Final Report

Biodiversity Assessment and Targeted Surveys: Interconnector Pipeline Project, Parwan and Melton

Prepared for

CH2M Beca

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Ecology and Heritage Partners Pty Ltd

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SUMMARY

Background

Ecology and Heritage Partners Pty Ltd was commissioned by CH2M Beca on behalf of Western Water to conduct a detailed Biodiversity Assessment and Targeted Surveys for an alternative and preferred proposed pipeline alignments located between Parwan and Melton. This report is an amended report which focuses on the preferred alignment (based on the final footprint provided by Beca on 17 December 2020). Impacts to native vegetation, state offsets and targeted survey results are discussed in the context of this study area. The biodiversity assessment was undertaken to identify and characterise the vegetation on-site and determine the presence (or likelihood thereof) of any significant flora and fauna species and/or ecological communities.

Methods

Biodiversity Assessment

A flora and fauna assessment was undertaken between 19 and 21 of February 2018 to obtain information on terrestrial flora and fauna values within the study area. A habitat hectare assessment was undertaken in conjunction with the flora survey. Vegetation within the study area was assessed according to the habitat hectare methodology, which is described in the Vegetation Quality Assessment Manual.

A subsequent vegetation assessment was undertaken on 13 October 2020 to verify the extent of native vegetation, due to the time passed since the initial assessment and season difference.

Matted Flax-lily Targeted Survey

Targeted flora surveys for Matted Flax-lily *Dianella amoena* were undertaken between 19 and 21 of February 2018. Areas identified as supporting suitable habitat were traversed, with surveys conducted along transect lines approximately five metres apart, or as dictated by the density of existing grasses and weeds. The location of all plants was recorded during the survey with a handheld GPS (accuracy of +/- 5 metres). Matted Flax-lily surveys were repeated for the section of pipeline east of Eynesbury Rd in December 2018, following a shift in the alignment.

Spiny Rice-flower Targeted Survey

Targeted flora surveys for Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* were undertaken between 28 and 30 of May 2018. Areas identified as supporting suitable habitat were traversed, with surveys conducted along transect lines approximately five metres apart, or as dictated by the density of existing grasses and weeds. The location of all plants was recorded during the survey with a handheld GPS (accuracy of +/- 5 metres).

Large-headed Fireweed, Small Golden Moths & Button Wrinklewort Targeted Surveys

Large-headed Fireweed *Senecio macrocarpus*, Small Golden Moths *Diuris basaltica* and Button Wrinklewort *Rutidosis leptorhynchoides* targeted surveys were undertaken on the 17 December 2018 and 19 February 2019. Surveys involved two trained observers walking the length of the pipeline (Figure 2).

Striped Legless Lizard Targeted Survey

Striped Legless Lizard *Delma impar* targeted surveys were conducted on six separate occasions during Spring 2018: 2 October, 8 October, 25 October, 31 October, 8 November and 13 November (Figure 6). Ten tile grids,

each comprising 50 terracotta roofing tiles (10x5 pattern), were placed along the length of the pipeline alignment, including one grid on the alternative alignment (Figure 5).

Growling Grass Frog Targeted Survey

Growling Grass Frog *Litoria raniformis* targeted surveys were conducted on two separate occasions adjacent to the Werribee River during peak breeding period from November – December when the species is known to be actively calling. Call playback and spotlighting occurred at night on the 29 November and 05 December 2018, along the Werribee River that intersects the preferred alignment and adjacent dams (Figure 2).

Golden Sun Moth Targeted Survey

Targeted surveys for Golden Sun Moth *Synemon plana* were undertaken on 14 and 24 November 2017, 15 and 22 December 2017, and 11 January 2018 by Zoologists experienced in the detection and identification of the species. Surveys concentrated on areas identified as supporting native grassland, as well as non-native areas comprising scattered occurrences of wallaby grass *Rytidosperma* spp.

Transects were identified and walked in any potential habitat present within the study area over a minimum of four separate days. Surveys were conducted in accordance with approved methodology identified within the Biodiversity Precinct Planning Kit and according to the Survey Guidelines for the species.

