation patch and 557 scattered trees.

4.2.2 Significant fauna

Revisions in project design have led to the following avoidance a minimisation of impacts to significant fauna species:

- Avoidance of Salt Creek and its associated floodplain. This will avoid impacts to potential habitat for Growling Grass Frog, Latham's Snipe, Little/Dwarf Galaxias, Corangamite Water Skink, Hairy Burrowing Crayfish and Eastern Great Egret.
- Avoidance of Plains Grassy Wetland (EVC 125) which is considered to be provide potential habitat for Hairy Burrowing Crayfish.
- Avoidance of grassland habitat along Hamilton Highway with the potential to support Striped Legless Lizard and Tussock Skink.
- Avoidance and or minimisation of impacts to woodland habitat which may support Grey-headed Flying Fox, Little Eagle and Yellow-bellied Sheathtail Bat through the measures to avoid and minimise impacts to Plains Grassy Woodland vegetation (EVC 55). Koala (regionally significant) is also known to occur within this habitat.

4.2.3 Significant flora

Revisions in project design have led to the following avoidance a minimisation of impacts to significant flora species:

- Avoidance of project footprint proximity to Salt Creek. This will avoid impacts to potential habitat for *A. flutitans* and *C. gunniamum*.
- Avoidance of grassland habitat along Hamilton Highway. This will avoid impacts to potential habitat for *D. ameona* and *P. spinescens* var. *spinescens*.

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4.3 Direct impacts

4.3.1 Native vegetation

Based on the project design and construction method, the project will result in the removal of **1.436 ha** of native vegetation and includes the following (**Figure 3**):

- 0.077 ha of Plains Grassy Woodland across two patches (HZ1, HZ2, HZ24 and HZ25).
- 20 large trees (1 large tree in a patch and 19 scattered trees).
- 1 small scattered trees.

Impacts to native vegetation have been determined based on the *Guidelines for the removal, destruction or lopping of native vegetation*.

Table 6 provides a summary of habitat zones within the project footprint and **Table 7** provides a summary of scattered trees. Detailed VQA information for vegetation within the project footprint is presented in **Appendix F**. All habitat zones that fall within the project footprint are comprised of patches

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of three canopy trees (with touching canopies) above an exotic understorey dominated by exotic pasture species. Only HZ2 contains a large tree.

Table 8: Patches within the project footprint

Zone ID	EVC	No. large trees	VQA score	Area (ha)
HZ1	Plains Grassy Woodland (55)	0	11	0.023
HZ2	Plains Grassy Woodland (55)	1	20	0.018
HZ24	Plains Grassy Woodland (55)	0	11	0.014
HZ25	Plains Grassy Woodland (55)	0	11	0.002

Table 9: Trees recorded within the project footprint

Type	Size	Species	Count
Scattered	Large	River Red Gum <i>Eucalyptus camaldulensis</i>	19
	Small	River Red Gum <i>Eucalyptus camaldulensis</i>	1

4.3.2 Loss of hollow bearing trees

The project will result in the loss of 14 hollow bearing trees out of the approximate 359, present within the study area. These trees will primarily be lost in association to project impacts occurring the south west corner of the study area. Retention of hollow bearing trees within the study area near Hardys Lane and Boonerah Estate Road has been considered to retain connectivity within the landscape. Due to the size and age class of remnant trees within the study area, majority contains tree hollows and avoidance of all hollow bearing trees was not possible. Hollow bearing trees which are proposed to be impacted are scattered within the south-west corner of the study area and where a suitable cavity occurs, would only be anticipated to be utilised by highly mobile fauna, most likely common bird and bat species.

4.3.3 Significant fauna

The project will result in the loss of 0.077 ha of native vegetation plus 20 large and 1 small remnant trees from within the study area. These areas may provide habitat for the EPBC Act listed Grey-headed Flying Fox and the FFG Act listed Yellow-bellied Sheath-tail Bat and Little Eagle.

A significant impact assessment has been undertaken in accordance with the EPBC Act significant impact guidelines for Grey-headed Flying Fox and is provided in **Appendix G**. No significant impact is likely for Grey-headed Flying Fox based on the significant impact assessment. This is largely due to the avoidance of high-quality habitat within the study area and the removal of a small area of habitat which is unlikely to be critical to the survival of this species (**Appendix G**).

Furthermore, this habitat may also support the Koala, a species of local significance. As per section 5.2.2 Koala was observed during the field survey and is likely to primarily utilise treed vegetation along Hardys Lane, Boonerah Estate Road and in particular the large area of contiguous and semi contiguous woodland habitat north of Thorburn's lane and east of Boonerah Estate Road which will not be impacted by the project. The species is less likely to utilise vegetation to be impacted by the project which primarily consists of isolated trees within grazed paddocks, however occasional use of such trees is considered possible.

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4.3.4 Significant flora

No significant flora species or floristic communities were identified as part of the assessment. Due to the avoidance of areas which may provide suitable habitat for threatened flora species including Salt Creek and remnant degraded Plains Grassland (EVC 132, HZ19), no impacts to threatened flora are anticipated.

4.4 Indirect impacts

Potential indirect mechanisms of impact associated with the project include:

- Noise and light pollution immediate adjacent to nesting and roosting habitat, which may adversely impact the natural behaviour of associated species and reproductive cycles and success. Works will occur within proximity to two Brolga breeding wetlands. In relation to Mortlake Common works will be offset from the boundary of the study area and the boundary of the Mortlake Flora Reserve by 160 meters based on current design plans. The northern extent of the wetland is approximately 200 meters south of the reserve boundary. Project works will also occur within proximity to wetland ID 28264 however, works at this location are to be restricted to an underground transmission cable and will occur at a distance of approximately 600 meters from the wetland. Works will also occur in proximity to a minor camp (Hexham) of Grey-headed Flying Fox. This camp is located within 1.5 km of the project footprint.
- Changes to hydrology during and following construction of the solar farm also have the potential to indirectly impact ecological values within and adjoining the study area. As part of a separate study ELA were engaged to assess potential flood impacts associated with existing conditions under AEP flood events (ELA, 2024). This assessment concluded that, in general, flows within the study area are concentrated to waterways and defined overland flow paths in the region with sufficient terrain relief to limit the amount of sheet flow. Flow within the study area largely confined to the banks and flood plains of the primary features of Salt Creek (and an associated unnamed tributary) and Blind Creek. Given that impervious surfaces associated with the design would account for less than 0.1% of the overall catchment the study considered that it would not affect the outcomes of hydraulic modelling nor impact existing condition overland flow regimes. A proviso to this been that maintenance of buffers around Salt Creek and Mortlake common. As per section 4.3.3 these buffers have been maintained by the project design (**Appendix E**). On that basis no material impacts to native vegetation to be retained and associated flora and fauna habitat are anticipated as a result in changes to study area horology.
- An increase in traffic in the immediate area including haul trucks which may result in an increase of fauna mortality due to motor vehicle collision with wildlife.
- Impacts to water quality within waterways and waterbodies associated within ground disturbance and sediment run off.

Whilst these mechanisms of indirect impact have been identified it is important to consider these impacts in the context of existing land uses within and abutting the study area. These include:

- Existing agricultural activities.
- Timber production / harvesting.
- Existing works associated with the Mortlake Power station.
- The presence of an existing major road (Hamilton Highway) along the study areas eastern boundary.

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It is therefore considered that indirect impacts associated by the project can be addressed by mitigation measures to be implemented during project construction. Mitigation measures are recommended in Section 6.

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5. Legislative implications

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

The EPBC Act is Commonwealth legislation that protects MNES. Where a development or activity has the potential to have a significant impact on a MNES, a referral is made to the DCCEEW. An action must be referred if it 'has, will have or is likely to have a significant impact' on a MNES. DCCEEW provides guidelines on assessing whether a proposed action is likely to have a significant impact on an MNES and whether a referral is likely to be required. The Minister or delegate determines whether the activity can proceed with no further assessment by the Commonwealth, or whether it will be a controlled action for which assessment is required.

Implications

Habitat for the following EPBC Act listed species was identified within the study area:

- *D. amoena*.
- *P. spinescens* var. *spinescens*.
- Growling Grass Frog.
- Latham's Snipe.
- Little Galaxias / Dwarf galaxias.
- Striped Legless Lizard.
- Corangamite Water Skink.
- Grey-headed Flying Fox.

With the exception of Grey-headed Flying Fox identified habitat for these species has been avoided by the project footprint. Therefore, impacts to these species are considered unlikely and assessment against species specific significant impact guidelines is not considered to be warranted.

For Grey-headed Flying Fox project impacts will result in the loss of a small number of foraging trees within proximity to a known minor camp of the species. These trees, all River Red Gums may provide occasional foraging habitat (when in flower) but the species is unlikely to be reliant on this habitat. To account for natural variance of food resources (flowering periods) the species forages over a broad area with individuals known to fly as far as 40 km to feed before return to a camp that same night (DAWE, 2021). Given the small extent of vegetation losses in the context of the study area and broader landscape the direct project impacts are unlikely to have a significant impact on the species. Furthermore, indirect impacts associated with noise and light are not considered likely to impact on the species. Camps, many of which are Nationally important known proximity to large cities and towns and therefore subject to prolonged exposure to noise and light disturbance that far exceed that likely to be encountered during construction and operation of the solar farm. Formal assessment of project impacts against the species significant impact criteria is presented in **Appendix G**.

The project is not considered to require referral to the minister under the EPBC Act.

5.2 Environmental Effects Act

The *Environment Effects Act 1978* (EE Act) requires the preparation of an EES for activities considered to have, or to be capable of having, a significant effect on the environment. Triggers for an EES are set out as referral criteria in the *Ministerial Guidelines for Assessment of Environmental Effects under the EE Act* (DTP, 2023).

Implications

Project impacts are assessed against EES criteria in Table 12 below.

Table 12. Environmental effects assessment criteria

Criteria type	Criteria met
individual referral criteria	Potential removal, destruction or lopping of 10 hectares or more of native vegetation, that consists of, or comprises a combination of: – an ecological vegetation class (EVC) classified as endangered; or – an EVC that is classified as vulnerable (with a condition score of 0.5 or more) or rare (with a condition score of 0.6 or more); and – that is not authorised for removal under an approved forest management plan or fire protection plan No The project will result in the loss of 1.436 ha of native vegetation. Of this vegetation 1.436 ha is considered to belong to an endangered EVC.
Potential clearing of an area determined as 'critical habitat' under the <i>Flora and Fauna Guarantee Act 1988</i>	No Critical habitat has yet to be defined by the FFG Act. Regardless given the modified and disturbed nature of the study area and avoidance and minimisation by the project
Potential for loss of a significant proportion (10 percent or greater) of known remaining population of a threatened species within Victoria.	Two species listed under the FFG Act may be impacted by the project. These species are Yellow-bellied Sheathtail Bat and Little Eagle. Provided vegetation clearance activities associated with the project avoid spring summer when Little Eagle has the potential to be breeding and Yellow-Bellied Sheathtail Bat has the potential to be present impacts to these species are anticipated to be minor. Given the small magnitude of project impacts it is likely to have a negligible impact on overall species habitat (if the species is present).
Potential for long-term change to the ecological character of a wetland listed under the Ramsar Convention or in A Directory of Important Wetlands in Australia.	No, No Ramsar sites occur within 10 km of the study area.
Combined referral criteria	Potential removal, destruction or lopping of 10 hectares or more of native vegetation, unless it is authorised for removal under an approved forest management plan² or fire protection plan. No, see response above.
Matters listed under the <i>Flora and Fauna Guarantee Act 1988</i> : – potential loss of a significant area of a listed ecological community; or – potential loss of a	No

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Criteria type	Criteria met
genetically important population of an endangered or threatened species (listed or nominated for listing), including from loss or fragmentation of habitats; or – potentially significant effects on habitat values of a wetland supporting migratory bird species.	
Matters listed under the <i>Flora and Fauna Guarantee Act 1988</i> : – 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 from loss or fragmentation of habitats; or – potentially significant effects on habitat values of a wetland supporting migratory bird species.	No

Based on an assessment against referral criteria the project does not require further assessment under the EE Act.

5.3 Planning and Environment Act 1987

The P&E Act governs the use, development, and protection of land in Victoria. The Act provides an integrated framework for planning policies and considerations across local, regional and state levels of governance and land use. These are incorporated through the Victorian Planning Provisions (VPP) and enacted under the municipal planning scheme through legal instruments such as planning permits and precinct plans.

5.3.1 Victorian native vegetation removal regulations

The Victorian Native Vegetation Removal regulations are designed to protect Victoria’s biodiversity from uncontrolled clearing. Under Clause 52.17 of the VPP, a permit is required to remove, destroy or lop native vegetation on sites greater than 0.4 hectares; unless an exemption applies, or the work is undertaken in accordance with a Precinct Structure Plan (PSP) as set out under Clause 52.16 of the VPP.

The process for determining impacts when native vegetation is removed is set out under the *Guidelines for the removal, destruction or lopping of native vegetation* (the ‘Guidelines’). They apply a risk-based approach using the extent, quality and landscape scale importance of vegetation to determine its significance and therefore the assessment pathway under which the application must be considered and associated approval conditions. Risk based assessment pathways are summarised in Table 13.

Table 13. Assessment pathways

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed

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Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
0.5 hectares or more	Detailed	Detailed	Detailed

In addition to the regulation of native vegetation removal under Clause 52.16 or 52.17, the Planning and Environment Act also regulates impacts to biodiversity via planning zones, overlays, and local laws.

Implications

Impacts to native vegetation have been determined based on the *Guidelines* (DEECA, 2017). This includes consideration of the three-step approach (avoid, minimise and offset) to ensure the removal of native vegetation achieves a no net loss to biodiversity.

The extent of vegetation removal has been mapped to include both direct removal of vegetation and consequential impacts to trees outside the project footprint based on encroachment of more than 10% of the associated TPZs. Native vegetation offset requirements have been assessed using Native Vegetation Removal tools provided by DEECA (**Appendix H**)

A total of 37.772 ha of native vegetation patches and 578 (557 large and 21 small) scattered trees were identified in the study area. Of this vegetation the project will impact upon 1.436 ha of native vegetation including 0.077 ha of native vegetation patches and 21 trees (20 large and 1 small). The planning application will fall under the Detailed Assessment Pathway and require an offset of **0.292 general habitat units** to compensate for the loss. This offset must:

- Be located within the Glenelg Hopkins Catchment Management Authority (CMA) or Moyne Shire Council.
- Have a minimum strategic biodiversity score of 0.305, and 20 large trees.

For further details, see the response to the applicant's requirements and Native Vegetation Removal report in **Appendix H**.

Prior to works commencing, a planning permit will be required for the removal of native vegetation under Clause 52.17 of the Victorian planning scheme. The application must be lodge with the Minister for Planning, who is the responsible authority for a Renewable energy facility with an installed capacity of 1MW or greater, via DELWP in accordance with the *Solar Energy Facilities - Design and Development Guideline* (DELWP, 2019).

5.3.2 Planning Overlays

Planning Overlays are a mechanism of the VPP applied over areas of land to control and guide their development. The overlays typically include schedules which specify the overlays objectives and requirements within a given planning scheme. Depending on the schedule these overlays can be general or specific in nature. Three types of overlay are considered to be of specific relevance to the assessment of ecological impacts. These are, Environmental Significance Overlays (ESOs), Vegetation Protection Overlays (VPO's) and Significant Landscape Overlays (SLO's).

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Unless an exemption applies, any permit application to remove native vegetation within an area which is subject to one or more of these overlays must show consideration of the intent and requirements of those overlays.

Implications

A small portion of the study area and proposed project footprint are within an area subject ESO3 of the Moyne Shire Planning Scheme. This location of this ESO coincides with a *Eucalyptus globulus* plantation.

The statement of environmental significance of the ESO relates to the presence of the Mortlake (gas fired) Power Station and associated generated noise. The objective of the ESO is to ensure the potential noise impact are considered in any decision regarding accommodation land use and development.

Given the nature of the project in the context of the ESO objectives no permit implications in accordance with the ESO are anticipated.

5.4 Flora and Fauna Guarantee Act 1988

The FFG Act regulates the protection and management of biodiversity including the conservation of threatened species and communities and the management of threatening processes. Permits are required to take, remove, or disturb listed and/or protected flora species, listed communities and fish on public land. Listed fauna species are also protected under controls contained in the *Wildlife Management Act 1975*.

Implications

Two threatened fauna species listed under the FFG Act are considered to have potential to be impacted by the project. These species are Little Eagle and Yellow-Bellied Sheath-tail Bat. Provided vegetation clearance activities associated with the project avoid spring/summer when Little Eagle has the potential to be breeding and Yellow-Bellied Sheath-tail Bat has the potential to be present impacts to these species are anticipated to be minor. Little Eagle is likely to be able to flee the area. No permits are required under the FFG Act for impacts to threatened fauna. Consideration should however be given to requirements under the Wildlife Act and species-specific offset requirements in accordance with the guidelines.

No threatened flora or fauna species, communities or protected flora were identified by the field survey. Therefore, no permit implications are anticipated under the FFG Act.

The project is considered as having the potential to exacerbate one threatening process listed under the Act. The project has avoided the vast majority of hollow bearing trees in the study area and trees to be impacted are typically isolated within cleared paddocks. A total of 14 hollow bearing trees are to be impacted by the project out of the approximate 359 present within the study area.

5.5 Wildlife Act 1975

The Wildlife Act protects and manages wildlife (fauna) in Victoria. The purpose of the act is to provide procedures for the protection and conservation of wildlife, the prevention of wildlife extinction, sustainable use and access to wildlife, and prohibit and regulate interactions with wildlife.

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The Wildlife Act regulates interactions with wildlife including both native and non-native terrestrial species, and is the main legislation determining licensing relating to wildlife along the FFG Act for threatened and protected taxa.

The Wildlife Regulations 2013 provides for changes in licensing for the possession, use and trade of wildlife and further instruments for protecting wildlife under Part 2 – Protection of Wildlife including that a ‘Person not to damage, disturb or destroy any wildlife habitat’ under Section 42 of the regulations.

If trees are felled, fauna monitoring and salvage of hollow-dependent fauna or nesting birds may be required by the responsible authority. This work should be undertaken by a suitably qualified ecologist/zoologist with appropriate permits under the Wildlife Act and FFG Act

Implications

Native vegetation to be impacted by the project and in particular woodland vegetation and scattered trees are considered likely to support a diversity of fauna species including Koala (regionally significant) which was observed during the field survey. Where required clearance of this vegetation should be done in a staged manner to encourage fauna to flee the area into areas of contiguous and or connected vegetation to be retained of their own accord. It is also recommended that vegetation clearance works be undertaken outside of spring summer when faunal activity is typically highest and resident fauna is most likely to be breeding.

Although translocation of wildlife is typically not supported by DEECA, salvage and relocation to adjacent habitat may be required. Expectations around faunal salvage should be discussed with the Moyne Shire and as appropriate the regional DEECA office prior to works commencing.

5.6 Catchment and Land Protection Act 1994

The CaLP Act is the main legislative instrument for preventing land degradation and defining catchment planning and land management responsibilities.

The act has provisions for pest animals and noxious weeds and sets out requirements for landowners (including the Crown) in relation to these matters and land management practices. Under the Act, landowners have responsibilities set out for different categories of weeds which are listed by species in a ‘declared list of noxious weeds’. These categories include State Prohibited Weeds, Regionally Prohibited Weeds, Regionally Controlled Weeds, and Restricted Weeds.

Landowners have responsibility to take all reasonable steps to control and prevent the spread and growth of Regional Controlled noxious weed species on their land and roadsides which adjoin their land. Appropriate weed control measures should be incorporated into the Construction Environmental Management Plan (CEMP) for any proposed works within the study area.