Results

Flora

Two state significant species were recorded on site Austral Tobacco *Nicotiana suaveolens* and Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra) with no other significant flora species recorded during the field assessment.

There is suitable habitat within the study area for flora species of national significance including Matted Flax-Lily, Spiny Rice-flower, Large-headed Fireweed, and Small Golden Moths *Diuris basaltica.* State significant species include Bacchus Marsh Wattle *Acacia rostriformis*, Buloke *Allocasuarina luehmannii*, Plains Joyweed *Alteranthera* sp. 1 (Plains), Buloke mistletoe *Amyema linophylla* subsp. *orientalis*, Cane Spear-grass *Austrostipa breviglumis,* Heath Spear-grass *Austrostipa exilis*, Yellow Burr-daisy *Calotis lappulacea*, Frosted Goosefoot *Chenopodium desertorum* subsp. *desertorum*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis,* Small Scurf-pea *Cullen parvum*, Slender Tick-trefoil *Desmodium varians,* Late-flower Flax-lily *Dianella tarda*, Pale Spike-sedge *Eleocharis pallens,* Werribee Blue-box *Eucalyptus baueriana* subsp. *thalassina*, Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*, Brittle Greenhood *Pterostylis truncata,* Fragrant Saltbush *Rhagodia parabolica* and Rye Beetle-grass *Tripogon loliiformis.*

Matted Flax-lily

Targeted surveys for Matted Flax-lily were undertaken during the known flowering period when the species was known to be flowering within the locality, no specimens were recorded within both the northern and southern alignment. Two individuals were recorded approximately two kilometres north of the main alignment and will not be impacted.

Other EPBC Act-listed flora species

No Spiny Rice-flower, Large-headed Fireweed, Small Golden Moths and Button Wrinkle-wort were recorded within the study area despite surveys being conducted during the flowering season for these species.

Communities

Two nationally significant ecological communities were recorded within the main alignment: *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP), and *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia* (GBGWDNG). There is a total of 4.961 hectares of NTGVVP and 0.266 hectares of Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia proposed to be impacted by the preferred alignment (Figure 2).

These communities are represented by Plains Grassland, and Plains Grassy Woodland that meet specific condition thresholds. Both communities are proposed to be partially impacted.

Further, one state significant ecological community, Western (Basalt) Plains Grasslands community, is present within areas of *Low Rainfall* Plains Grassland.

Fauna

One significant fauna species, Golden Sun Moth, was recorded during the field assessment. There is suitable habitat within the study area for two other nationally significant fauna, Striped Legless Lizard, and Growling Grass Frog, and 19 species of State conservation significance.

Golden Sun Moth

Targeted surveys for Golden Sun Moth were undertaken and a total of 991 Golden Sun Moth were recorded across the preferred and alternative alignments (Figure 1; Table 8). There is a total of 10.357 hectares of suitable Golden Sun Moth habitat proposed to be impacted within the construction footprint (Figure 2).

Other EPBC Act-listed fauna species

No Striped Legless Lizard or Growling Grass Frog were recorded within the preferred alignment during the targeted surveys.

Legislative Implications

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Golden Sun Moth were recorded in the study area and the proposed alignment impacts upon 10.357 hectares of known habitat for the species. A total of 4.961 hectares of the nationally significant ecological community NTGVVP, and 0.266 hectares of Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia are also proposed to be impacted by the preferred alignment (Figure 2).

Given that the project will result in a significant impact on matters of National Environmental Significance under the EPBC Act, a referral to the Commonwealth Minister of the Environment and Energy for assessment under the Act was prepared. A decision was made on 8 November 2018 that the proposed works is a controlled action (EPBC Ref: 2018/8260) under the EPBC Act. It was decided on 27 March 2019 that the project will be assessed by Preliminary Documentation, including an Offset Management Plan.