A permit from Agriculture Victoria is required to remove soil, sand, gravel, or stone that contains or is likely to contain a noxious weed or that comes from land on which noxious weeds grow. A permit is also required to deposit on land a noxious weed or the seeds of noxious weeds that are capable of germinating.

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Implications

Five weeds listed under the CaLP Act were recorded during the field survey. During construction and operation the project will be required to implement measures to prevent the introduction and spread of CaLP Act listed weeds. These measures should be detailed in a Construction Environment Management Plan and the subject of project inductions.

Works are not understood to involve the removal or import of soil. However, should this change the need for a permit from Agriculture Victoria should be reviewed.

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6. Next steps

Prior to works commencing, a planning permit will be required for the removal of native vegetation under Clause 52.17 of the Victorian planning scheme. The application must be lodged with the Minister for Planning, who is the responsible authority for a Renewable energy facility with an installed capacity of 1MW or greater, via DEECA in accordance with the *Solar Energy Facilities - Design and Development Guideline* (DELWP, 2019). The permit application will need to show consideration of Victoria's Native Vegetation Removal Regulations, including the requirement to avoid and minimise impacts, and secure an offset of **0.292 general habitat units and 20 large trees**. The application will fall under the '**detailed assessment pathway**' under the regulations.

In addition, the following approvals may be required:

- Requirement for pre-clearance surveys for fauna and supervision of vegetation clearing by a suitably qualified ecologist. Trees proposed for removal contain tree hollows and may support common fauna which require relocating. Any relocation plans should be included in the construction environment management plan.
- Arborist assessment of trees along underground cable route and alternative internal road in site B where applicable to determine if any impacts to remnant trees are proposed based on HDD and / ground compaction (**Appendix E**).

Recommended management measures which should be implemented are listed below. Where relevant, these measures should be incorporated into the CEMP and/or operational Environmental Management Framework (EMF) to be developed for the project.

- Briefing of construction and operational personnel of ecological values within the project area and its surrounds.
- Establishing temporary fencing and permanent fencing (where appropriate) around native trees and habitat zones and associated threatened species habitat to be retained based on their associated tree protection zones. Fencing must be of a good standard to ensure all vehicles, equipment and materials (including stockpiles) are excluded from the area. Fencing to be signed "No-Go Zone".
- Pre-construction site assessment to confirm that vegetation, habitat and trees to be retained have been adequately protected from impact.
- Undertake pre-clearing inspections to confirm the on-site location of fauna immediately prior to habitat removal. This is to be followed by the salvage and translocation of fauna by a suitably qualified zoologist or wildlife handler if required.
- Where suitable, salvage tree hollows of hollow bearing trees to be lost. Where possible introduce habitat into areas to be retained. Salvaged hollows could be attached to trees to mitigate impacts to arboreal fauna or birds, or placed in the understorey to provide habitat for ground dwelling fauna.
- Removal of large native trees that support fauna habitat should be undertaken between February and September to avoid the breeding season for the majority of fauna species.
- Managing native fauna that may be displaced due to habitat removal, in compliance with the *Wildlife Act 1975* and in consultation with public land managers where relevant.

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- Limit noise disturbance in proximity to the minor Grey-headed Flying Fox Camp. Where possible time loud construction events outside of the period of October to December when the majority of Grey-headed Flying Fox births occur (DAWE, 2021).
- Limit noise disturbance in proximity to Mortlake Common if Brolga is present during the species breeding season which is typically considered to be winter to spring (July to November) (DSE, 2003).
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Authority guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands.
- Implementation of appropriate measures to manage the risk of the spread and introduction of pest animals, weeds and pathogens during construction.
- Implementation of traffic management inclusive of reduced speed limits during construction to reduce the risk animal strike. In particular this measure should be considered on Hardys Lane, Boonerah Estate Road and Thorburn's Lane to reduce potential impacts to resident fauna species such as Koala.
- Daily inspections of open trenches or pits for trapped animals, such as reptiles and small-ground dwelling mammals.
- Incidental finds procedure (stop work and response) for fauna known to occur within proximity to the project footprint. This should include measures specific to the species of Brolga and Growling Grass Frog, which are known to occur in Mortlake Common and may be intermittently and opportunistically present within and abutting the project footprint during the project's construction and operation.
- Night lighting be restricted to the minimum amount required to safely operate the site to minimise light pollution and adverse effects to nocturnal species such as bats. This will include using:
 - light shields to direct light and reduce light spill.
 - low beam vehicle lights except where safety is compromised.
 - Undertaking construction during daylight hours.

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Appendix A Likelihood of threatened species

A1 Terms

Likelihood of occurrence	FFG Act	EPBC Act	Protected Matters Search Tool
Present: The species/ecological community was recorded by ELA or by a recent assessment in the study area. High: The flora species/ecological community was identified to have been recently recorded (~10 years) by the desktop assessment and suitable high quality species habitat exists or could exist in the study area following detailed ecological studies. For fauna, species recent records were identified by the desktop assessment, the study area is within the species known range and is likely to support a population of the species, or the species may be reliant on its habitat. Moderate: The species/community predicted distribution includes the study area but the desktop assessment did not identify records of the species and the study area is unlikely (or is not considered) to support species habitat. For fauna, the species historical records were identified by the desktop assessment and the species may regularly visit the study area. Further assessment to determine the extent and nature of their habitat use is likely to be required. Low: The flora species/ecological community was not identified to have been recently recorded by the desktop assessment and/or suitable species habitat does not exist in or adjacent to the study area. For fauna, the species recent or historical records were identified by the desktop assessment, however the species may fly over or be present on a rare and opportune basis when foraging but is unlikely to make significant use of the study area or to rely on its habitats. Negligible: The species/community predicted distribution includes the study area but the desktop assessment did not identify records of the species and the study area is unlikely (or is not considered) to support species habitat.	EX: Extinct CR: Critically endangered EN: Endangered VU: Vulnerable	EX: Extinct CE: Critically endangered EN: Endangered VU: Vulnerable CD: Conservation dependent	PMST-K: Species or species habitat known to occur within area PMST-L: Species or species habitat likely to occur within area PMST-M: Species or species habitat may occur within area PMST-F: Foraging, feeding or related behaviour likely to occur within area

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A2 Significant fauna

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
Amphibians									
<i>Litoria raniformis</i>	Growling Grass Frog	VU	VU	12	2018	VBA, PMST	Moderate	The species persists in isolated populations in the greater Melbourne area, in the south-west of Victoria and a few sites in central Victoria and Gippsland. Occurs in a variety of still or slow-moving permanent and semi-permanent water bodies with abundant submerged and emergent vegetation and minimal tree canopy cover including farm dams, irrigation channels and disused quarries.	Recently recorded in the surrounding areas. Suitable wetland habitat available within the study area.
<i>Pseudophryne bibronii</i>	Brown Toadlet	EN		3	1962	VBA	Low	Found in a wide variety of habitats such as dry forests, woodland, shrubland, grassland, coastal swamps, heathland, and sub-alpine areas, particularly in areas that are likely to be inundated after rainfall. Shelter in damp areas under leaf litter, logs, or other cover	Last recorded in the surrounding areas over 62 years ago. Some suitable habitat available within the study area.
<i>Pseudophryne semimarmorata</i>	Southern Toadlet	EN		13	1979	VBA	Low	Occurs in forests, woodlands, heaths, and grasslands at lower elevations. Found under leaf litter, logs or rocks in damp areas and drainage lines but not necessarily near permanent water.	Last recorded in the surrounding areas over 45 years ago. Some suitable habitat within the study area.
Bats									
<i>Miniopterus orianae bassanii</i>	Southern Bent-winged Bat (southern ssp.)	CR		7	2010	VBA, PMST	Low	Only found in south-western Victoria and south-eastern South Australia in a limited number of caves with suitable microclimate.	No suitable caves. Species not known to use tree hollows, however, may on occasion forage within the study area.

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	VU	9	2021	VBA, PMST	Moderate	Wide ranging and highly mobile species that uses a range of habitats where flowering eucalyptus trees, fruit crops and urban gardens are present. Roosts are commonly in gullies, close to water with a dense canopy.	No nearby camps, however, may on occasion forage within the study area.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail Bat	VU		12	2011	VBA	High	Occurs in a variety of habitats. Forages above the canopy but can also forage in treeless areas. Requires tree hollows for roosting and nesting.	Suitable tree hollows and foraging habitat occurs within the study area.
Birds									
<i>Accipiter novaehollandiae</i>	Grey Goshawk	EN		1	1998	VBA	Low	Mainly tall wet forests and gullies in the Otway Ranges but also woodlands, dry forests, wooded farmland and suburban parks in the Strzelecki Ranges, Gippsland Plains and Otway Plains.	Few records over 10 years ago. Sub-optimal habitat within the study area.
<i>Actitis hypoleucos</i>	Common Sandpiper	VU	Ma, Mi	N/A	N/A	PMST	Low	Prefers the muddy edges or rocky shores of fresh or saline coastal wetlands. Less often recorded inland on the muddy or sandy edges of lakes, dams, waterholes and bore drains.	Limited suitable habitat within the study area.
<i>Antigone rubicunda</i>	Brolga	EN		107	2020	VBA	Moderate	Large open wetlands, grassy plains, coastal mudflats, and irrigated croplands. Occasionally mangrove-studded creeks and estuaries.	Degraded wetland habitat occurs within the study area. May occasionally use the study area when inundated.
<i>Aphelocephala leucopsis</i>	Southern Whiteface	VU		N/A	N/A	PMST	Low	A wide range of open woodland and shrubland habitats, containing shrubs and / or grasses in the understorey. Occurs in the foothills, lowlands, and plains.	Limited suitable habitat within the study area.

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Apus pacificus</i>	Fork-tailed Swift		Ma, Mi	N/A	N/A	PMST	Low	Primarily an aerial species which forages in flight and may occasionally land.	Modelled habitat, no nearby recent records. Foraging habitat occurs but likely only utilised on an opportunistic basis.
<i>Ardea alba modesta</i>	Eastern Great Egret	VU	Ma	5	2018	VBA	Moderate	Widespread in Australia. Inhabits swamps and marshes, grasslands, margins of rivers and lakes, salt pans, estuarine mudflats, and other wetland habitats.	Potential for this species to occur within the surrounding farmlands and the mapped wetland when inundated or Salt Creek.
<i>Ardeotis australis</i>	Australian Bustard	CR		1	1876	VBA	Negligible	Primarily an inland and tropical species.	No suitable habitat.
<i>Biziura lobata</i>	Musk Duck	VU	Ma	10	1995	VBA	Low	Prefers deep fresh open water and densely vegetated wetlands and swamps. Occasionally found in estuaries and bays.	Limited suitable habitat within the study area.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	CR	EN	N/A	N/A	PMST	Low	Prefers permanent freshwater wetlands with tall aquatic vegetation such as bullrushes (<i>Typha</i> spp.) and spikerushes (<i>Eleocharis</i> spp.). Occasionally occurs in rice fields and saltmarshes.	Limited suitable habitat within the study area.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		VU, Ma, Mi	11	2012	VBA, PMST	Low	Widespread in most regions of Victoria, especially in coastal areas. Inhabits shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Limited suitable habitat within the study area.
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CE, Ma, Mi	5	1998	VBA, PMST	Low	Nonbreeding migratory species that occurs primarily on intertidal mudflats of estuaries, lagoons, mangroves, and less often on beaches, rocky shores and around lakes, dams. Can also occur on suitable inland habitats in the Kerang area, Mildura, and western districts.	Limited suitable habitat within the study area.

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Calidris melanotos</i>	Pectoral Sandpiper		Ma, Mi	N/A	N/A	PMST	Low	Nonbreeding migratory species that prefers shallow fresh to saline wetlands with open fringing mudflats and low, emergent, or fringing vegetation, such as grass or samphire. Also occurs in swamps, saltmarshes, lakes, and inundated grasslands.	Limited suitable habitat within the study area.
<i>Calidris minuta</i>	Little Stint		Ma	1	1988	VBA	Low	A migratory species that breeds in Scandinavia and Russia. In Australia, recorded on mudflats, sandflats or islets of sheltered coastal estuaries and embayments. Also found in near-coastal wetlands including open shallow freshwater lakes, lagoons and shallow pools and puddles, as well as sewage farms and salt ponds.	Limited suitable habitat within the study area.
<i>Calidris ruficollis</i>	Red-necked Stint		Ma, Mi	5	2011	VBA	Low	Coastal species which occurs in sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores. Occasionally occur in saltworks, sewage farms, saltmarsh, shallow wetlands, lakes, swamps, riverbanks, dams, flooded paddocks or damp grasslands.	Limited suitable habitat within the study area.
<i>Callocephalon fimbriatum</i>	Gang-Gang Cockatoo	EN	EN	1	1980	VBA, PMST	Low	Gang-gang Cockatoos primarily occur within the temperate eucalypt forests and woodlands of mainland south-east Australia. The species is an altitudinal migrant. During summer months, Gang-gang Cockatoos primarily inhabit mature, wet sclerophyll forests, typically dominated by eucalypts. During winter months, Gang-gang Cockatoos tend to range beyond montane forests to inhabit woodland assemblages at lower, drier altitudes	Single historical record. Foraging habitat available within the study area, however given the limited records is unlikely to be present.

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Charadrius bicinctus</i>	Double-banded Plover		Ma, Mi	2	1988	VBA	Low	Found in both coastal and inland areas on coastal beaches, mudflats, sewage farms, riverbanks, fields, dunes, upland tussock grasses and shingle.	Limited suitable habitat within the study area.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern subspecies)		VU	N/A	N/A	PMST	Low	Prefers woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, a low shrub cover and plenty of fallen timber. Also occurs in River Red Gum Forest near wetlands	Limited suitable habitat within the study area.
<i>Falco hypoleucos</i>	Grey Falcon	VU	VU	N/A	N/A	PMST	Low	Primarily occurs inland in arid areas but can occur elsewhere in Australia. Prefers lightly timbered woodland and Acacia scrub.	Limited suitable habitat within the study area.
<i>Falco subniger</i>	Black Falcon	CR		3	2011	VBA	Low	Sparsely distributed across Victoria. Occurs in woodland, shrubland and grassland in particularly along wooded watercourses and agricultural land with scattered remnant trees.	Limited suitable habitat within the study area.
<i>Gallinago hardwickii</i>	Latham's Snipe		VU, Ma, Mi	3	2018	VBA, PMST	Moderate	Non-breeding migratory species that occurs in freshwater wetlands with low dense vegetation on or near the coast. Preferred wetland vegetation includes sedges, grasses, lignum, reeds, and rushes. Also occurs in saltmarsh and creek edges on migration, drainage ditches along roadsides and railways, crops and pasture.	Suitable habitat occurs at Salt Creek and within pasture.
<i>Gelochelidon macrotarsa</i>	Australian Gull-billed Tern		Ma, Mi	2	1999	VBA	Low	Prefers marshier habitats of freshwater swamps, brackish and salt lakes and occasionally on beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands, and grasslands.	Limited suitable habitat within the study area.

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Grantiella picta</i>	Painted Honeyeater	VU	VU	N/A	N/A	PMST	Negligible	Prefers forest/woodland, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands with mistletoe a high number of mature trees. Also occurs in acacia-dominated woodlands, paperbarks, casuarinas, Callitris, and trees on farmland or gardens.	No suitable habitat or mistletoe.
<i>Hieraaetus morphnoides</i>	Little Eagle	VU		4	2018	VBA	Moderate	Widespread species. Occurs primarily in wooded farmland and dry woodlands.	Suitable foraging habitat within the study area.
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU	VU Ma, Mi	N/A	N/A	PMST	Low	Primarily an aerial species which forages in flight and may occasionally land. Occurs most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Modelled habitat, no nearby recent records. Foraging habitat occurs but likely only utilised on an opportunistic basis.
<i>Lathamus discolor</i>	Swift Parrot	CR	CE	N/A	N/A	PMST	Low	Non-breeding winter migrant. Prefers dry forest and woodland, particularly box-ironbark forest in central and NE Victoria, and eucalyptus sp. within greater Melbourne. Feeds on nectar and lerps of winter flowering eucalyptus including Grey Box (<i>Eucalyptus microcarpa</i>), Red Ironbark (<i>Eucalyptus tricarpa</i>), Mugga Ironbark (<i>Eucalyptus sideroxylon</i>) (far north-east Victoria), Yellow Gum (<i>Eucalyptus leucoxylon</i>) and White Box (<i>Eucalyptus albens</i>).	Modelled habitat, no nearby recent records. Foraging habitat occurs but likely only utilised on an opportunistic basis.
<i>Melanodryas cucullata cucullata</i>	Hooded Robin	VU	EN	N/A	N/A	PMST	Low	Found all over mainland Australia. Inhabits lightly timbered woodland usually dominated by acacia and/or eucalypts.	Limited suitable habitat.
<i>Motacilla flava</i>	Yellow Wagtail		Ma, Mi	N/A	N/A	PMST	Negligible	Nonbreeding migratory species. Occurs in grassland habitat subject to inundation.	No suitable habitat.

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale	
<i>Myiagra cyanoleuca</i>	Satin Flycatcher		Ma, Mi	N/A	N/A	PMST	Negligible	In Victoria, the species is widespread in the south and east. Prefers tall wetter Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily vegetated gullies.	No suitable habitat.	
<i>Neophema chrysostoma</i>	Blue-winged Parrot		VU, Ma	N/A	N/A	PMST	Low	Occurs in range of habitats from coastal, sub-coastal, and inland areas, through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands and are found near wetlands both by the coast and in semi-arid zones. Can also be found in altered environments like airfields, golf courses, and paddocks	Paucity of records.	
<i>Oxyura australis</i>	Blue-billed Duck	VU		2	2020	VBA	Low	Prefers deep permanent well vegetated freshwater swamps, large dams, lakes, and open waters. Important breeding sites are primarily in south-west Victoria but also at a few sites in Port Phillip, north-east Victoria, Gippsland, and north-west Victoria.	Limited habitat.	suitable
<i>Pedionomus torquatus</i>	Plains-wanderer	CR	CE	N/A	N/A	PMST	Negligible	Prefers native grassland.	No suitable habitat.	
<i>Plegadis falcinellus</i>	Glossy Ibis		Ma, Mi	1	1991	VBA	Low	Occasionally seen in eastern Victoria. Requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains, mangroves, and rice fields.	Limited habitat.	suitable
<i>Rhipidura rufifrons</i>	Rufous Fantail		Ma, Mi	N/A	N/A	PMST	Low	Found in south and central Victoria in wet sclerophyll forests, subtropical and temperate rainforests. It sometimes inhabits drier sclerophyll forests and woodlands.	Limited habitat.	suitable
<i>Rostratula australis</i>	Australian Painted-snipe	CR	EN, Ma	N/A	N/A	PMST	Low	Occurs in shallow fresh or brackish wetlands with permanent or semi-permanent water, cover of adjacent grasses and muddy edges. Also occurs in waterlogged grassland, sewage ponds and dams.	Limited habitat.	suitable

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale	
<i>Spatula rhynchotis</i>	Australasian Shoveler	VU		18	2017	VBA	High	Found throughout much of Victoria. Prefers permanent, well-vegetated wetlands with abundant aquatic vegetation but will use most freshwater habitats.	Limited habitat.	suitable
<i>Stagonopleura guttata</i>	Diamond Firetail	VU	VU	N/A	N/A	PMST	Low	Found throughout south-eastern mainland Australia. Inhabits grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland.	Limited habitat.	suitable
<i>Stictonetta naevosa</i>	Freckled Duck	EN		6	2019	VBA	Low	Prefers large freshwater inland wetlands, generally with dense vegetation. Occasionally recorded in coastal wetlands.	Limited habitat.	suitable
<i>Tringa nebularia</i>	Common Greenshank	EN	EN, Ma, Mi	5	1988	VBA, PMST	Low	Prefers sheltered coastal habitats with large mudflats and saltmarsh, mangroves, or seagrass. Can occur inland, in estuaries and mudflats, mangrove swamps and lagoons, billabongs, swamps, sewage farms and flooded crops.	Limited habitat.	suitable
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Fish										
<i>Galaxiella toourtkoourt</i>	Little Galaxias	EN		2	2008	VBA	Present	Occupies coastal drainages in western Victoria and South Australia.	Recorded at Salt Creek during targeted Growling Grass Frog surveys.	
<i>Macquaria australasica</i>	Macquarie Perch	EN	EN	2	1920	VBA	Low	Occurs in upstream reaches of Murray-Darling Basin where water has lots of cover from aquatic vegetation, rocks, and overhanging banks.	Limited habitat.	suitable
<i>Nannoperca obscura</i>	Yarra Pygmy Perch	VU	VU	N/A	N/A	PMST	Negligible	Typically occurs in lakes, ponds, and slow-flowing rivers, but prefers small to medium sized streams that are shallow with moderate to high flow. Usually associated with large amounts of aquatic vegetation.	No suitable habitat.	