Flora and Fauna Guarantee Act 1988 (FFG Act - Victoria)

There is suitable habitat within the study area for eight species listed or protected under the FFG Act, including Golden Wattle, Varnish Wattle, Buloke, Common Cassinia, Jersey Cudweed, Nardoo, Cotton *Fireweed* and Fuzzy *New Holland* Daisy. Additionally, *one* state significant ecological *community,* Western (Basalt*)* Plains Grasslands, was recorded *where* all Low Rainfall Plains Grassland was *mapped.*

The majority of the study area is located within private land, and therefore a permit is not required for these areas. The vegetation present along Nerowie Road is located on public land and will require a permit under the FFG Act for impacts to species and ecological communities. Within this area, Fuzzy New Holland Daisy and Western (Basalt) Plains Grassland were recorded and are within the construction footprint, with a total of 1.2394 hectares of Western (Basalt) Plains Grassland recorded and approximately 75 – 100 Fuzzy New Holland Daisy individuals.

Environment Effects Act 1978 (Victoria)

The final development plan for the proposed development includes impacts to four endangered ecological vegetation classes; *Low Rainfall* Plains Grassland, Riverina Plains Grassy Woodland, Floodplain Riparian Woodland and Lignum Swamp. A total of 8.893 hectares of native vegetation patches are proposed to be impacted, with the alignment traversing through several larger patches of native vegetation (i.e. adjacent native vegetation will be retained). The total proposed impacts to native vegetation is below the 10 hectare impact threshold, with the impacts having been reduced through a revision of the impact footprint. Therefore, a referral under the EES Act is not required.

Project History

Several changes to the pipeline alignment have occurred since the commencement of the project. Two main routes were initially considered and surveyed during the field assessment undertaken in 2018 to inform this Biodiversity Assessment report. One was selected as the final preferred route, due to its location alongside the southern boundary of the existing gas pipeline easement, which created fewer overall disruptions to the private agricultural land that the pipeline intercepts. Furthermore, the selected alignment proposed to cross the Werribee River at the same location as other utility services, to prevent additional disturbance to both ecological and cultural values along the river corridor. This alignment was used to prepare our original Planning Permit and EPBC submissions.

Changes within the final alignment have occurred to further reduce impacts to areas of native vegetation, along with consideration of culturally sensitive areas. Specifically, this has included the reduction in width of the construction corridor and reduction in size of select lay down areas to reduce impacts on ecological values. A subsequent field assessment was undertaken with DELWP on 13 October 2020 to confirm the extent of native vegetation present, which recorded an increase in native vegetation. The vegetation mapping was updated and we have further reduced the construction corridor width and laydown areas to minimise our associated impact and offset requirements to reflect the recent vegetation mapping. The current version of this report includes the final impact values and associated offset requirements for the proposed pipeline.

SUMMARY OF APPLICATION REQUIREMENTS

Table S1. Application requirements for a permit to remove native vegetation under the Detailed Assessment Pathway (*Victoria Planning Provisions* Clause 52.17 -3; DELWP 2017a)

No.	Application Requirement	Response
1	Information about the native vegetation to be removed, including: • The assessment pathway and reason for the assessment pathway. • A description of the native vegetation to be removed. • Maps showing the native vegetation and property in context. • The offset requirements that will apply if the native vegetation is approved to be removed.	Within NVR report – Appendix 3
2	Topographic and land information relating to the native vegetation to be removed.	Refer to Section 1 and Figure 1.
3	Recent dated photographs of the native vegetation to be removed.	Refer to Section 4.1 of this report.
4	Details of any other native vegetation that was permitted to be removed on the same property with the same ownership as the native vegetation to be removed, where the removal occurred in the five-year period before the application to remove native vegetation is lodged.	Refer to 4.1.
5	An avoidance and minimise statement.	Refer to Section 5.7
6	A copy of any property vegetation plan that applies to the site.	Not applicable.
7	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay	Not applicable
8	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan	Not applicable – the application does not fall under Clause 52.16 covered by a Native Vegetation Precinct Plan
9	An offset statement explaining than an offset that meets the offset requirements for the native vegetation to be removed has been identified and how it will be secured	Are likely to be available for purchase form a third party – see Section 5.7.3
Additional application requirements for applications in the Detailed Assessment Pathway		
10	A site assessment report of the native vegetation to be removed, including: • A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status. • The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches. • The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	Refer to Section 4 and Appendix 1 of this report and the NVR Report – Appendix 2
11	Information about impacts on rare or threatened species habitat, including: • The relevant section of the Habitat importance map for each rare or threatened species requiring a species offset. • For each rare or threatened species that the native vegetation to be removed is habitat for, according to the Habitat importance maps: - the species' conservation status	Within NVR report – Appendix 3

No.	Application Requirement	Response
	- the proportional impact of the removal of native vegetation on the total habitat for that species - whether their habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat	

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by CH2M Beca on behalf of Western Water to conduct a Biodiversity Assessment and Targeted Surveys of two proposed alignments (alternative and preferred) for an interconnector water pipeline between Parwan and Melton (Figure 1). The preferred pipeline alignment has been confirmed (referred to as the 'study area') and comprises road reserves, private property and traverses the Werribee River (Figure 1).

The purpose of the assessment is to identify the extent and type of remnant native vegetation present within the study area and identify the presence of significant flora and fauna species and/or ecological communities. Following the identification of habitat for nationally significant flora and fauna species targeted surveys were also conducted as part of this investigation.

This report presents the results of the biodiversity assessment and targeted survey and discusses the potential ecological and legislative implications associated with the proposed action based on the final construction footprint for the alignment. The report also provides recommendations to address or reduce impacts and, where necessary, highlights components that require further investigation.

The current report is an amendment to previous versions and includes the results of the recent site assessment undertaken on 13 October 2020 to confirm the extent of native vegetation across the study area against the initial assessment undertaken in early 2018. Native vegetation impacts have been updated based on the recent site assessment, along with impacts to state and commonwealth significant ecological values present within the selected alignment.

1.2 Objectives

The objectives of the flora and fauna assessment were to:

- Review the relevant flora and fauna databases and available literature;
- Conduct a field assessment to identify flora and fauna values within the study area;
- Provide maps showing any areas of remnant native vegetation and locations of any significant flora and fauna species, and/or fauna habitat (if present);
- Classify any flora and fauna species and vegetation communities identified or considered likely to occur within the study area in accordance with Commonwealth legislation; and
- Advise whether any additional flora and/or fauna surveys are required prior to works commencing (e.g. targeted surveys for significant flora and fauna species).

Where areas of remnant vegetation were present, a habitat hectare assessment was completed to quantify the quality and extent of any areas of remnant native vegetation present within the study area.

1.3 Study Area

The study area is located between Parwan and Melton, approximately 60 kilometres north west of Melbourne's CBD (Figure 1). The preferred alignment is approximately 13.5 kilometres in length and includes private property and the Nerowie Road road reserve (Figure 1). The alignment predominantly cross private

properties that are currently used for = agriculture (i.e. stock grazing and crops). The study area is predominantly bound by semi-rural properties between Parwan and Melton, however the western area includes the southern road reserve of Nerowie Road, and crosses Bucklers Road, Green Hill Road, and Eynesbury Road in Parwan and Eynesbury.

The landscape holds sections of slightly undulating hills containing areas of remnant native vegetation, cropped pastureland, road reserves and crosses the Werribee River at the far eastern end of the alignment.

According to the Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) Tool (DELWP 2020a), the study area occurs within the Victorian Volcanic Plain bioregion. It is located within the jurisdiction of the Port Philip and Westernport Catchment Management Authority (CMA) and transects between the Moorabool Shire Council and Melton City Council municipalities.

2 METHODS

2.1 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DELWP NVIM Tool (DELWP 2020a) and NatureKit (DELWP 2020b) for:
    - Modelled data for location category, remnant vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current EVCs.
- EVC benchmarks (DELWP 2020c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2018a);
- The Commonwealth Department of Agriculture, Water and the Environment (DAWE) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- VicPlan (DELWP 2020d) to ascertain current zoning and environmental overlays in the study area;
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened and Protected Lists (DELWP 2018b; DELWP 2017a);
- Other relevant environmental legislation and policies as required;
- Aerial photography of the study area; and,
- Previous ecological or other relevant assessments of the study area.

2.2 Field Assessments

2.2.1 Flora Assessment

A flora assessment was undertaken between the 19 and 21 of February 2018 to obtain information on flora and fauna values within the study area. An additional field assessment was completed on 30 of May 2018 to assess changes to the study area. The study area was walked, with all observed vascular flora and fauna species recorded, any significant records mapped and the overall condition of vegetation and habitats noted. Ecological Vegetation Classes (EVCs) were determined with reference to DELWP pre-1750 and extant EVC mapping and their published descriptions (DELWP 2020c).