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale	
<i>Prototroctes maraena</i>	Australian Grayling	EN	VU	N/A	N/A	PMST	Negligible	Occurs in freshwater rivers and streams with moderate flow, gravel substrate and alternating pools and rifles. The species spends part of its lifecycle in freshwater and at least part of the larval and/or juvenile stages in coastal seas.	No suitable habitat.	
Mammals										
<i>Antechinus minimus maritimus</i>	Swamp Antechinus (mainland)	VU	VU	N/A	N/A	PMST	Low	Mainly occurs in damp areas with dense vegetation at about 1–2 m above ground level, including dense wet heathlands, tussock grasslands, sedgeland, damp gullies, swamps, and some shrubby woodlands. Found in Coastal Victoria as far east as Wilson's Promontory.	Limited habitat.	suitable
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	EN	EN	N/A	N/A	PMST	Low	Occurs in a range of environments from rainforest to open woodland. Particularly wet eucalypt forests with rocky outcrops, extensive riparian vegetation and ground dwelling prey. Highly mobile but requires suitable den sites such as rock crevices, caves, hollow logs, burrows, and tree hollows. In Victoria, locations include East Gippsland, the Strzelecki Ranges, and Wilson's Promontory NP	Limited habitat.	suitable
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	EN	EN	N/A	N/A	PMST	Low	Prefers heathland, heathy open forest, and woodland with dense ground cover up to 1 m tall on sandy and well drained soils. Also occurs in dense Blackberry thickets.	Limited habitat.	suitable
<i>Ornithorhynchus anatinus</i>	Platypus	VU		1	1911	VBA	Low	Prefers well vegetated freshwater creeks, slow-moving rivers, lakes joined by rivers, and built water storages such as farm dams. Builds burrows into riverbanks among tree roots.	Limited habitat.	suitable

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Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale	
<i>Perameles gunnii</i>	Eastern Barred Bandicoot	EN	EN	4	1997	VBA	Negligible	Extinct in the wild. Has been reintroduced in areas along the Bass Coast, in Hamilton and Woodlands Historic Park in Greenvale.	No suitable habitat.	
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	VU	VU	N/A	N/A	PMST	Negligible	Occurs in tall mature eucalypt forest in areas of high rainfall and nutrient-rich soils. Their forest type preferences change with latitude and elevation; mixed coastal forests to dry escarpments in northern part of range; moist coastal gullies and creek flats to tall mountain forests in southern part of range	No suitable habitat.	
<i>Potorous tridactylus trisulcatus</i>	Long-nosed Potoroo	VU	VU	N/A	N/A	PMST	Negligible	In Victoria, the Long-nosed Potoroo (SE Mainland) occurs in six discrete regions (Seebeck 1981), including the South-western region, Grampians, Otways, Western Port, Wilsons Promontory, and east Gippsland. Most commonly inhabits heath-woodland grading into heath dominated by Eucalyptus obliqua and E. baxteri, and sometimes E. radiata.	No suitable habitat.	
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	VU		17	2010	VBA	Low	Occurs in grassland and shrubland with tussocky grasses, cracking soils, rocks and logs. Can occur in agricultural land and in sheds.	Limited habitat.	suitable
Invertebrates										
<i>Engaeus sericatus</i>	Hairy Burrowing Crayfish	VU		4	2021	VBA	Moderate	Freshwater crayfish that burrows into river banks. May occur in streams with surrounding native vegetation in agricultural areas.	Limited habitat.	suitable

Scientific name	Common name	FFG	EPBC	Count of records	Last recorded	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Synemon plana</i>	Golden Sun Moth	VU	VU	N/A	N/A	PMST	Low	Prefers native grassland with Rytidosperma and Austrostipa grass species and suitable inter-tussock space. Also occurs in exotic grassland comprising Serrated Tussock and Chilean Needle Grasses.	Limited suitable habitat.
Reptiles									
<i>Delma impar</i>	Striped Legless Lizard	EN	VU	13	2013	VBA, PMST	Moderate	Occurs in grassland with complex grass structure, including native and exotic tussock grasses with high biomass, surface rocks, arthropod burrows, or cracking soils. Occurs on roadsides and can persist in disturbed areas with low-moderate intensity grazing but not in cropped or ploughed land.	Degraded Grassland potential habitat. Plains provides suitable habitat.
<i>Eulamprus tympanum marnieae</i>	Corangamite Water Skink	EN	EN	N/A	N/A	PMST	Moderate	Habitat consists of large deeply fissured basaltic flows or outcrops, remnant vegetation and adjacent permanent or ephemeral wetlands.	Suitable habitat at Salt Creek.
<i>Lissolepis coventryi</i>	Swamp Skink	EN	EN	N/A	N/A	PMST	Low	Occurs in densely vegetated swamps and associated watercourses, and adjacent wet heaths (tea-tree thickets), sedgeland and saltmarshes.	Limited suitable habitat.
<i>Pseudemoia pagenstecheri</i>	Tussock Skink	EN		65	2013	VBA	Moderate	Occurs in grassland habitat.	Degraded Grassland potential habitat. Plains provides suitable habitat.

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A3 Significant flora

Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VU				PMST	Moderate	River Swamp Wallaby-grass grows mostly in permanent swamps and lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally fluctuating water levels.	Suitable habitat present at Salt Creek within Floodplain Riparian Woodland.
<i>Carex tasmanica</i>	Curly Sedge		EN	1	2005	VBA	Low	Uncommon, confined to seasonally wet, heavy clayey soils immediately north of Melbourne (Craigieburn) and farther west (to Heywood near Portland).	Limited suitable habitat present within study area. Unlikely to occur.
<i>Comesperma polygaloides</i>	Small Milkwort		CR	1	1901	VBA	Low	Occasional on heavier soils (clays, alluvium) supporting grassland and grassy woodland communities in central and south-western areas.	Historical record only. Low-quality, degraded habitat present within the study area. Unlikely to occur.
<i>Coronidium gunnianum</i>	Pale Swamp Everlasting		CR	4	2013	VBA	Moderate	Usually at low elevations (under c. 100 m) in grasslands and riverine Eucalyptus camaldulensis woodland on soils that are prone to inundation.	Degraded but ephemeral Plains Grassy Wetland habitat within the study area. Potential to occur following inundation.
<i>Dianella amoena</i>	Matted Flax-lily	EN	CR			PMST	Moderate	Most commonly in lowland grasslands, grassy woodlands, valley grassy forest and creek lines of herb-rich woodland. Typically, the species occurs on well drained to seasonally wet fertile sandy loams to heavy cracking clays derived from Silurian or Tertiary sediments, or from volcanic geology	Plains Grassland on Hamilton Highway provides habitat for this species which can occur in degraded environments.

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Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Dodonaea procumbens</i>	Trailing Hop-bush	VU				PMST	Low	This species grows in low-lying, often winter-wet areas in woodland, low open forests, heathland and grasslands, on sands and clays. Victorian populations have been recorded in various plant communities including grassy woodland dominated by River Red Gum in western Victoria, heathy dry forest in central Victoria, damp heath in far-western Victoria	Limited suitable habitat. Woodlands have stock access and are likely too degraded to occur.
<i>Glycine latrobeana</i>	Clover Glycine	VU	VU	10	1998	VBA, PMST	Low	Clover Glycine is found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands, and low open woodlands with a grassy ground layer	Limited suitable habitat. Woodlands have stock access and are likely too degraded to occur.
<i>Juncus revolutus</i>	Creeping Rush		EN	2	1979	VBA	Negligible	Found in damp saline or subsaline communities near the coast.	No suitable habitat.
<i>Lachnagrostis adamsonii</i>	Adamson's Blown-grass	EN	EN			PMST	Low	Confined to slow moving creeks, swamps, flats, depressions, or drainage lines (such as along roadsides) that are seasonally inundated or waterlogged and usually moderately to highly saline. Soils are black, cracking clays or duplex soils with poorly permeable subsoils ranging from acidic (pH 4.6) to alkaline (pH 9.1). Plants appear to favour sites that have some shelter from the wind, often provided by other species such as Canary-grass (<i>Phalaris aquatica</i>), <i>Juncus</i> spp. or <i>Gahnia</i> spp. This preference for protected sites may explain why plants are rarely found around larger, more open, exposed saline lakes. The species will also tolerate some waterlogging but will not survive in relatively deep water for any length of time.	Not recorded in Not recorded in Plains Grassy Wetland during GGF survey. Survey was during species flowering period. Habitat is highly degraded.
<i>Lachnagrostis robusta</i>	Salt Blown-grass		EN	1	2008	VBA	Negligible	Occurs around margins of salt lakes and saline depressions mostly across the Volcanic Plain, with eastern outliers near Tooradin and Seaspray and a few sites west of the Grampians (Douglas, Natimuk areas).	No suitable habitat.

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Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Lachnagrostis semibarbata</i> var. <i>filifolia</i>	Purple Blown-grass		EN	2	2009	VBA	Low	There are two varieties, both occurring in Victoria, mostly associated with slightly to markedly saline sites. This subspecies known further east near the Gippsland Lakes east of Sale.	Not recorded in Plains Grassy Wetland during GGF survey. Survey was during species flowering period. Habitat is highly degraded.
<i>Lachnagrostis semibarbata</i> var. <i>semibarbata</i>	Purple Blown-grass		EN	1	1995	VBA	Low	Scattered in wet marshes and slightly saline swamps and depressions across the Victorian Volcanic Plain.	Not recorded in Plains Grassy Wetland during GGF survey. Survey was during species flowering period. Habitat is highly degraded.
<i>Lepidium aschersonii</i>	Spiny Peppergrass	VU	EN	4	1983	VBA, PMST	Negligible	Mostly on heavy clay soil near salt lakes on volcanic plain, but with outlying records from near Lake Omeo (in 1940 & 1981) and the Grampians (in 1893).	No suitable habitat.
<i>Lepidium hyssopifolium</i>	Basalt Peppergrass	EN	EN			PMST	Low	Collected from scattered sites on the volcanic plain, but now much reduced from its former range and recorded recently only from e.g. Moorabool, Winchelsea, Bacchus Marsh, Woodend, Trentham. Most recent collections are from disturbed, rather weedy sites. One collection from near Port Fairy is noteworthy for its occurrence in a slightly saline estuary amongst saltmarsh and fringing sedgeland.	Limited suitable habitat. Unlikely to occur.
<i>Leucochrysum albicans</i> subsp. <i>tricolor</i>	White Sunray	EN	EN	2	2007	VBA, PMST	Low	In Victoria, the Hoary Sunray occurs almost exclusively on acidic clay soils derived from basalt, occasionally on nearby sandy-clay soils derived from sedimentary material	Limited suitable habitat. Unlikely to occur.
<i>Microseris scapigera</i> s.s.	Plains Yam-daisy		CR	1	2009	VBA	Low	Formerly widespread in moist depressions on the basalt plains of western Victoria, but now very rare due to loss of habitat.	Limited suitable habitat. Unlikely to occur.

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Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Pimelea spinescens</i> <i>subsp. spinescens</i>	Spiny Rice-flower	CE	CR			PMST	Moderate	Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Plants from more northerly populations occur on red clay complexes, while plants from southern populations occur on heavy grey-black clay loams. Topography is generally flat, but populations may occur on slight rises or in slightly wettish depressions. Vegetation is often dominated by <i>Themeda triandra</i> , with <i>Austrostipa</i> spp. or <i>Austroanthonia</i> spp. co-dominant.	Plains Grassland on Hamilton Highway provides habitat for this species which can occur in degraded environments.
<i>Poa sallacustris</i>	Salt-lake Tussock-grass	VU	CR			PMST	Negligible	Apparently endemic in Victoria. Known only from margins of brackish to salt lakes in the western district (Lakes Corangamite and Terangpoom near Cressy, Black Lake near Skipton, Lake Linlithgow near Hamilton) although generally occurring above the level of significant saline influence. Regarded as threatened by grazing and encroachment of exotic pasture species.	No suitable habitat.
<i>Prasophyllum</i> sp. <i>aff. correctum</i> (Mortlake)	Western Gaping Leek-orchid		CR	7	2020	VBA	Low	Endemic to Victoria were known only from grassland in the Mortlake area west of Melbourne.	Limited suitable habitat. Unlikely to occur.
<i>Prasophyllum spicatum</i>	Dense Leek-orchid	VU	CR			PMST	Negligible	Coastal heathland and near-coastal heathy forest on sandy soils	No suitable habitat.
<i>Prasophyllum suaveolens</i>	Fragrant Leek-orchid	EN	CR			PMST	Low	Endemic to the basalt plains of south-western Victoria this species is mostly found from inland areas growing in grasslands and open grassy woodlands, on poorly drained, red-brown soils.	Limited suitable habitat. Unlikely to occur.
<i>Prasophyllum viretrum</i>	Basalt Leek-orchid		CR	5	2013	VBA	Low	Restricted to a few sites in south-western Victoria growing in moist to wet grassland on dark basaltic loam.	Limited suitable habitat. Unlikely to occur.
<i>Pterostylis chlorogramma</i>	Green-striped Greenhood	VU	EN			PMST	Low	Moist areas of heathy shrubby forest on well-drained soils.	Limited suitable habitat. Unlikely to occur.

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Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale	
<i>Ptilotus erubescens</i>	Hairy Tails		CR	25	2004	VBA	Low	Occasional on relatively fertile soils supporting grassland and woodland communities in northern and western Victoria, but not in mallee areas.	Limited habitat.	suitable Unlikely to occur.
<i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	EN	EN			PMST	Low	Restricted to open stands of plains grassland and grassy woodlands, on fertile clays to clay loams, usually in areas where the grass cover is more open, either as a result of recurrent fires or grazing by native macropods or stock. It also occurs on low rises with shallow, stony soils at less than 100 m above sea level.	Limited habitat.	suitable Unlikely to occur.
<i>Senecio macrocarpus</i>	Large-headed Fireweed	VU	CR			PMST	Low	Grasslands, sedgeland, shrublands and woodlands, generally on sparsely vegetated sites on sandy loam to heavy clay soils, often in depressions that are waterlogged in winter. At many sites in western Victoria, the Large-fruit Groundsel occurs with many other herb species in grassland dominated by Kangaroo Grass <i>Themeda triandra</i> on heavy basalt clay soils. There are also several records from Yellow Gum <i>Eucalyptus leucoxylon</i> woodland, generally in low, flat areas where there are few other understorey species.	Limited habitat.	suitable Unlikely to occur.
<i>Senecio psilocarpus</i>	Swamp Fireweed	VU				PMST	Negligible	Restricted to several sites in herb-rich winter-wet swamps throughout the south of the state, to the west of Sale. Grows on volcanic clays and peaty soils.	No suitable habitat.	
<i>Swainsona murrayana</i>	Slender Darling-pea	VU	EN			PMST	Low	Extremely rare in northern and western Victoria, with an isolated southern recorded labelled 'Wannon River'. Usually found in seasonally inundated flats and around lakes.	Limited habitat.	suitable Unlikely to occur.
<i>Thelymitra basaltica</i>	Grassland Sun-orchid		CR	2	2007	VBA	Low	Grassland on sandy brown volcanic loams.	Limited habitat.	suitable Unlikely to occur.

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Scientific name	Common name	EPBC	FFG	Number of records	Last record	Source	Likelihood of occurrence	Habitat requirements	Rationale
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	EN	EN			PMST	Negligible	Found in coastal heathland, grassland and woodland, but extending further inland into similar habitats in the west of its range. On moist or dry sandy soils.	No suitable habitat.
<i>Thelymitra matthewsii</i>	Spiral Sun-orchid	VU	EN			PMST	Negligible	Little is known of the specific habitat requirements of the Spiral Sun-orchid. It grows in heathy open forest and woodlands, on well-drained sand, gravel and clay loam soils, especially areas where there has been some soil disturbance, such as around old quarries and gravel pits, and on road and track verges, including those periodically slashed for fire breaks. Most sites tend to have a relatively open ground layer.	No suitable habitat.
<i>Thelymitra orientalis</i>	Hoary Sun-orchid	CE	CR			PMST	Negligible	Grows in damp heathy flats and seepage areas usually in peaty white sands.	No suitable habitat.
<i>Xerochrysum palustre</i>	Swamp Everlasting	VU	CR			PMST	Low	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. The species will also grow in more marginal wetland habitats such as seasonally wet areas of native grassland and heath communities.	Limited suitable habitat. Unlikely to occur.

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Appendix B Growling Grass Frog targeted survey

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Mortlake Solar Farm Targeted Growling Grass Frog Survey

Urbis

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1. Introduction

1.1 Background

Eco Logical Australia (ELA) has been engaged Urbis, on behalf of BrightNight to undertake an ecological assessment for of the proposed solar farm site located near Hamilton Highway, Mortlake (Stage 1). An initial ecological constraints assessment of the site was completed on 2 August 2022 (ELA, 2024). This assessment identified the potential of the site to support Growling Grass Frog. Growling Grass Frog is listed as vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act) and Vulnerable under the Victorian Flora and Fauna Guarantee Act (FFG Act). Targeted surveys were recommended to determine species presence absence and inform project legislative implications in relation to the species.

1.2 Species profile

Growling Grass Frog is a large species of frog and a member of the Bell Frog complex. Adult frogs can be as large as 105 mm in length. Colouration is variable between individuals but typically ranges from dull olive to bright emerald green, with large black, brown and bronze splotches on its dorsal surface (Clemann & Swan, 2023). A black stripe runs from the species nostril, through the eye and above the tympanum (Clemann & Swan, 2023). The species is also characterised by the presence of warts across its dorsum, flanks and legs (Clemann & Swan, 2023).

Growling Grass Frog depend on a mix of aquatic and terrestrial habitat for breeding, foraging, shelter and dispersal, and are typically found in areas with both permanent and semi-permanent waterbodies with still or slow-moving water (DEWHA, 2009). Optimal breeding habitat includes emergent vegetation around the edges of waterbodies, mats of floating and submerged plants and with minimal shading from trees (DEWHA, 2009). Growling Grass Frogs also regularly use water bodies as non-breeding habitat and prefer areas with emergent vegetation to provide for protection and areas in which they can bask (DEWHA, 2009). They periodically use terrestrial areas adjacent to the water bodies that have shelter and feeding habitat that includes terrestrial vegetation such as grasses and low shrubs that provide invertebrates for food and shelter when frogs are migrating overland between water bodies (DEWHA, 2009). Rocks, logs and debris surrounding the waterbodies provide essential over-wintering habitat (DEWHA, 2009). Connectivity between clusters of suitable waterbodies is essential to promote movement between breeding and non-breeding sites to maintain genetic diversity, improve breeding opportunities under different environmental conditions and promote recolonisation following local extinction (DEWHA, 2009).

Principal threats to Growling Grass Frogs are habitat loss and degradation such as:

- changes in hydrological regimes that reduce the hydroperiod and stops tadpoles reaching metamorphosis
- removal of aquatic and terrestrial vegetation, fallen logs and debris which provide over-wintering habitat
- overshadowing of waterbodies by trees that reduces water temperatures, which is unfavourable for tadpole growth

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- damage to banks by trampling caused by stock, which creates turbidity and loss of emergent vegetation for shelter
- predation of eggs and larvae by introduced fish such as Mosquito Fish *Gambusia affinis*
- loss of habitat connectivity.
- poor water quality caused by increased turbidity, nutrients, pesticides, detergents and heavy metals
- disease from Chytrid fungus (DEWHA 2009 and DELWP, 2017).

Growling Grass Frog breeding occurs during warmer months from August through to March (DELWP, 2017). Females lay eggs in water bodies that retain water at least through summer, enabling the tadpoles to develop (DELWP, 2017).



Figure 1. Growling Grass Frog (photo Jonathan Billington, ELA)

1.3 Survey rationale

A review of records for Growling Grass Frog identified 12 records occurring within a 10 km buffer of the site boundary, the most recent of which was recorded in 2018 (VBA, 2023). Of these records, three were collected in the last 30 years that occur within proximity (approximately 2 km) of the site. These records are as follows:

- A record within Mortlake Common collected in 2000.
- A record near the confluence of Salt Creek and Hopkins River collected in 2011.
- A record associate with Boonerah Estate Road collected in 2011.

Given the sites proximity to these records and its location between two large areas of known habitat (Mortlake Common and Salt Creek) potential habitat was identified for the species to be present within waterbodies and farm dams across the site, either as resident or when moving across the landscape between those environs. Targeted survey was thus recommended. The location of Growling Grass Frog records is shown in Figure 3.

2. Methods

Surveys for Growling Grass Frog comprised of detailed habitat assessments and nocturnal surveys comprising of call playback and spotlight surveys. Surveys were conducted with reference to the following guidelines and references:

- Significant Impact Guidelines for the Vulnerable Growling Grass Frog *Litoria raniformis* (DEWHA, 2009a).
- Survey Guidelines for Australia's threatened frogs (DEWHA, 2010).
- Biodiversity Precinct Structure Kit (DSE 2010).

Survey locations and methods are described below.

2.1 Survey locations

Given the number of waterbodies across the site, sampling of all potential habitat was not possible. A subset of representative waterbodies was therefore selected on the basis of the following rationale:

- Location of historic records.
- Habitat attributes, taking into consideration habitat extent and quality. This was informed by the results of the desktop and field based constraints assessment.
- Proximity to natural drainage lines and unnamed watercourses with the potential to link habitats between Mortlake Common and Salt Creek.
- Location within the projects likely impact footprint as informed by preliminary project design.

In total, seven locations were the subject of targeted survey comprising three locations along Salt Creek and five discrete locations (one location included two small discrete waterbodies sampled together because of their proximity (Figure 3). At the time of assessment, areas of Mortlake Common and the drainage line linking the site to the reserve were noted to be dry (Figure 3). Surveys at this location were therefore not possible at the time of assessment. Suitable habitat on site was however surveyed which is proximal to the site and Mortlake Common Boundary.

Survey locations are presented in Figure 3.

2.2 Habitat assessment

A diurnal assessment of each survey location was undertaken. The purpose of this assessment was to characterise and describe the quality and extent of habitat present, and to assess its potential to support Growling Grass Frog. Habitat attributes recorded at each location were as follows:

- Waterbody type (i.e. creek, dam or drainage line).
- Presence of aquatic vegetation and type (emergent, submergent, floating).
- In-stream habitat (i.e. rocks and logs).
- Terrestrial refuge (i.e. grassy banks, logs, rocks).
- Waterbody dimensions and likelihood of permanence.

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2.3 Nocturnal surveys

Nocturnal surveys were conducted over two evenings after sunset during suitable weather conditions (above 12 degrees, no to moderate wind). The timing of these surveys occurred during the Growling Grass Frog breeding season between November and March in temperate regions (DEWHA 2009a). Typically, optimal timing for detection of this species is between November and December, when males are actively calling following rain events (DEWHA, 2009a).

On arriving at each location ELA ecologists passively listened for frogs for a period of 10 minutes. If no frogs were heard call-playback was used to elicit a response from any males that may have been present. Call play-back was conducted using a pre-recorded male Growling Grass Frog call broadcast through a hand-held Bluetooth speaker. Calls were broadcast for a period of 2 minutes followed by 5 minutes of quiet listening. If nothing was heard, the call playback procedure was repeated. Following call-playback, active searches with hand-held torches were systematically completed in suitable habitat around the margins and banks of the waterbody/waterway. Given the site extent and the number of waterbodies present, emphasis was placed site based surveys rather than reference site checks.

The Growling Grass Frog – Calling and Activity Diary survey data available on the Ecological Consultants Association of Victoria website confirmed species activity on the nights and period of survey however, the majority of sites were in greater Melbourne (ECA Vic, 2024). The species was recorded in Dunkeld approximately 50 km northwest of the site on the 7 December 2023.

Weather conditions during the nocturnal surveys were suitable for detection and included:

- 4 December 2023 – 10% cloud cover, light air (4 km/h beaufort wind scale), 16-13 °C, Last significant rainfall 26 November 2023 (14.8 mm) (BoM, 2024).
- 5 December 2023 – 80% cloud cover, gentle breeze (11 -15 km/h beaufort wind scale), 15-19 °C, Last significant rainfall 26 November 2023 (14.8 mm) (BoM, 2024).

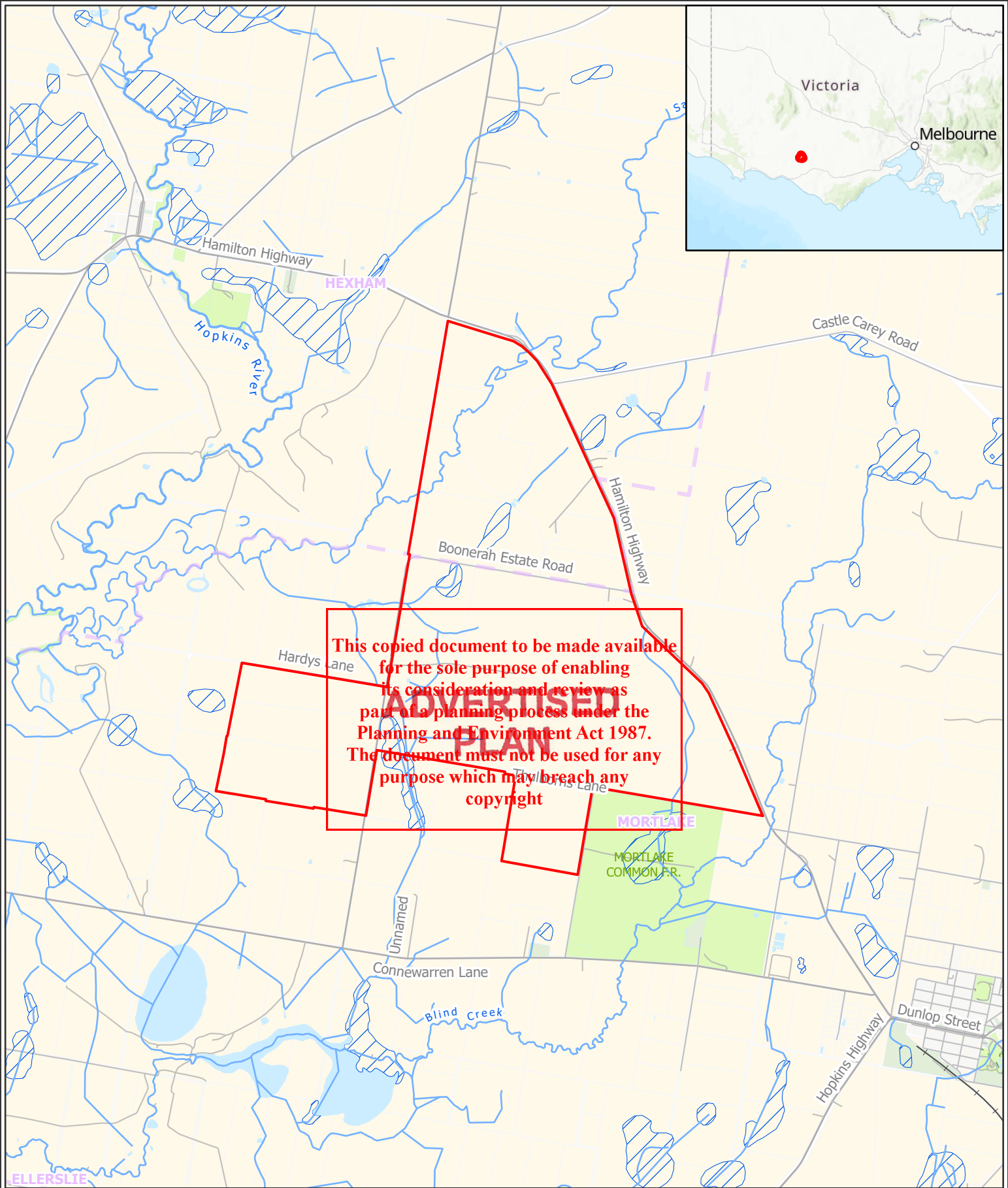
Proceeding daytime temperatures ranged between 27 – 32 degrees and were also considered conducive to frog activity.

2.4 Study limitations

The survey effort and methods were consistent with relevant state and Commonwealth guidelines, and although the targeted surveys were undertaken during suitable, and often favourable, survey periods for the target species, detection is not guaranteed even if a species may be present (i.e. imperfect detection). Species also fluctuate in abundance and distribution based on prevailing and preceding conditions; and may occur at low densities (i.e. low detectability) at times.

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Location of the Study Area

Moyne Shire

- | | | |
|---|--|--|
| Study Area | Area subject to inundation | --- Trail |
| Locality | Rail | Parcels |
| Local Government Area | Roads | Park or Reserve |
| Major watercourse | Streets | Other public land |
| Minor watercourse | Minor streets | |
| Water area | Tracks | |



Datum/Projection:
GDA 1994 MGA Zone 54
Project: 4927-RS Date: 2/02/2024



Source:
Basemap: VICMAP, 2023
Inset basemap: ESRI Topographic

3. Results

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3.1 Habitat assessments

The highest quality habitat was identified along Salt Creek and in particular location 1 which was the most downstream location sampled, where the waterway was wide and shallow with a high cover of aquatic macrophyte vegetation (Figure 3; Plate 1). Aquatic macrophyte vegetation comprised of discrete beds of reeds and rushes primarily situated along the waterways margins including Cumbungi (*Typha domingensis*) and Giant Rush (*Juncus pallidus*) with an extensive cover of floating and emergent Water Ribbons (*Triglochin procera*) interspersed with discrete areas of open water. Banks showed some signs of stock access but were otherwise colonised by a mixture of pasture and native tussock grass species. Scattered River Red Gums (*Eucalyptus camaldulensis*) along the waterways provided light shading. Similarly, location 2 also had an extensive cover of floating and emergent *T. procera* with discrete beds of reed and rushes along its margin (Figure 3; Plate 2). Canopy cover, however, was absent and signs of stock access more extensive. Location 3 was located near the Hamilton Highway Road crossing (bridge) which contained a high cover of macrophytes but was dominated by emergent species such as Common Reed (*Phragmites australis*), *T. domingensis* and Tall Spikerush (*Eleocharis sphacelata*) (Figure 3; Plate 3). Habitat along Salt Creek particularly locations 1 and 2 provided good refuge, foraging and basking opportunities for Growling Grass Frog.

Survey locations 4 and 5 were located in the interior of the site proximal to the Boonerah Estate Road reserve (Figure 3; Plates 4 and 5). The locations, which comprised two discrete dams were highly degraded by intensive stock (sheep) access and devoid of aquatic macrophyte cover or fringing habitats. These dams, appearing anthropogenic in origin were heavily trafficked at the time of assessment with areas of pugging. Habitat here was considered marginal for Growling Grass Frog with species use likely to be limited to dispersal and occasional refuge habitat when adult frogs are moving across the landscape.

Survey locations 6 - 8 were located in the southeastern corner of the site and surveyed for their proximity to Mortlake Common and a drainage line connecting the common to the subject site (Figure 3; Plates 6 - 8). Survey location 6 was comprised of two discrete waterbodies approximately 50m apart (Figure 3; Plates 6 and 7). The northern of these two waterbodies (location 6N) was bordered by volcanic boulders (around 2/3 of the waterbodies perimeter) with extensive cover of submerged Red Water-milfoil (*Myriophyllum verrucosum*) and Pondweed (*Potamogeton* sp.) (Figure 3; Plate 6). It appeared as if water levels at the waterbody were in the process of receding. Signs of stock access here were evident, but limited to areas lacking rock cover, with the presence of the volcanic rock perhaps acting as a deterrent to stock access. Habitat here for Growling Grass Frog was low to moderate. Submerged macrophyte cover and bordering volcanic rock likely to provide refuge habitat, but the waterbodies small extent and shallow nature meaning it is unlikely to provide a permanent source of habitat and is likely not suitable to support breeding. The second waterbody to the south (6S) was of far lower habitat value, devoid of macrophyte cover, or fringing vegetation and showing signs of extensive stock access (Figure 3; Plate 7). Filamentous algae was noted floating near its margins.

Survey location 7 was completely bordered by volcanic rock and had a near 100% cover of Water Fern (*Azolla* sp.) with discrete beds of *Juncus* sp. along its margin and no obvious signs of stock access (Figure 3; Plate 8). Like the northern most wetland (location 6N), habitat at survey location 7 was considered

low to moderate with the dam providing some refuge to the species but due to its small size unlikely to support breeding or to provide habitat to the species year-round.

As noted in section 2.1 whilst not a location of targeted survey (as a consequence of being dry at the time of assessment), the drainage line linking the site to Mortlake Common was also assessed for habitat suitability (Plate 9). On inspection, the drainage line was noted to be heavily colonised by terrestrial pasture species such as Perennial Rye Grass *Lolium sp.*, with no aquatic vegetation persisting (Figure 3; Plate 9). This was considered to indicate that the drainage line is ephemeral and frequently dry. The drainage line therefore is only likely to act as an intermittent dispersal corridor during periods of high and perhaps sustained rainfall.

Habitat characteristics by survey location are further summarised in Appendix A.



Plate 1: Salt Creek (location 1)



Plate 2: Salt Creek (location 2)



Plate 3: Salt Creek (location 3)



Plate 4: Stock dam (location 4)

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Plate 5: Stock dam (survey Location 5)



Plate 6: Wetland fringed by rock with extensive cover of submerged aquatic vegetation (location 6N)



Plate 7: Stock watering dam (survey location 6S)



Plate 8: Small waterbody fringed with extensive rock cover (survey location 7)



Plate 9: Drainage line linking study area and Mortlake Common

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3.2 Nocturnal surveys

Despite suitable survey timing, weather and the presence of suitable habitat, no Growling Grass Frog were detected and amphibian activity was notably low across survey locations. Non target frog species recorded included Spotted Marsh Frog *Limnodynastes tasmaniensis*, Striped Marsh Frog *Limnodynastes peroni* and Southern Brown Tree Frog *Litoria ewingii*. Results by location are summarised in Table 1 below.

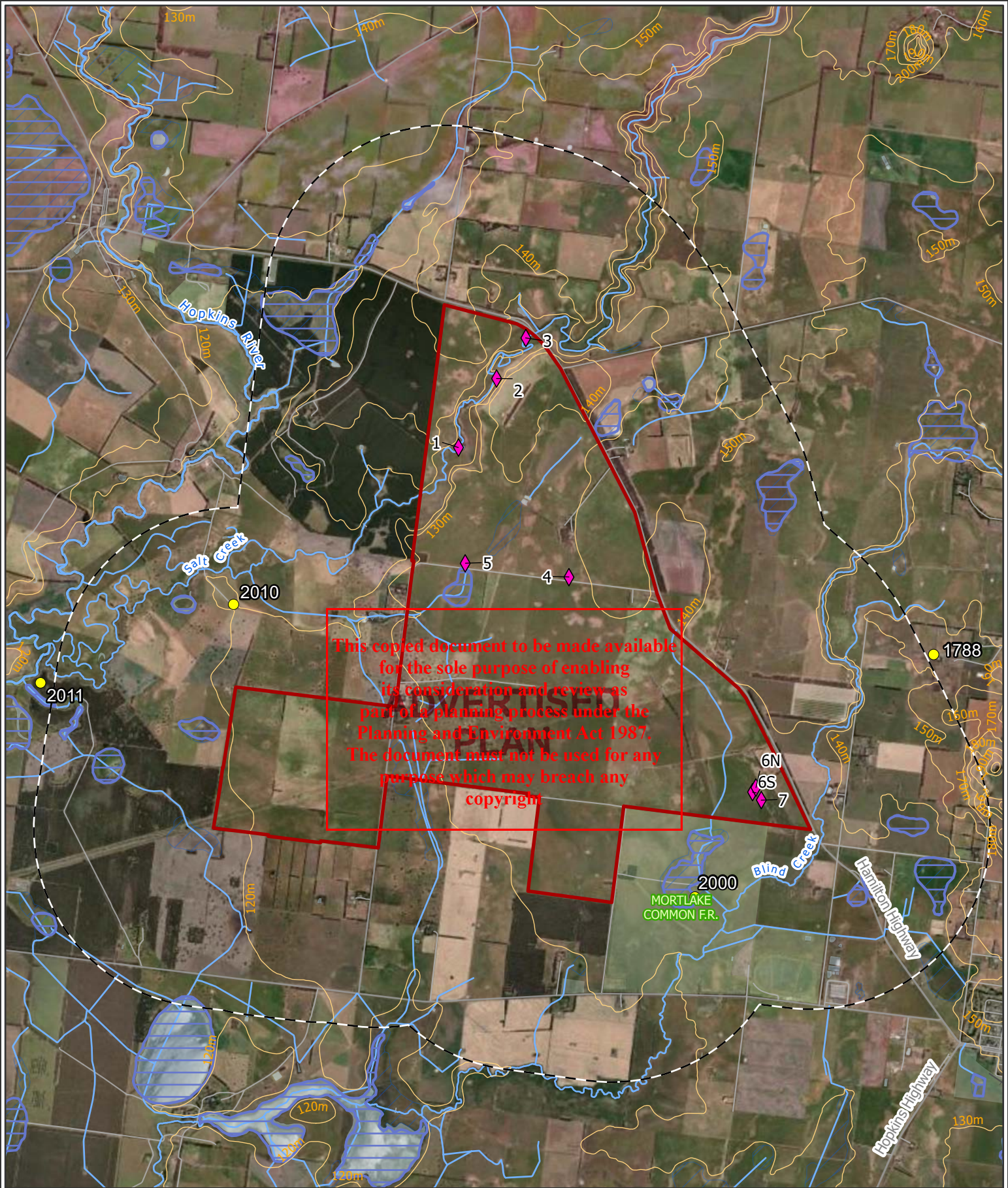
Table 1. Targeted survey results

Survey location	Species	Comments
1	Nil	No frog activity
2	Spotted Marsh Frog, Striped Marsh Frog	
3	Striped Marsh Frog	
4	Spotted Marsh Frog	
5	Nil	No frog activity
6	Spotted Marsh Frog, Striped Marsh Frog and Southern Brown Tree Frog.	
7	Nil	No frog activity

In addition to non-target frog species, native species including Australian Short finned Eel *Anguilla australis*, Eastern Snake-necked Turtle *Chelodina longicollis* and the EPBC Act listed Dwarf Galaxias *Galaxias pusilla* (considered synonymous with Little Galaxias *Galaxiella toourtkoourt*) were also recorded at Salt Creek. Fish activity was most prevalent at survey location 1, where in the shallow water, fish were observed close to the surface.