Where remnant vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (DSE 2004a).

A recent assessment was undertaken on 13 October 2020 to confirm the extent of native vegetation and provided an updated assessment on the extent and quality of native vegetation within the alignment. The October assessment provided an opportunity to assess the vegetation in an ideal season (spring), following a

wet winter (Plate 1). The former assessments were undertaken at the end of summer and during autumn, during much drier conditions and when much of the site had been exposed to grazing (Plate 2).

Plate 1. Plains Grassland (PG2) observed during spring and without grazing pressure (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 2. Plains Grassland within the study area recorded during the 2018 assessment (Ecology and Heritage Partners Pty Ltd 19/02/2018).

2.2.2 Targeted Surveys

Matted Flax-lily *Dianella amoena*

Matted Flax-lily is listed as Endangered under the EPBC Act, threatened under the FFG Act and Endangered on the Advisory List for Threatened Flora in Victoria (DEPI 2014).

Matted Flax-lily is a perennial, tufted, mat-forming lily which can form patches of up to five metres wide. The plant can grow vegetatively, through sending underground rhizomatous roots, which rise above the ground with a tiller of several leaves, spread over a distance from the parent plant.

Plate 3. Matted Flax-lily flowering at a reference site (Ecology and Heritage Partners Pty Ltd 19/02/2018).

The leaves of the Matted Flax-lily are generally glaucous, blue in colour but may be red at the base and usually but not always having small hooks (teeth) along the margins and midrib. The leaves taper to approximately 45 centimetres long depending on site and climatic conditions and are borne on tillers with the leaves arranged alternatively, with several leaves per tiller. Matted Flax-lily generally flowers between November and February but may continue flowering with summer and autumn rains. It has pale blue to violet flowers with bright yellow stamens and berries, which are generally purple in colour (Plate 3). The flowers and berries are born on culms extending to typically 30 centimetres in height but this may alter depending on plant location and season (DSE 2010b).

The Matted Flax-lily generally occurs in grassland and grassy woodland habitats, on well drained to seasonally wet fertile sandy loams to heavy cracking clay soils derived from Silurian or Tertiary sediments, or from volcanic geology (DSE 2010b).

Targeted flora surveys for Matted Flax-lily were undertaken between 19 and 21 of February 2018 and surveys were repeated east of Eynesbury Road in 17 December 2018, following the shift in the preferred alignment. The study area was systematically traversed in areas of potential habitat at approximately five-metre linear intervals in accordance with the survey guidelines for Matted Flax-lily outlined in the *Biodiversity Precinct Structure Planning Kit* (DSE 2010a). Although the study area does not occur in a Precinct Structure Plan area to which the guidelines generally apply, they are considered 'best practice' guidelines for conducting Matted Flax-lily Surveys. Targeted surveys were directed to all potential habitat (i.e. native and non-native grasslands including degraded areas, and fence lines). Any Matted Flax-lily plants identified were recorded with a GPS with a five-metre accuracy.

It is recommended that the optimal time to conduct Matted Flax-lily surveys is during the flowering season which generally occurs between late spring to early summer (DSE 2010b).

For the purposes of this survey, a reference site located at Epping Cemetery, Epping was used to examine the diagnostic features of the species prior to undertaking surveys within the study area. Although these specimens were not located near the study area (approx. 50 kilometres east), given that the specimens at the reference site were flowering and/or fruiting, it provides evidence that the current surveys were conducted at a suitable time to ensure detection of the species if present.

Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*

Spiny Rice-flower is a perennial sub-shrub listed as Critically Endangered under the EPBC Act, as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), and as endangered under the *Advisory List of Rare and Threatened Plants in Victoria* (DEPI 2014). The species is endemic to Victoria and is found between the south-west and north-central parts of the State. It occurs in grassy EVCs such as Plains Grassland (EVC 132), Plains Grassy Woodland (EVC 55), Plains Woodland (EVC 803) and Plains Grassland/Grassy Woodland Mosaic (EVC 897) (DEWHA 2009a; DELWP 2017c). Spiny Rice-flower is typically found in small populations (<500 individuals).