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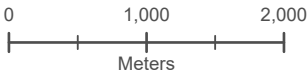
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Growling Grass Frog Targeted Survey Results: Overview

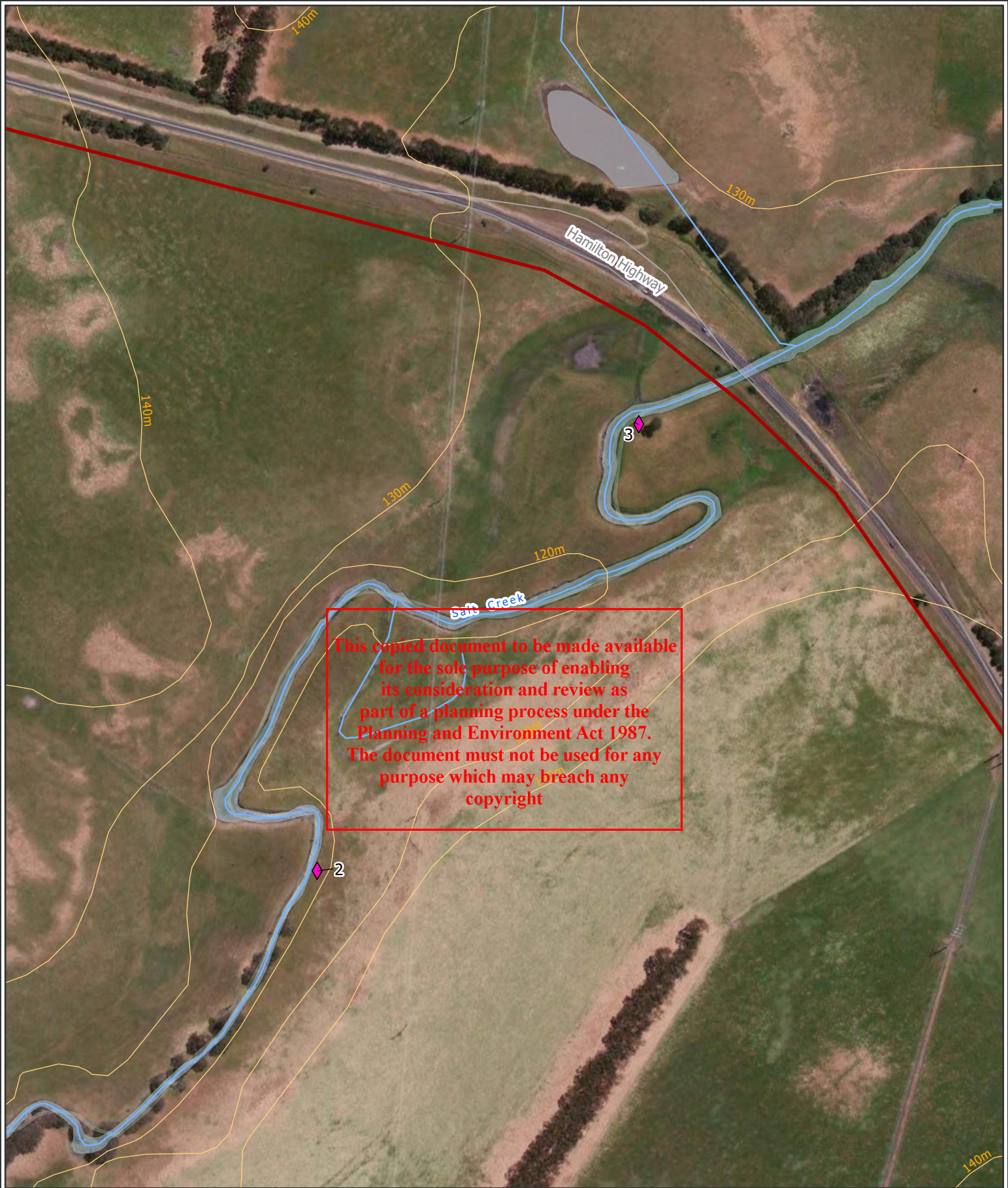
Moyne Shire

- Study area
- 2km buffer on study area
- Growling Grass Frog (VBA, 2023)
- ◆ Growling Grass Frog targeted survey location
- Elevation - 10m
- Current wetland
- Major watercourse
- Minor watercourse
- Water area
- Area subject to inundation
- Park or Reserve
- Other public land



Datum/Projection:
GDA 1994 VICGRID94
Project: 4927-LP Date: 29/01/2024

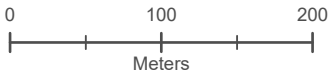




Growling Grass Frog Targeted Survey Results: Detail map 1 **Moyne Shire**

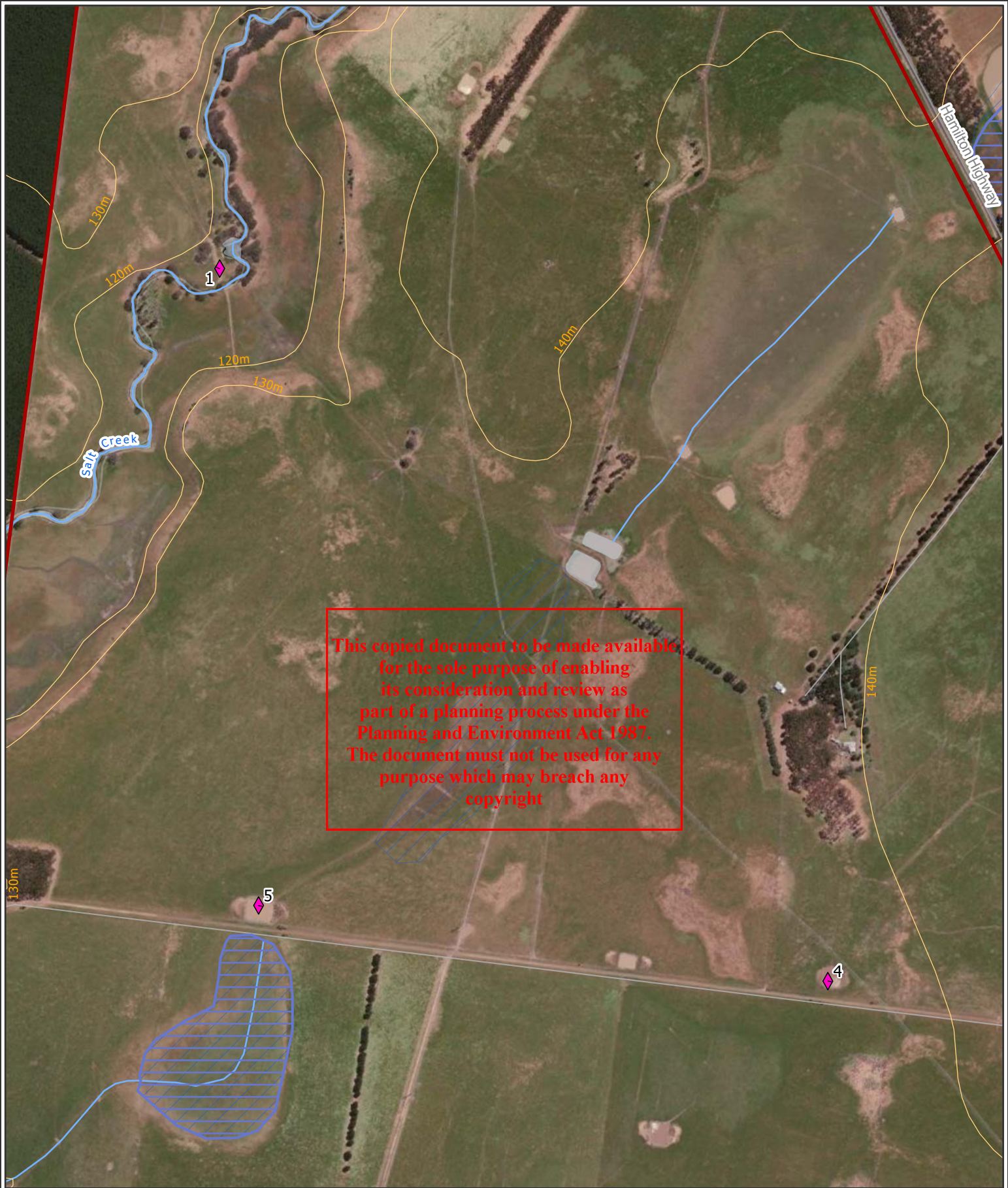
- Study area
- 2km buffer on study area
- ◆ Growling Grass Frog targeted survey location
- Elevation - 10m
- Minor watercourse
- Water area
- Other public land

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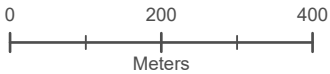




Growling Grass Frog Targeted Survey Results: Detail map 2 **Moyne Shire**

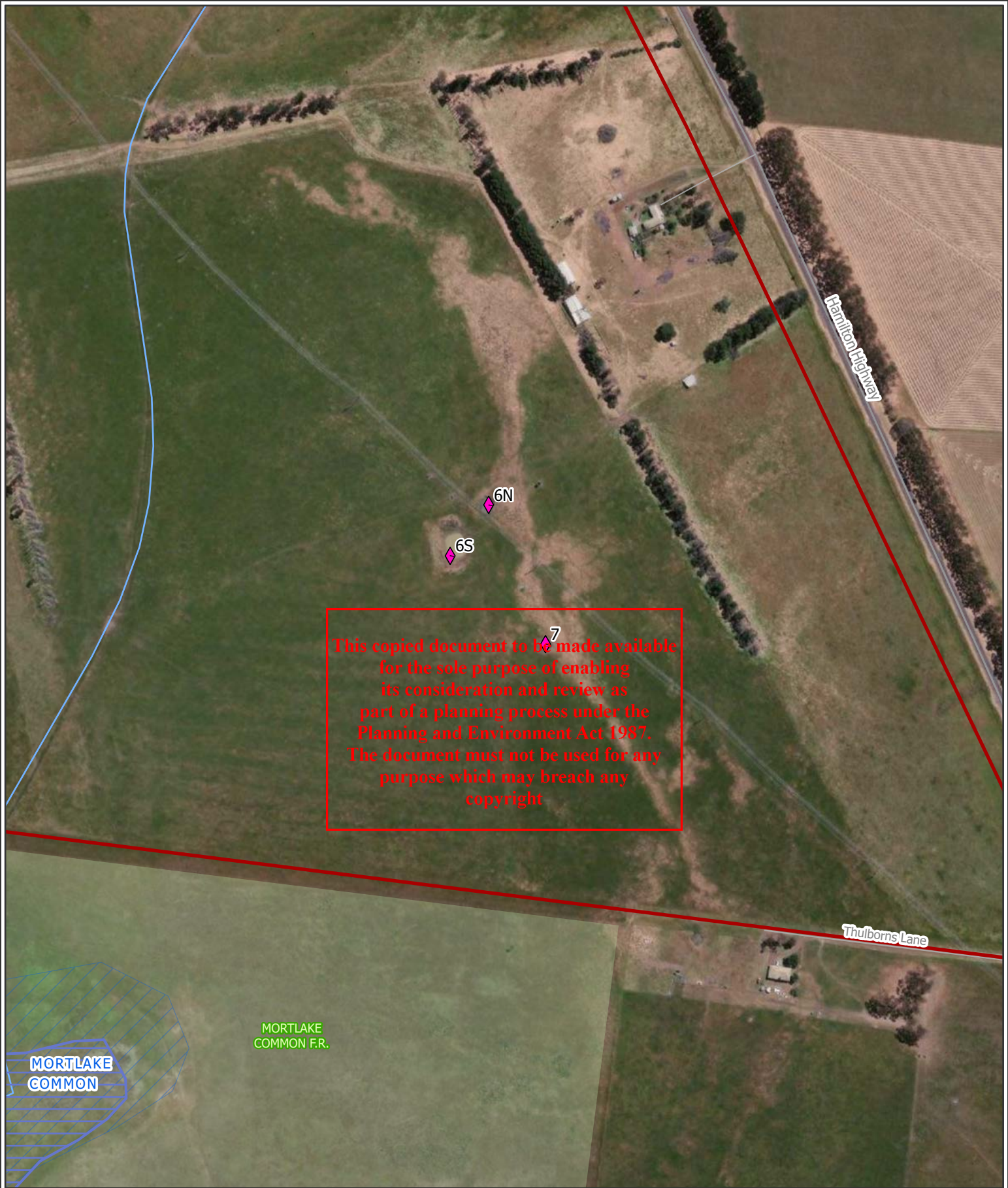
- | | |
|--|--|
| Study area | Current wetland |
| 2km buffer on study area | Minor watercourse |
| ◆ Growling Grass Frog targeted survey location | Water area |
| — Elevation - 10m | Area subject to inundation |
| | Other public land |

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Growling Grass Frog Targeted Survey Results: Detail map 3

Moyne Shire

- Study area
- Current wetland
- 2km buffer on study area
- Minor watercourse
- Area subject to inundation
- Park or Reserve
- ◆ Growling Grass Frog targeted survey location

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4. Discussion

No Growling Grass Frog were detected and amphibian activity was notably low across all survey locations.

Despite not recording Growling Grass Frog at the time of the assessment, Salt Creek provides suitable habitat for the species due to the permanency of the water and abundance of fringing and floating aquatic vegetation. It is uncertain as to why none were recorded during the assessment given the suitability of habitat. However, given the presence of suitable habitat and existing recent historical records, it remains likely that Growling Grass Frog occur at Salt Creek, at least on an intermittent basis.

Outside of Salt Creek surveyed habitat is mostly considered marginal for the species. Dams across the site were typically heavily trafficked by sheep and as a consequence heavily degraded, lacking suitable terrestrial fringing and aquatic macrophyte cover and offering little species refuge. Where stock access was limited by natural features, such as the presence of volcanic rock, habitat suitability was higher although the small size of these habitats (locations 6N and 7) and their likely ephemeral nature they are unlikely to support the species on an ongoing basis. Furthermore, the drainage line identified during the desktop assessment as potentially linking the site and Mortlake Common was dry and colonised exclusively by pasture grass species. This considered to indicate that it likely provides limited opportunities for species dispersal. Based on these assessments it now considered that species dispersal across the site, linking the habitats of Salt Creek and Mortlake is unlikely, with connectivity between these habitats likely supported by other waterways and bodies within the surrounding landscape.

On the basis of species non detection and limited habitat, Growling Grass Frog (with the exception of Salt Creek) are considered to have a low likelihood of occurrence.

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APPENDIX A. Habitat assessment

Location	Type	Character	Species	Vegetation		Cover %		Dimensions
				Fringing	Emergent	Floating		
1	Creek	Open pool of shallow water with minimal shading from River Red Gums along tree banks. Emergent and floating aquatic vegetation with in-stream debris including logs for basking. Muddy banks edges show signs of pugging from sheep.	Bullrush <i>Typha sp.</i> Common Reed <i>Phragmites australis</i> Common Tussock-grass <i>Poa Labillardieri</i> Giant Rush <i>Juncus pallidus</i> Tall Spikerush <i>Eleocharis sphacelata</i> Water Ribbons <i>Triglochin procera</i> River Red Gum <i>Eucalyptus camaldulensis</i> Pasture Grass	40	10	30		Contiguous waterway, approximately 12 m wide
2	Creek	Shallow narrow creek line with a moderate cover of floating and emergent aquatic vegetation and in-stream woody and small rocky debris. Native and exotic fringing grassy and sedgy vegetation. Muddy banks edges show signs of pugging from sheep.	Common Tussock-grass <i>Poa Labillardieri</i> Tall Spikerush <i>Eleocharis sphacelata</i> Thistle sp. Toowoomba Canary Grass <i>Phalaris aquatica</i> Water Ribbons <i>Triglochin procera</i>	80	30	25		Contiguous waterway, approximately 12 m wide
3	Creek	Shallow narrow creek line with a high cover of emergent aquatic vegetation dominated by Common Reed <i>Phragmites australis</i> . Minimal in-stream woody and small rocky debris. Native and exotic fringing grassy and sedgy vegetation. Muddy banks edges show signs of pugging from sheep.	Bullrush <i>Typha sp.</i> Common Reed <i>Phragmites australis</i> Common Tussock-grass <i>Poa Labillardieri</i> Tall Spikerush <i>Eleocharis sphacelata</i> Water Ribbons <i>Triglochin procera</i> Pasture Grass	80	60	5		Contiguous waterway, approximately 15 m wide

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4	Dam	Stock dam. Highly pugged. Fringing comprises pasture grass only with one large rock for shelter. Marginal dispersal habitat as dam is located between to ephemeral wetlands and downstream of Salt Creek.	Pasture Grass	80	0	0	40 x 20 m
5	Dam	Stock dam. Highly pugged. Stands of scotch thistle and fringing pasture grass. Marginal dispersal habitat as dam is located between to ephemeral wetlands and downstream of Salt Creek.	Pasture Grass	80	0	0	55 x 40 m
6N	Wetland	Small wetland / dam bounded by medium and large sized volcanic rock. The grassy bank was primarily improved pasture grass with scattered native Wallaby Grass and Rush. High aquatic vegetation cover dominated, Pondweed and Milfoil. With only a small amount of emergent and fringing Juncus sp. A second low quality dam was located approximately 50 m to the south west.	Red Water-milfoil <i>Myriophyllum verrucosum</i> Pondweed <i>Potamogeton sp</i> Rush <i>Juncus sp.</i> Spikerush <i>Eleocharis sp.</i> Wallaby Grass <i>Rytidosperma sp.</i> Pasture Grass	50	5	65	16 x 10 m
6S	Dam	Low-quality dam with pasture grass dominating the pugged grassy bank. In proximity to nearby moderate quality wetlands Location 6N and 7. Floating filamentous algae near margins	Pasture Grass, floating filamentous algae.	5	0	0	25 x 20 m

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7	Wetland	Small wetland / dam bounded by medium and large sized volcanic rock. The grassy bank was primarily improved pasture grass with scattered native Wallaby Grass and Rush. Aquatic vegetation cover was high and was dominated by Water Fern	Rush <i>Juncus sp.</i> Spikerush <i>Eleocharis sp.</i> Wallaby Grass <i>Rytidosperma sp.</i> Water Fern <i>Azolla s.p</i> Pasture grass	80	5	90	10 x 12 M
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Appendix C Protected Matters Search Tool

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Sep-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

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Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	53
Listed Migratory Species:	12

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Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	15
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

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Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	Community known to occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area	In buffer area only
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	Community likely to occur within area	In feature area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat known to occur within area	In feature area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Nannoperca obscura Yarra Pygmy Perch [26177]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
FROG			
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In feature area
INSECT			
Synemon plana Golden Sun Moth [25234]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Antechinus minimus maritimus Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat may occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Miniopterus orianae bassanii Southern Bent-wing Bat [87645]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In feature area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area	In feature area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lachnagrostis adamsonii Adamson's Blown-grass, Adamson's Blowngrass [76211]	Endangered	Species or species habitat likely to occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat likely to occur within area	In buffer area only

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat known to occur within area	In feature area
Pimelea spinescens subsp. spinescens Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Poa sallacustris Salt-lake Tussock-grass [24424]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat may occur within area	In feature area
Prasophyllum suaveolens Fragrant Leek-orchid [64956]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Pterostylis basaltica Basalt Greenhood [56506]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat may occur within area	In feature area
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area	In feature area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In buffer area only

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat may occur within area	In feature area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area	In feature area
Thelymitra orientalis Hoary Sun-orchid [88011]	Critically Endangered	Species or species habitat may occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area	In feature area

REPTILE			
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eulamprus tympanum marnieae Corangamite Water Skink, Dreeite Water Skink [64487]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca Satin Flycatcher [612]	This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright	Species or species habitat likely to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area

Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]	ADVERTISED PLAN	Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area

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Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]	ADVERTISED PLAN	Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]	This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright	Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]		Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

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Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Cobra Killuc W.R.	Nature Conservation Reserve	VIC	In buffer area only
Mortlake Common F.R	Nature Conservation Reserve	VIC	In feature area

Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.	