Plate 4. Spiny Rice-flower (Ecology and Heritage Partners Pty Ltd 2016)

The species is slow-growing and reaches up to 30 cm high (Plate 4). Plants are mostly dioecious (male and female flowers on separate plants) but some plants are monoecious (male and female flower on same plant). It bears small yellow flowers between April and August (DEWHA 2009a).

Targeted flora surveys for Spiny Rice-flower were undertaken between 28 and 30 of May 2018 and repeated east of Eynesbury Road 27 November 2018, following the shift in the preferred alignment. As the repeated targeted surveys were undertaken outside the Spiny Rice-flower flowering period, intensive surveys were undertaken with two trained ecologists walking tight line transects approximately five metres apart. The study area was systematically traversed in areas of potential habitat at approximately five metre linear intervals in accordance with the survey guidelines for Spiny Rice-flower outlined in the *Biodiversity Precinct Structure Planning Kit* (DSE 2010a). Although the study area does not occur in a Precinct Structure Plan area to which the guidelines generally apply, they are considered 'best practice' guidelines for conducting Spiny Rice-flower Surveys. Targeted surveys were directed to all potential habitat (i.e. native and non-native grasslands including degraded areas, and fence lines). Any Spiny Rice-flower plants identified were recorded with a GPS with a five-metre accuracy.

It is recommended that the optimal time to conduct Spiny Rice-flower surveys is during the flowering season which generally occurs during winter, May - August (DSE 2010b).

Large-headed Fireweed *Senecio macrocarpus*

Large-headed Fireweed is listed as Vulnerable under the EPBC Act. In Victoria, it is listed under the FFG Act, and is considered Endangered under the DELWP Advisory List (DEPI 2014).

The species grows as either as an erect long-lived herb or a small shrub (40–70 centimetres tall). Leaves are stalkless, greyish in colour and covered in cobweb like hairs, leaves are arranged alternately, to 10 centimetres long and 2-5 millimetres wide. Flower heads are yellow and generally 6- 8 in number, 20 millimetres long with each plant containing 50 – 100 individual flowers (Plate 5). Flowers are generally present on the plant from August through to October (Hills and Boekel 2003; Sinclair 2009).

Plate 5. Large-headed Fireweed (Ecology and Heritage Partners Pty Ltd)

Large-fruit Fireweed are known to still occur within Victoria, new South Wales and South Australia with the species considered extinct in Tasmania (Sinclair 2009). Within Victoria scattered records exist from Nhill in western Victoria, to Yan Yean reservoir and Seymour in central Victoria. Historical records are within 10 kilometres of the study area and therefore they are considered to have a low likelihood of occurrence along the proposed pipeline alignment.

Targeted surveys for this species was undertaken 27 November 2018 (east of Eynesbury Road) and 17 December 2018 and 19 February 2019 for remainder of preferred alignment within the alignment footprint. The peak flowering season is between August and November, however flowering can also occur later in the season and searches focussed on identifying old flowerheads.

Button Wrinklewort *Rutidosis Leptorhychoides*

Button Wrinklewort are listed as Endangered under the EPBV Act. In Victoria, it is listed under the FFG Act and is considered Endangered under the DELWP Advisory List (DEPI 2014).

The species is a tufted, simple or few-branched erect herb to 30 centimetres in height (Plate 6). Leaves are linear and mostly 1 -4 centimetres long and 0.5 – 1.5 millimetres wide. The species once occurred as far west as Casterton, however it is now confined to basaltic grasslands within 130 kilometres west of Melbourne due to loss of habitat. Historical records are not found within 10 kilometres of the study area and therefore they are considered to have a low likelihood of occurrence along the proposed pipeline alignment.

Plate 6. Button Wrinklewort (Ecology and Heritage Partners Pty Ltd)

Targeted surveys for this species was undertaken 27 November 2018 (east of Eynesbury Road) and again 17 December 2018 and 19 February 2019. Flowering for this species occurs between December and March.