RFA Name	State	Buffer Status
West Victoria RFA	Victoria	In feature area

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Woorndoo-Hopkins Wetlands	VIC	In buffer area only

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Hexham Wind Farm	2022/09287		Assessment	In buffer area only	

Controlled action				
Dundonnell Wind Farm, VIC	2012/6557	Controlled Action	Post-Approval	In feature area
Mortlake Wind Farm	2008/4128	Controlled Action	Post-Approval	In buffer area only
Mt Fyans Wind Farm	2019/8589	Controlled Action	Assessment Approach	In feature area
Otway Development	2002/621	Controlled Action	Post-Approval	In buffer area only

Not controlled action

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Ellerslie Timber Bridge Partial Restoration	2009/4734	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Mortlake South Wind Farm, 5 km south of Mortlake, Vic	2017/8137	Not Controlled Action	Completed	In buffer area only
Salt Creek Wind Farm	2006/3012	Not Controlled Action	Completed	In buffer area only
Salt Creek Wind Farm transmission line, Vic	2016/7763	Not Controlled Action	Completed	In feature area
The Sisters Wind Farm	2008/4268	Not Controlled Action	Completed	In buffer area only
Victorian Generator Project	2005/1984	Not Controlled Action	Completed	In feature area
Water pipelines, Mortlake Power Station	2006/2881	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

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Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

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The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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Appendix D Observed species

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D1 Key

Origin	Status
* - Introduced	EPBC – listed under EPBC Act
N - Naturalised	EPBC Mi– migratory species listed under EPBC Act
In – Indigenous	EPBC Ma - marine species listed under EPBC Act
	FFG L – Listed under FFG Act
	FFG P – Protected under the FFG Act
	DELWP – Listed on the DELWP Advisory lists
	Noxious – Listed as a noxious weed
	H/T – Considered a high threat weed in the context of the site

D2 Fauna

Common Name	Species Name	Origin ¹	Status ²
Australian White Ibis	<i>Threskiornis molucca</i>	In	
Australasian Grebe	<i>Tachybaptus</i> <i>novaehollandiae</i>	In	
Australasian Pipit	<i>Anthus novaehollandiae</i> <i>cracticus</i>	In	
Australian Magpie	<i>Cracticus tibicen</i>	In	
Australian Raven	<i>Corvus corax</i>	In	
Black Swan	<i>Cygnus cygnus</i>	In	
Brown Falcon	<i>Falco berigora</i>	In	
Brown Songlark	<i>Cincloramphus cruralis</i>	In	
Brown Tree Frog	<i>Littoria ewingii</i>	In	
Chestnut Teal	<i>Anas castanea</i>	In	
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	In	
Common Starling	<i>Sturnus vulgaris</i>	*	
Crested Pigeon	<i>Ocyphaps lophotes</i>	In	
Little/Dwarf Galaxias	<i>Galaxiella toourtkoort</i>	In	EPBC Act
Eastern Rosella	<i>Platycercus eximius</i>	In	
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	In	
Eastern Long-necked Turtle	<i>Chelodina longicollis</i>	In	
European Goldfinch	<i>Carduelis carduelis</i>	*	
European Skylark	<i>Alauda arvensis</i>	*	
Fairy Martin	<i>Petrochelidon ariel</i>	In	
Hoary-headed Grebe	<i>Poliiocephalus</i>	In	

Common Name	Species Name	Origin ¹	Status ²
	<i>poliocephalus</i>		
House Sparrow	<i>Passer domesticus</i>	*	
Mosquito Fish	<i>Gambusia affinis</i>	*	
Nankeen Kestrel	<i>Falco cenchroides</i>	In	
New-holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	In	
Long Billed Corella	<i>Cacatua tenuirostris</i>	In	
Pacific Black Duck	<i>Anas superciliosa</i>	In	
Red-rumped Parrot	<i>Psephotus haematonotus</i>	In	
Short-finned Eel	<i>Anguilla australis</i>	In	
Southern Brown Tree Frog	<i>Litoria ewingii</i>	In	
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>	In	
Striped Marsh Frog	<i>Limnodynastes peroni</i>	In	
Stubble Quail	<i>Coturnix pectoralis</i>	In	
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	In	
Tawny Frogmouth	<i>Podargus strigoides</i>	In	
Tree Martin	<i>Petrochelidon lunifrons</i>	In	
Welcome Swallow	<i>Hirundo neoxena</i>	In	
Whistling Kite	<i>Halastur spectabilis</i>	In	
White-faced Heron	<i>Egretta novaehollandiae</i>	In	
White-necked Heron	<i>Ardea pacifica</i>	In	
Willie Wagtail	<i>Rhipidura leucophrys</i>	In	
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	In	

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D3 Flora

Species name	Common name	Origin ¹	Status ²
<i>Acacia genistifolia</i>	Spreading Wattle	In	FFG-P
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Coast Wattle	N	
<i>Acacia mearnsii</i>	Black Wattle	In	FFG-P
<i>Acacia melanoxylon</i>	Blackwood	In	
<i>Acacia oxycedrus</i>	Spike Wattle	In	FFG-P
<i>Acacia terminalis</i>	Sunshine Wattle	In	FFG-P
<i>Acrotriche serrulata</i>	Honeypot	In	
<i>Allocasuarina littoralis</i>	Black Sheoak	In	

Species name	Common name	Origin ¹	Status ²
<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge	In	
<i>Amyema</i> spp.	Mistletoe	In	
<i>Arthropodium strictum</i> s.l.	Chocolate Lily	In	
<i>Asparagus asparagoides</i>	Bridal Creeper	*	
<i>Asperula</i> spp.	Woodruff	In	
<i>Austrostipa</i> spp.	Spear Grass	In	
<i>Avena</i> spp.	Wild Oats	*	
<i>Banksia marginata</i>	Silver Banksia	In	
<i>Bossiaea heterophylla</i>	Variable Bossiaea	In	FFG
<i>Bossiaea prostrata</i>	Creeping Bossiaea	In	
<i>Bursaria spinosa</i>	Sweet Bursaria	In	
<i>Carex inversa</i>	Knob Sedge	In	
<i>Carex</i> spp.	Sedge	In	
<i>Cassinia aculeata</i> subsp. <i>aculeata</i>	Shiny Cassinia	In	
<i>Cassinia longifolia</i>	Slender Dodder-laurel	In	
<i>Cassytha glabella</i>	Centella	In	
<i>Centella cordifolia</i>	Rock Fern	In	FFG-P
<i>Cheilanthes</i> spp.	Autumn Wasp-orchid	In	FFG-P
<i>Chiloglottis curvicalvia</i>			
<i>Cirsium vulgare</i>	Spear Thistle	*	
<i>Clematis microphylla</i> s.l.	Small-leaved Clematis	In	
<i>Comesperma volubile</i>	Love Creeper	In	
<i>Correa reflexa</i>	Common Correa	In	FFG-P
<i>Cotula australis</i>	Common Cotula	In	
<i>Cyperus eragrostis</i>	Drain Flat-sedge	*	
<i>Dactylis glomerata</i>	Cock's Foot	*	
<i>Dianella revoluta</i> s.l.	Black-anther Flax-lily	In	
<i>Dichondra repens</i>	Kidney Weed	In	
<i>Dillwynia glaberrima</i>	Smooth Parrot-pea	In	
<i>Ehrharta</i> spp.	Veldtgrass	*	
<i>Einadia nutans</i>	Nodding Saltbush	In	
<i>Epacris impressa</i>	Common Heath	In	FFG-P

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Species name	Common name	Origin ¹	Status ²
<i>Eucalyptus bridgesiana</i> s.l.	But But	In	
<i>Eucalyptus globoidea</i>	White Stringybark	In	
<i>Eucalyptus tereticornis</i> subsp. <i>mediana</i>	Gippsland Red-gum	In	
<i>Exocarpos cupressiformis</i>	Cherry Ballart	In	
<i>Gahnia radula</i>	Thatch Saw-sedge	In	
<i>Geranium</i> spp.	Crane's Bill	In	
<i>Gonocarpus humilis</i>	Shade Raspwort	In	
<i>Gonocarpus tetragynus</i>	Common Raspwort	In	
<i>Hardenbergia violacea</i>	Purple Coral-pea	In	
<i>Holcus lanatus</i>	Yorkshire Fog	*	
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	In	
<i>Hypericum gramineum</i>	Small St John's Wort	In	
<i>Hypochaeris radicata</i>	Cat's Ear	*	
<i>Isolepis</i> spp.	Sword-sedge	In	
<i>Juncus pallidus</i>	Pale Rush	In	
<i>Juncus bufonius</i>	Toad Rush	In	
<i>Kennedia prostrata</i>	Red Bonnet	In	
<i>Kunzea ericoides</i> s.l.	Burgan	In	
<i>Lepidosperma concavum</i>	Variable Sword-sedge	In	
<i>Leucopogon virgatus</i> var. <i>virgatus</i>	Common Bearded-heath	In	
<i>Lomandra filiformis</i>	Wattle Mat-rush	In	
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	In	
<i>Lomandra nana</i>	Dwarf Mat-rush	In	
<i>Melaleuca ericifolia</i>	Swamp Paperbark	In	
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	In	
<i>Olearia lirata</i>	Snowy Daisy-bush	In	
<i>Opercularia</i> sp.	Stinkweed	In	
<i>Oxalis</i> spp.	Wood Sorrel	N	
<i>Pinus radiata</i>	Radiata Pine	*	
<i>Plantago gaudichaudii</i>	Narrow Plantain	In	
<i>Plantago lanceolata</i>	Ribwort Plantain	*	
<i>Platylobium formosum</i> s.l.	Handsome Flat-pea	In	

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Species name	Common name	Origin ¹	Status ²
<i>Platysace lanceolata</i>	Shrubby Platysace	In	
<i>Poa labillardierei</i>	Common Tussock-grass	In	
<i>Poa spp.</i>	Tussock Grass	In	
<i>Poranthera microphylla s.l.</i>	Small Poranthera	In	
<i>Pteridium esculentum</i> subsp. <i>esculentum</i>	Austral Bracken	In	
<i>Pultenaea spp.</i>	Bush-pea	In	
<i>Rytidosperma spp.</i>	Wallaby Grass	In	
<i>Senecio prenanthoides</i>	Beaked Fireweed	In	
<i>Senecio spp.</i>	Fireweed	In	
<i>Tetrarrhena juncea</i>	Forest Wire-grass	In	
<i>Themeda triandra</i>	Kangaroo Grass	In	
<i>Triticum aestivum</i>	Common Wheat	*	
<i>Viola hederacea sensu Entwisle (1996)</i>	Ivy-leaf Violet	In	
<i>Wahlenbergia spp.</i>	Bluebell	In	
<i>Xanthorrhoea minor</i> subsp. <i>lutea</i>	Small Grass-tree	In	FFG-P

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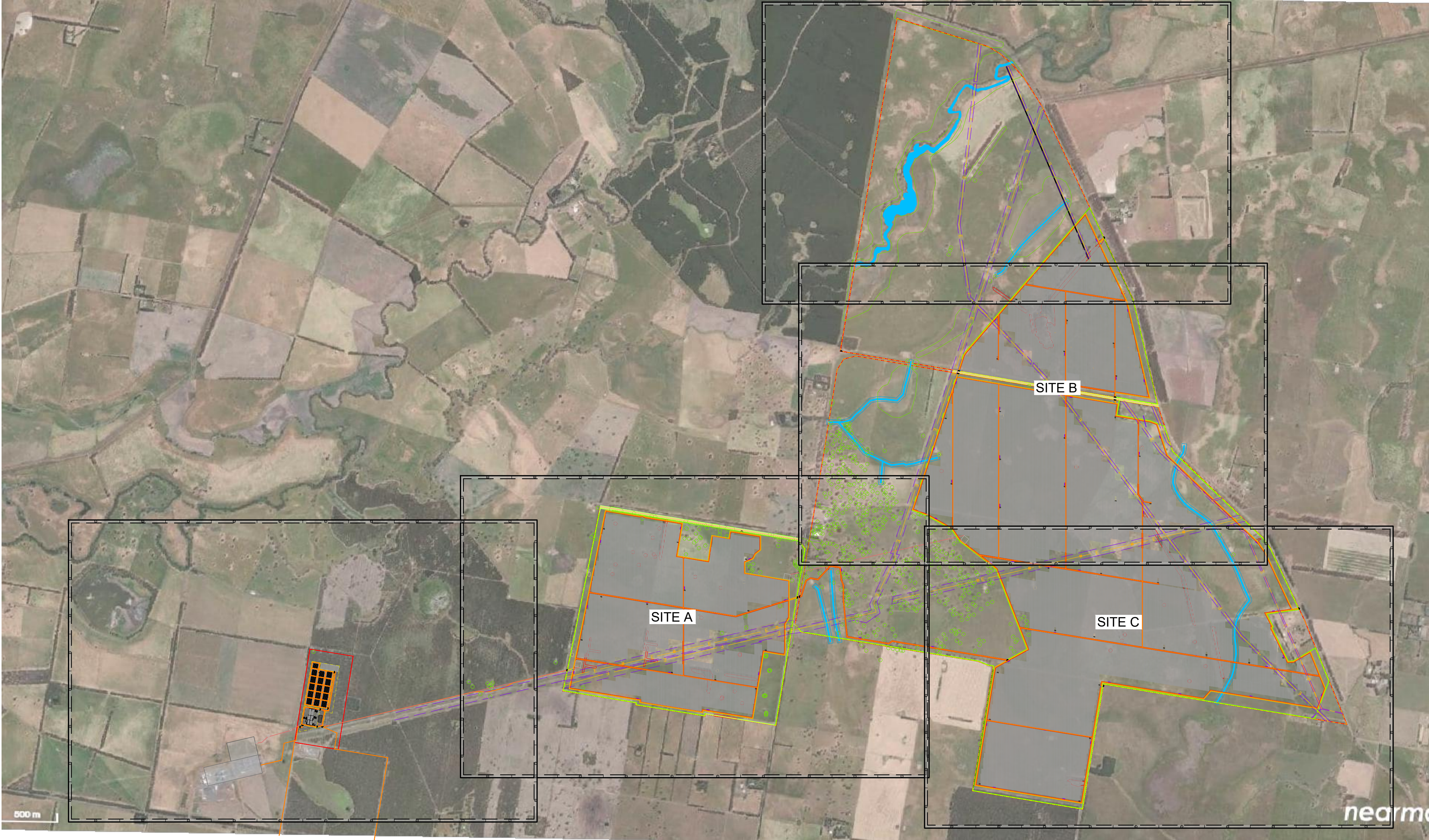
Appendix E Design Plans

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MORTLAKE ENERGY HUB

SITE PLAN



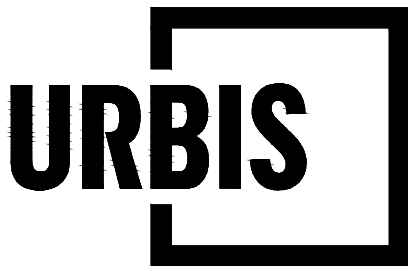
PROJECT DETAILS	
BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	360MWp
AC CAPACITY	300MW
PV MODULES	795,762
STRING TRACKERS	8455
SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

- DEVELOPMENT BOUNDARY
- PERIMETER FENCE
- SECURITY FENCE
- UNDERGROUND CABLE 33kV
- ACCESS ROADS
- PUBLIC ROADS IN RESERVE
- EXTERNAL VEGETATION BUFFER (5m)
- INTERNAL FIRE SAFETY BUFFER (10m)
- EXISTING EASEMENT POWERLINES SET WITHIN
- OVERLAND FLOW PATH
- PASSING BAYS
- GATES
- 45,000L WATER TANK (11)
- 288,00L WATER TANK (1)
- SOLAR INVERTER (44)
- EXISTING VEGETATION - REMOVED
- EXISTING VEGETATION - RETAINED

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- 2-STRING TRACKER (1251) - 66 PANELS
- 3-STRING TRACKER (7204) - 99 PANELS



PROJECT
MORTLAKE ENERGY HUB
SITE PLAN
HAMILTON HIGHWAY, MORTLAKE 3272
VICTORIA, AUSTRALIA

Level 10, 477 Collins Street | Melbourne VIC 3000 AUSTRALIA | +61 3 8663 4888 | URBIS Pty Ltd | ABN 50 105 256 228

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D	FOR REVIEW	AF	BB	11.04.2024
C	FOR REVIEW	OS	BB	18.03.2024
B	FOR REVIEW	AF	BB	28.02.2024
A	INTERNAL DRAFT FOR REVIEW	AF	BB	13.12.2023

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PLOT DATE: 19.06.2024

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PROJECT DETAILS

BOUNDARY AREA	1000 Ha
PANEL AREA	1000 Ha (05% of site)
GATES	19
DC CAPACITY	300MWp
AC CAPACITY	302MW
PV MODULES	756,762
STRING TRACKERS	9485
SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.84m

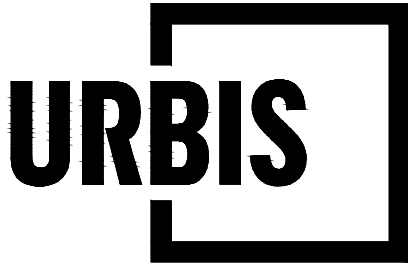
GENERAL LEGEND

DEVELOPMENT BOUNDARY

PERIMETER FENCE

SECURITY FENCE

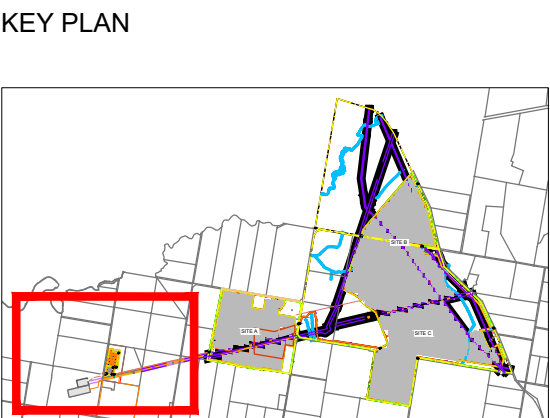
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A	INTERNAL DRAFT FOR REVIEW	AF	BB	13.12.2023

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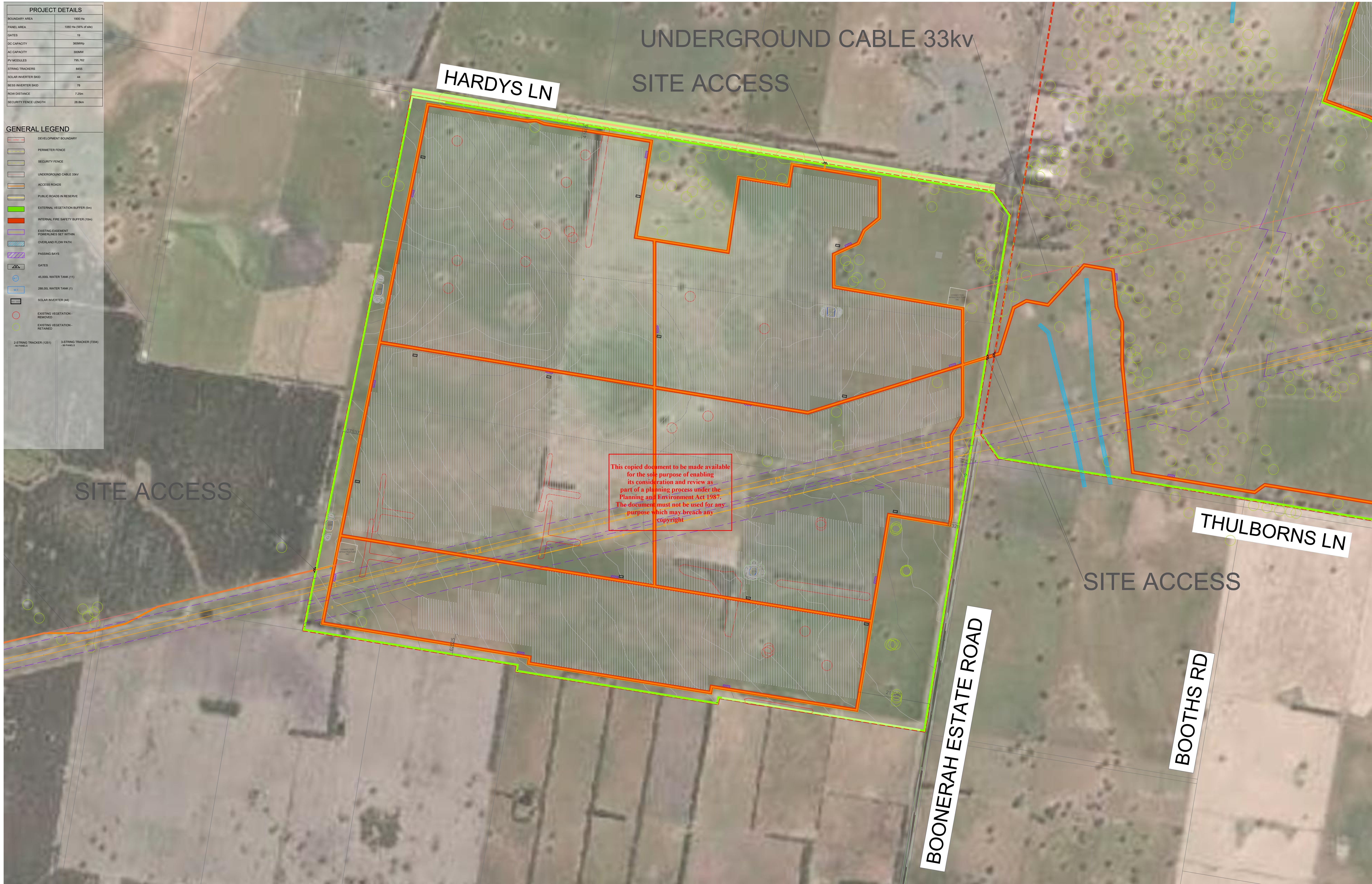
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001-CS DETAIL PLAN 01

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1:10000 @ A3
DRAWING NO.
001-CS

PROJECT NO.
P0040707
NORTH
REVISION
E

PROJECT DETAILS	
BOUNDARY AREA	1900 Ha
PANEL AREA	1060 Ha (56% of site)
GATES	19
DC CAPACITY	300MWp
AC CAPACITY	300MW
PV MODULES	795,762
STRING TRACKERS	8455
SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km



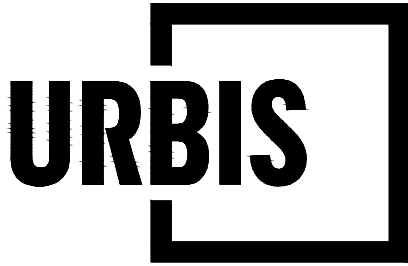
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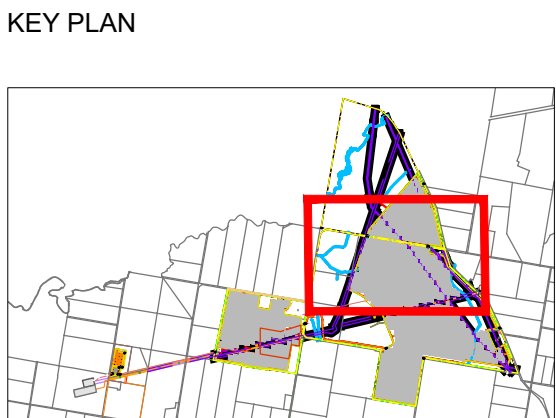
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PROJECT
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DRAWING TITLE
004-CS DETAIL PLAN 04

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DRAWING NO.
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P0040707
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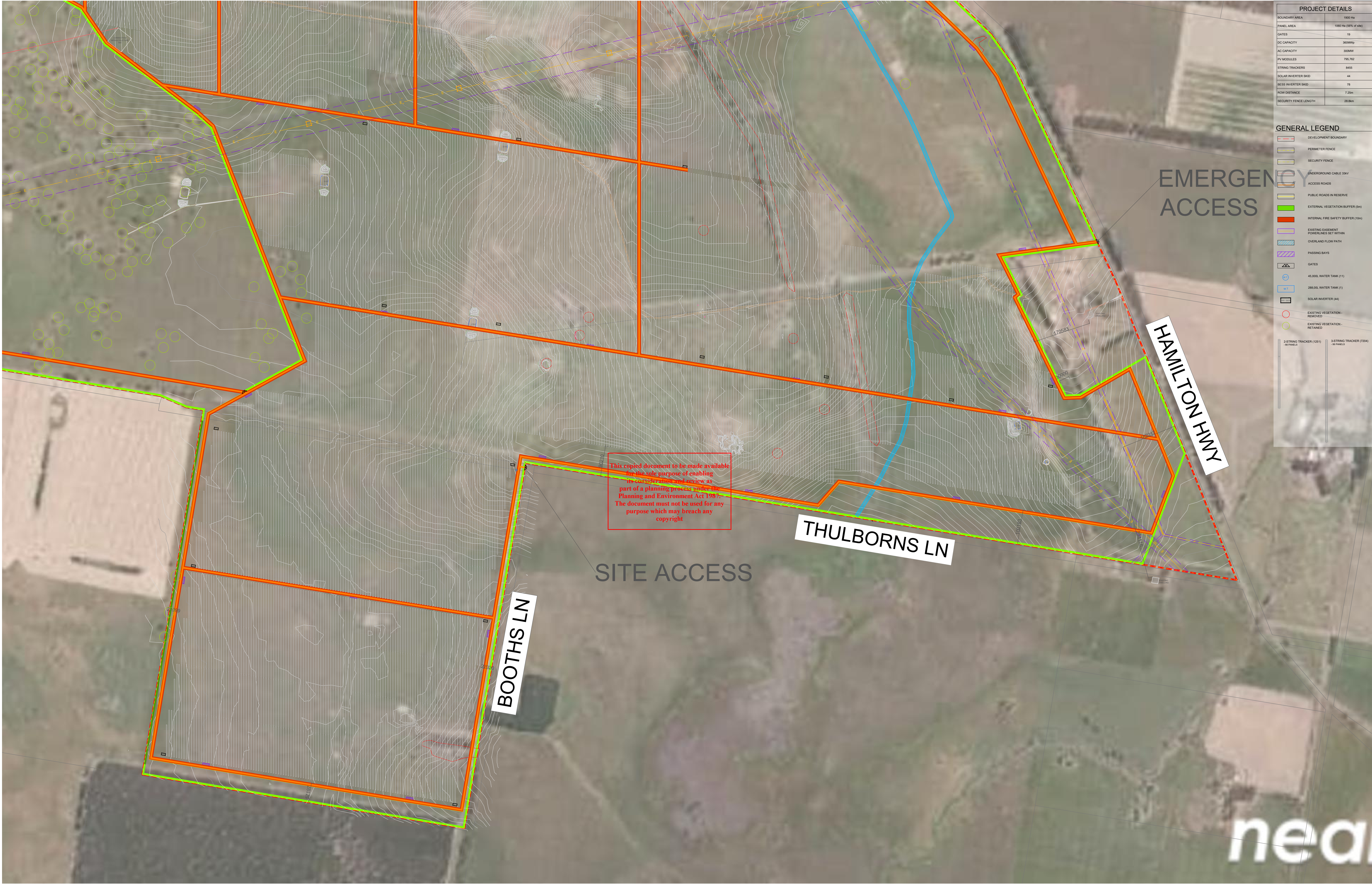
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PROJECT DETAILS

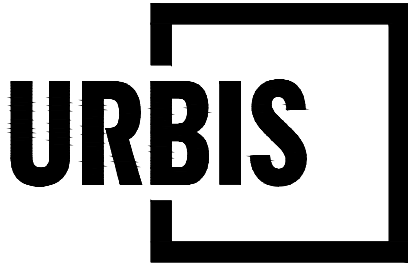
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PANEL AREA	1000 Ha (95% of 484)
GATES	10
DC CAPACITY	300MW
AC CAPACITY	300MW
PV MODULES	796,762
STRING TRACKERS	8465
SOLAR INVERTER SKID	44
BESS INVERTER SKID	78
ROW DISTANCE	7.25m
SECURITY FENCE LENGTH	28.8km

GENERAL LEGEND

- DEVELOPMENT BOUNDARY
- PERMETER FENCE
- SECURITY FENCE
- UNDERGROUND CABLE 33KV
- ACCESS ROADS
- PUBLIC ROADS IN RESERVE
- EXTERNAL VEGETATION BUFFER (5m)
- INTERNAL FIRE SAFETY BUFFER (10m)
- EXISTING EASEMENT POWERLINES SET WITHIN
- OVERLAND FLOW PATH
- PASSING BAYS
- GATES
- 40,000L WATER TANK (11)
- 288,000L WATER TANK (1)
- SOLAR INVERTER (44)
- EXISTING VEGETATION - REMOVED
- EXISTING VEGETATION - RETAINED

2-STRING TRACKER (1251)
18 PANELS

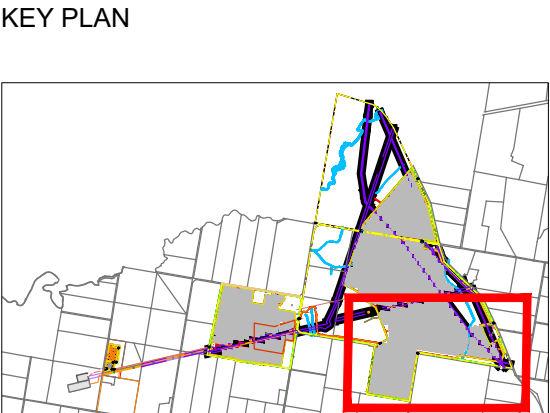
3-STRING TRACKER (1704)
18 PANELS



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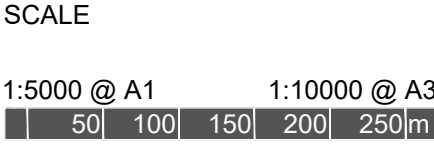
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D	FOR REVIEW	AF	BB	11.04.2024	
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PROJECT NO.
P0040707

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Appendix F Detailed VQA data for impacted vegetation

Table 10. Vegetation Quality Assessment scores

Habitat Zone			HZ1	HZ2	HZ24	HZ25
EVC			55_61	55_61	55_61	55_61
Bioregion			Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain
Bioregional Conservation Status (BCS)			Endangered	Endangered	Endangered	Endangered
Site Condition	Large Old Trees	10	0	9	0	0
	Tree Canopy Cover	5	4	4	4	4
	Lack of Weeds	15	0	0	0	0
	Understorey	25	0	0	0	0
	Recruitment	10	0	0	0	0
	Organic Litter	5	5	5	5	5
	Logs	0	0	0	0	0
	Total Site Score	75	9	18	9	9
Standardiser		-	1	1	1	1
Standardised Site Score		-	9	18	9	9
Landscape Context	Patch Size	10	1	1	1	1
	Distance to Core Area	5	1	1	1	1
	Neighbourhood	10	0	0	0	0
	Total Landscape Score	25	2	2	2	2
Habitat Score		100	11	20	11	11
Habitat Points = Score/100		1	0.110	0.200	0.110	0.110
Area Ha			0.023	0.018	0.016	0.020
Large tree in patch			0	1	0	0

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le 11. Trees in patches

Habitat Zone	Tree ID	Scientific Name	Common Name	DBH	Hollow(s)
HZ1	LT1	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	91	No

Table 12. Scattered trees

Tree ID	Scientific Name	Common Name	DBH	Size class	
T1	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	125	Large	Yes
T2	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	130	Large	Yes
T3	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	122	Large	Yes
T4	Stag	Dead tree	119	Large	Yes
T5	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	121	Large	No
T6	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	89	Large	No
T7	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	115	Large	No
T8	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	125	Large	Yes
T9	Stag	Dead tree	90	Large	Yes
T10	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	141	Large	No
T11	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	106	Large	Yes
T12	Stag	Dead tree	119	Large	Yes
T13	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	126	Large	Yes
T14	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	121	Large	Yes
T15	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	129	Large	Yes
T16	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	181	Large	Yes
T17	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	125	Large	Yes
T18	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	130	Large	Yes
T19	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	98	Large	No
T20	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>	River Red Gum	50	Small	No

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Appendix G EPBC Act assessment of impacts

Table 13. Grey-headed Flying-fox (listed as Vulnerable under the EPBC Act)

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	No, The species National Recovery Plan (DAWE, 2021) does not identify or define important populations of the species. The plan does however identify nationally important camps for the species. No camps occur within the study area. Of these camps, the camp in the Geelong Botanic Gardens is the nearest nationally significant camp and is approximately 140 kilometres east of the study area. Minor camps identified in the National Flying Fox Monitoring Viewer occur approximately 1.5 km to the west of the study area in Hexham, 41 km to the south in Warrnambool and 81 km to the east in Colac (DCCEEW, 2024c). The minor camp closest to the study area in Hexham, was first identified in August 2021 with between 2,500 – 9,999 individuals occurring (DCCEEW, 2024c). The number of individuals declined to between 500 -2,499 in February 2022 and is the last known monitoring undertaken for the camp (DCCEEW, 2024c). Grey-headed Flying-fox have also been recorded at Salt Creek Wind Farm approximately 10 km north of the study area as part of the bat monitoring undertaken for the wind farm in 2020 (Biosis, 2020). Suitable foraging habitat occurs within the study area in the form of large scattered paddock trees, and large remnant trees associated with Salt Creek (Figure 3). When in flower, these trees are likely to provide foraging habitat which forms part of a broader foraging extent. The project proposes to remove a small portion of foraging habitat within the study area. This vegetation primarily consists of isolated paddock trees, with larger more connected habitat to be retained. As such the proposed impact works are not considered likely to lead to a long-term decrease in the size of an important population of the species. Additionally temporary noise disturbance associated with project construction is considered unlikely to alter species occupancy. The species frequently found in association with large cities and towns where anthropogenic noise levels would be reasonably expected to commonly exceed those associated with the project.
2)	reduce the area of occupancy of an important population	No, Project impacts will be limited to the 0.077 ha of native vegetation patches and 20 large trees within the study area. Furthermore, as per the response to criterion 1 the study area is not located within proximity to any Nationally Important Camps (DAWE, 2021). However, the study area is located in close proximity to a minor camp in Hexham. As

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Criterion	Question	Response
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3)	fragment an existing important population into two or more populations	No, The project does not occur in association within proximity to any nationally important camps (DAWE, 2021). Construction and operation of the solar farm is unlikely to alter species movement. The species is highly dispersive, and impacts associated with the project are considered negligible when considering the species broad foraging extent.
4)	adversely affect habitat critical to the survival of a species	No, The National Recovery Plan (DAWE, 2021) identifies critical habitat for Grey-headed Flying Fox as • Habitat that supports important winter and spring (flowering) communities. • contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May) • contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer • Contain Native and or exotic species used for roosting at the site of a nationally important Grey-headed Flying-fox Camp. On the basis of vegetation composition, small area of vegetation loss and the study area's location relative to the nearest nationally important camp (approximately 140km) the project is not considered to be likely to adversely affect habitat critical to the survival of a species.
5)	disrupt the breeding cycle of an important population	No, Grey-headed Flying Fox are often found in association with major cities and town. Examples in Victoria include Melbourne and Geelong where large successful breeding populations are known in close proximity to city CBD's. The Hexham camp is a potential receptor of noise disturbance associated with project construction; however, such noise impacts are temporary and considered to be minor in the context of those experienced by other populations.

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Criterion	Question	Response
		The project is therefore not likely to disrupt the breeding cycle of an important population.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No, Habitat within the study area is limited to foraging habitat. The project will result in the loss of 0.077 ha of native vegetation and 20 large trees which provide foraging habitat with the project study area. This loss is considered negligible in the context of habitat to be retained in the study area and the species overall distribution.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No, No mechanism for the establishment of harmful invasive species are identified in relation to the project.
8)	introduce disease that may cause the species to decline	No, The project is not likely to introduce a disease that may cause the species to decline.
9)	interfere substantially with the recovery of the species.	No, The National Recover Plan (DAWE, 2021) identifies 9 recovery objectives for the species. On review of those objectives and in consideration of the following. - the nature of habitat to be impacted (broad foraging habitat) - The study areas distance from a nationally important camp (greater than 100km) - the small quantum of impact the project is not considered likely to interfere substantially with the recovery of the species
Conclusion	Is there likely to be a significant impact?	After considering the above statements, the project is unlikely to have a significant impact on the Grey-headed Flying-fox.

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Appendix H Response to application requirements of 52.17

The following information is provided as a response to the application requirements for the removal of native vegetation under the detailed pathway, in accordance with Schedule 52.17 of the Moyne Shire planning scheme and the *Planning and Environment Act 1987*.

1. Native vegetation to be removed or lost

Assessment pathway Detailed

Description

- 0.077 ha of Plains Grassy Woodland across two patches.
- 20 large trees (1 large tree in a patch and 19 scattered).
- 1 small scattered tree.

Extent 1.436 hectares

Condition score 0.11 to 0.20

Location category Location 2

Modelled habitat Not applicable

Offset 0.292 general habitat units

Offset requirements Glenelg Hopkins Catchment Management Authority (CMA) or Moyne Shire Council have a minimum strategic biodiversity score of 0.305 and contain 20 large trees.

2. Topographic and land information

Topography Generally low-lying to gently undulating. Moderately steep escarpment occurs in the north-east of the study area down to Salt Creek.

Water bodies and features Numerous waterbodies occur across the study area. Most are of manmade origin for the purpose of stock watering. Some low-lying areas occur including a DEECA mapped wetland in the central east of the study area with potential for occasional inundation following heavy rain. All were observed to be of low quality due to stock access.

Saline discharge areas None observed.

Erosion risk Sediment controls during construction will minimise the risk of sedimentation. Erosion is considered unlikely given that grass can establish under and between the solar panels post-construction stabilising the soil. Additionally, Salt Creek has been avoided as part of the design plans, with a buffer of approximately 1.3 km to the nearest location of project impact.

3. Photographs of vegetation

Photographs of all vegetation to be removed are presented below this table.

4. Additional vegetation clearance or approvals

Not applicable – there is no known application to remove native vegetation at the property in the past five years.

5. Avoid and minimise statement

Mitigation measures recommended to ensure indirect impacts are avoided and/or minimised are provide in Section 4.4.

6. Property management plans

Not applicable - There is no property vegetation plan for this parcel of land.

7. Defendable space statement

Not applicable – the removal of native vegetation is not required to create defendable space for bushfire mitigation.

8. Native Vegetation Precinct Plan considerations

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Not applicable - There is no native vegetation precinct plan covering this parcel of land.

9. Offset statement

Suitable offsets are available for purchase through the Native Vegetation Credit Register which have been identified on 5 August 2024 and is attached below. A quote from an accredited offset broker can be obtained as part of the planning application submission.

10. Site assessment report

This impact assessment report details information related to native vegetation and habitat within the study area.

11. Impacts to rare or threatened species habitat

Impacts to rare and threatened species are considered to be minor. The study area is highly modified and where suitable habitat exists it has largely been avoided by project design. .



Plate 12: HZ1



Plate 13: HZ2



Plate 14: HZ24



Plate 15: HZ25

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Plate 16: T1



Plate 17: T2



Plate 18: T3



Plate 19: T4



Plate 20: T5



Plate 21: T6

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Plate 22: T7



Plate 23: T8



Plate 24: T9



Plate 25: T10



Plate 26: T11



Plate 27: T12

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Plate 28: T13



Plate 29: T14



Plate 30: T15



Plate 31: T16



Plate 32: T17



Plate 33: T18

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Plate 34: T19



Plate 35: T20

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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: 01/08/2024
Time of issue: 2:00 pm

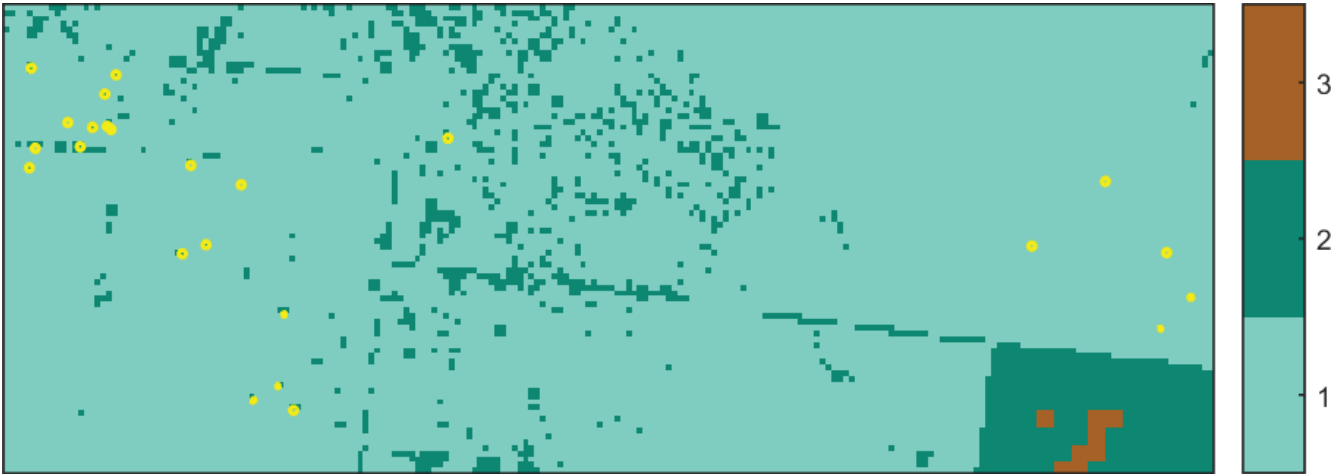
Report ID: ECL_2024_056

Project ID 23MEL4927_Mortlake_VG94_20240725

Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	1.436 ha
Extent of past removal	0.000 ha
Extent of proposed removal	1.436 ha
No. Large trees proposed to be removed	20
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map



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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	0.292 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Moyne Shire Council
Minimum strategic biodiversity value score ²	0.305
Large trees	20 large trees

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

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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

Native vegetation removal report

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 Code that applies
- A site assessment report including a habitat 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.

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For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

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This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that an application will meet the requirements of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes.

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Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file										Information calculated by EnSym		
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
2-HZ	Patch	vvp_0055_61	Endangered	1	no	0.200	0.018	0.018	0.380		0.004	General
1-HZ	Patch	vvp_0055_61	Endangered	0	no	0.110	0.023	0.023	0.380		0.003	General
2-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.400		0.015	General
3-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.400		0.015	General
1-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
4-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
9-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
5-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.387		0.015	General

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7-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.064	0.450		0.014	General
8-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
10-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
15-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.380		0.015	General
14-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.390		0.015	General
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16-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.400		0.015	General
17-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.280		0.014	General
18-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.330		0.014	General
20-T	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.031	0.340		0.006	General
19-T	Scattered Tree	vvp_0055_61	Endangered	1	no	0.200	0.071	0.071	0.340		0.014	General
24-HZ	Patch	vvp_0055_61	Endangered	0	no	0.110	0.020	0.020	0.380		0.002	General

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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
Southern Bent-wing Bat	<i>Miniopterus schreibersii bassanii</i>	61343	Critically endangered	Dispersed	Habitat importance map	0.0000
Curly Sedge	<i>Carex tasmanica</i>	500650	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	<i>Poa physoclina</i>	507791	Endangered	Dispersed	Habitat importance map	0.0000
Salt Blown-grass	<i>Lachnagrostis robusta</i>	504223	Rare	Dispersed	Habitat importance map	0.0000
Brolga	<i>Grus rubicunda</i>	10177	Vulnerable	Dispersed	Habitat importance map	0.0000
Fragrant Leek-orchid	<i>Prasophyllum suaveolens</i>	504567	Endangered	Dispersed	Habitat importance map	0.0000
Brackish Plains Buttercup	<i>Ranunculus diminutus</i>	504314	Rare	Dispersed	Habitat importance map	0.0000
Large-headed Fireweed	<i>Senecio macrocarpus</i>	503116	Endangered	Dispersed	Habitat importance map	0.0000
Salt Lawrencia	<i>Lawrencia spicata</i>	501888	Rare	Dispersed	Habitat importance map	0.0000
Plump Swamp Wallaby-grass	<i>Amphibromus pithogastrus</i>	503624	Endangered	Dispersed	Habitat importance map	0.0000
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Wavy Swamp Wallaby-grass	<i>Amphibromus sinuatus</i>	503625	Vulnerable	Dispersed	Habitat importance map	0.0000
Small Scurf-pea	<i>Cullen parvum</i>	502773	Endangered	Dispersed	Habitat importance map	0.0000
Snowy Mint-bush	<i>Prostanthera nivea var. nivea</i>	502746	Rare	Dispersed	Habitat importance map	0.0000
Button Wrinklewort	<i>Rutidosis leptorhynchoides</i>	502982	Endangered	Dispersed	Habitat importance map	0.0000
Clumping Golden Moths	<i>Diuris gregaria</i>	504887	Endangered	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	<i>Lachnagrostis punicea subsp. punicea</i>	504206	Rare	Dispersed	Habitat importance map	0.0000
Leafy Twig-sedge	<i>Cladium procerum</i>	500786	Rare	Dispersed	Habitat importance map	0.0000

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Elegant Parrot	<i>Neophema elegans</i>	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
Striped Legless Lizard	<i>Delma impar</i>	12159	Endangered	Dispersed	Habitat importance map	0.0000
Swamp Everlasting	<i>Xerochrysum palustre</i>	503763	Vulnerable	Dispersed	Habitat importance map	0.0000
Pale Swamp Everlasting	<i>Coronidium gunnianum</i>	504655	Vulnerable	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	<i>Lachnagrostis punicea subsp. filifolia</i>	504222	Rare	Dispersed	Habitat importance map	0.0000
Arching Flax-lily	<i>Dianella sp. aff. longifolia (Benambra)</i>	505560	Vulnerable	Dispersed	Habitat importance map	0.0000
Branching Groundsel	<i>Senecio cunninghamii var. cunninghamii</i>	503104	Rare	Dispersed	Habitat importance map	0.0000
Forked Rice-flower	<i>Pimelea hewardiana</i>	502522	Rare	Dispersed	Habitat importance map	0.0000
Small Milkwort	<i>Comesperma polygaloides</i>	500798	Vulnerable	Dispersed	Habitat importance map	0.0000
Tough Scurf-pea	<i>Cullen tenax</i>	502776	Endangered	Dispersed	Habitat importance map	0.0000
Button Immortelle	<i>Leptorhynchos waitzia</i>	501949	Plumage	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	<i>Austrostipa puberula</i>	503988	Rare	Dispersed	Habitat importance map	0.0000
Plains Yam-daisy	<i>Microseris scapigera s.s.</i>	504657	Vulnerable	Dispersed	Habitat importance map	0.0000
Matted Flax-lily	<i>Dianella amoena</i>	505084	Endangered	Dispersed	Habitat importance map	0.0000
Hairy Tails	<i>Ptilotus erubescens</i>	502825	Vulnerable	Dispersed	Habitat importance map	0.0000
Golden Cowslips	<i>Diuris behrii</i>	501061	Vulnerable	Dispersed	Habitat importance map	0.0000
Pale-flower Crane's-bill	<i>Geranium sp. 3</i>	505344	Rare	Dispersed	Habitat importance map	0.0000
Black Falcon	<i>Falco subniger</i>	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Trailing Hop-bush	<i>Dodonaea procumbens</i>	501090	Vulnerable	Dispersed	Habitat importance map	0.0000
Basalt Sun-orchid	<i>Thelymitra gregaria</i>	504019	Endangered	Dispersed	Habitat importance map	0.0000
Purple Diuris	<i>Diuris punctata</i>	501084	Vulnerable	Dispersed	Habitat importance map	0.0000
Spiny Rice-flower	<i>Pimelea spinescens subsp. spinescens</i>	504823	Endangered	Dispersed	Habitat importance map	0.0000
Clover Glycine	<i>Glycine latrobeana</i>	501456	Vulnerable	Dispersed	Habitat importance map	0.0000

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Common Pipewort	<i>Eriocaulon scariosum</i>	501218	Rare	Dispersed	Habitat importance map	0.0000
Small-flower Mat-rush	<i>Lomandra micrantha subsp. tuberculata</i>	504711	Rare	Dispersed	Habitat importance map	0.0000
White Sunray	<i>Leucochrysum albicans subsp. tricolor</i>	504581	Endangered	Dispersed	Habitat importance map	0.0000
Swamp Flax-lily	<i>Dianella callicarpa</i>	505086	Rare	Dispersed	Habitat importance map	0.0000

Habitat group

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

Habitat impacted

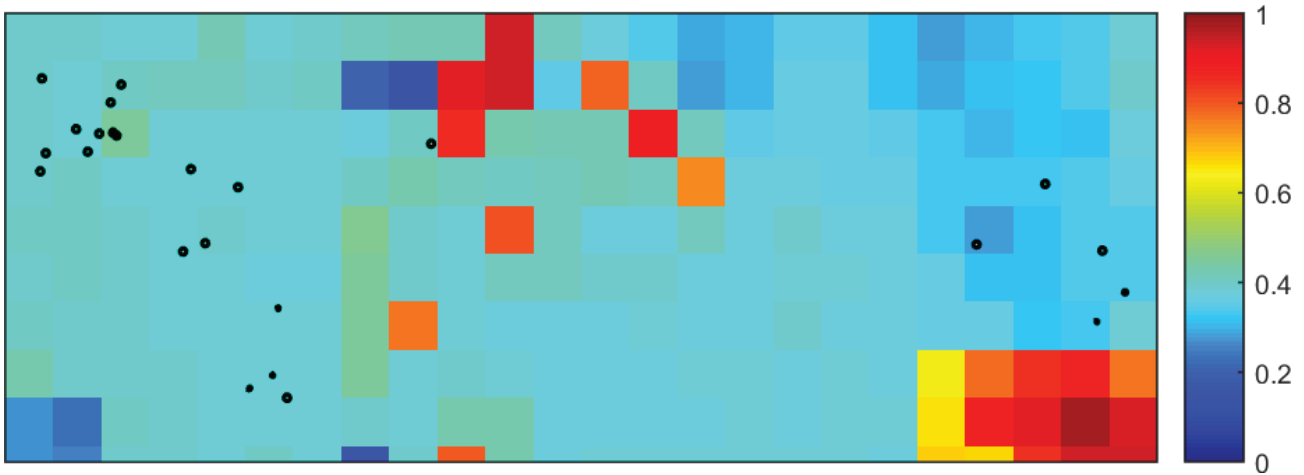
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance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

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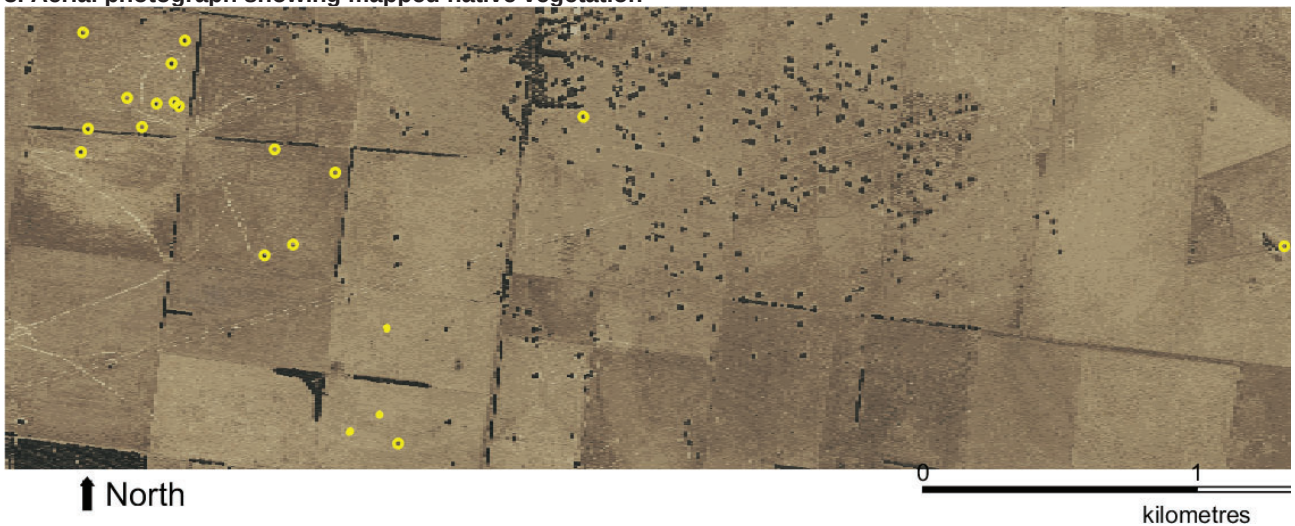
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



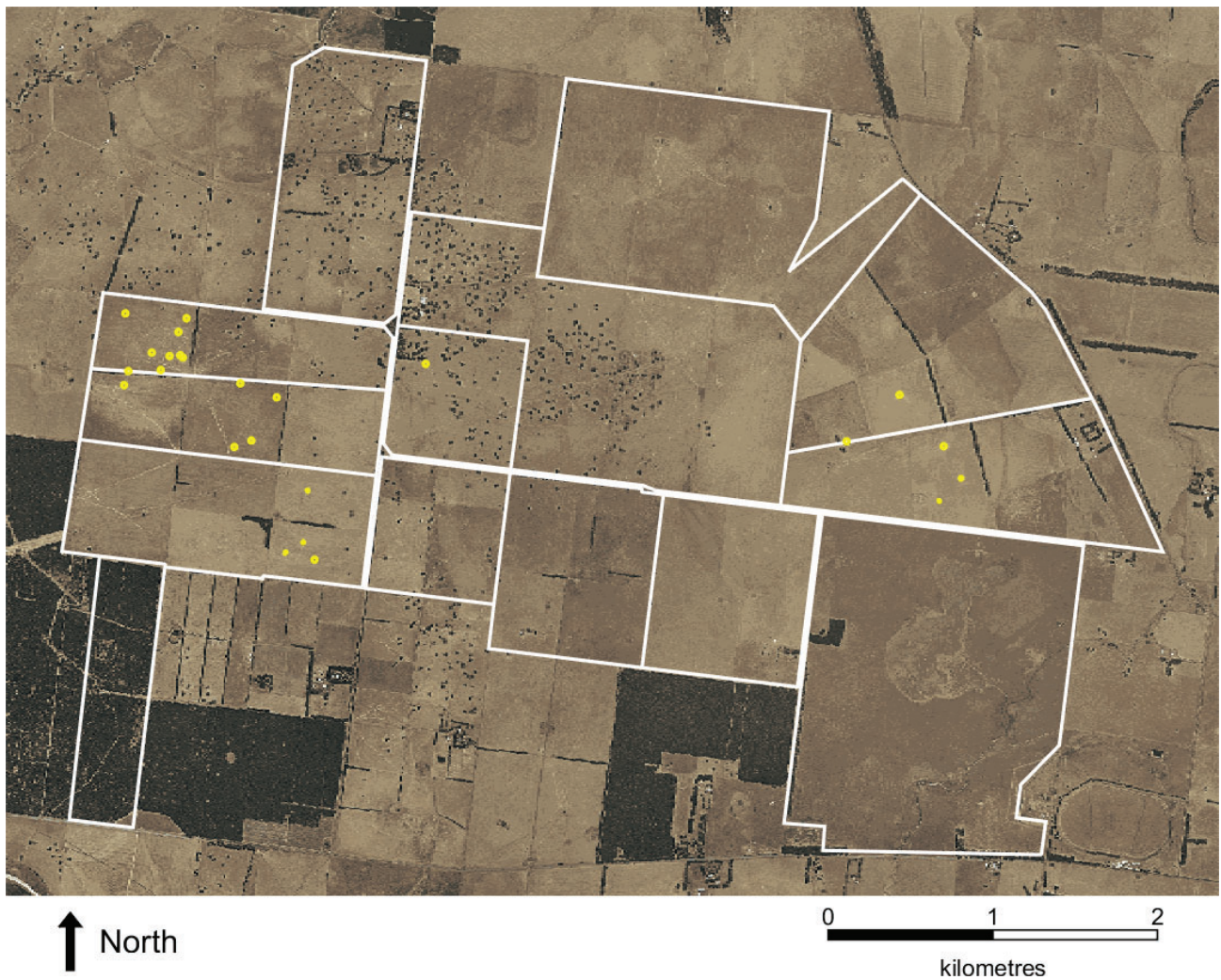
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3. Aerial photograph showing mapped native vegetation



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4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

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Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 05/08/2024 03:27 Report ID: 25680

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)
0.292	0.305	20	Glenelg Hopkins or LGA Moynie Shire

Details of available native vegetation credits on 05 August 2024 03:27

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-3027	1.231	267	Glenelg Hopkins	Pyrenees Shire	Yes	Yes	No	VegLink
VC_CFL-3693_01	2.194	600	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3727_01	12.327	24	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3763_01	3.246	266	Glenelg Hopkins	Glenelg Shire	Yes	Yes	No	VegLink
VC_TFN-C2046_01	7.575	1446	Glenelg Hopkins	Southern Grampians Shire	Yes	Yes	No	Ecocentric, Ethos, VegLink

These sites meet your requirements using alternative arrangements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
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There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

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Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
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There are no potential sites listed in the Native Vegetation Credit Register that meet your offset requirements.

LT - Large Trees

CMA - Catchment Management Authority

LGA - Municipal District or Local Government Authority

Next steps

If applying for approval to remove native vegetation

Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation

Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not available
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

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For more information contact the DEECA Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au

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This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that the credits shown will be available in the Native Vegetation Credit Register either now or at a later time when a purchase of native vegetation credits is planned.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes

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