Small Golden Moths Orchid *Diuris basaltica*

Small Golden Moths is an orchid species listed as Endangered under the EPBC Act. In Victoria, it is listed under the FFG Act, and is considered Endangered under the DELWP Advisory List (DEPI 2014).

The species is a slender flowering plant between 6 and 15 centimetres tall, often growing in clustered colonies of up to 30 individuals. Leaves are linear to 10 centimetres long, with flowers in 1 or 2 drooping not widely open and bright golden-yellow, orange-yellow, or orange in colour.

The species was locally common within the grasslands and grassy woodlands of the basalt plains to the west of Melbourne, however farming practices and infrastructure has now reduced the population to three known locations. Historical records (2012) of the species were recorded within five kilometres of the study area: Ferris Road in Melton, comprising the rail reserve of the Melbourne – Ballarat railway line (Biosis 2012). Due to the localised, isolated nature of remaining populations, there is considered to be a low – moderate likelihood of the species occurring within the study area.

Targeted surveys for this species were undertaken 27 November 2018 (east of Eynesbury Road) and 17 December 2018 and 19 February 2019 for the remainder of the preferred alignment. The flowering season is between September and October, however intensive searches were undertaken to increase detectability.

2.2.3 Fauna Assessment

A fauna assessment was undertaken on 19 and 21 February 2018 to obtain information on terrestrial fauna values within the study area. The study area was visually assessed and active searching for reptiles, frogs and small mammals was undertaken. Binoculars were also used to scan the area for birds, and observers listened for calls and searched for other signs of fauna such as nests, remains of dead animals, droppings and footprints. Potential habitat for fauna was assessed, with an emphasis on habitats that may provide shelter, food or other resources for significant species.

2.2.4 Targeted Surveys

Golden Sun Moth *Synemon plana*

Golden Sun Moth (GSM) is listed as Critically Endangered under the EPBC Act, threatened under the FFG Act and Critically Endangered on the Advisory List for Threatened Invertebrate Fauna in Victoria (DSE 2009) (Plate 7).

Plate 7. Golden Sun Moth (Ecology and Heritage Partners Pty Ltd)

The species typically occurs in native grassland and grassy woodland habitats dominated by greater than 40% cover of wallaby grass *Rytidosperma* spp. (DSE 2004b), but may also inhabit areas dominated by Kangaroo Grass (Endersby and Koehler 2006) and introduced grassland dominated by Chilean Needle-grass and other introduced species (A. Organ pers. obs.).

Male flight is typically low, to about one metre above the ground, fast and can be prolonged, but they are generally not recorded flying more than 100 metres from suitable habitat (Clarke and O'Dwyer 1999). The male of this species generally flies between 10am and 3pm on calm, warm (over 20°C), sunny days.

Prior to European settlement, the Golden Sun Moth was widespread and relatively continuous throughout its range, inhabiting grassy open woodlands and grassland, although it now mainly inhabits small isolated sites (DSE 2004). The species is threatened by habitat loss, disturbance and fragmentation due to agricultural expansion and urbanisation. Many populations are isolated and fragmented, impeding the ability of the relatively immobile females to recolonise areas, thereby reducing the likelihood of genetic exchange (DSE 2004). Such populations are therefore vulnerable as there is little likelihood of recolonisation in the event of a local extinction.

Most of the study area supports habitat comprising areas of Plains Grassland vegetation. Areas of vegetation outside of Plains Grassland are dominated by non-native flora, predominantly Toowoomba Canary-grass and Serrated Tussock *Nassella neesiana*, neither of which are known to also provide suitable habitat for the threatened Golden Sun Moth.

Surveys for Golden Sun Moth were undertaken in accordance with the recommended survey guidelines detailed in the significant impact guidelines for the species (DEWHA 2009), and the *Biodiversity Precinct Planning Structure Kit* (DSE 2010a).

Targeted surveys for Golden Sun Moth were undertaken on 14, 24 November 2017, 15, 22 December 2017, , 11 January 2018 and 18, 27 November 2020 and 2, 9 December 2020, by Zoologists experienced in the detection and identification of the species. Surveys concentrated on areas identified as supporting native grassland, as well as non-native areas comprising scattered occurrences of wallaby grasses (Figure 6).

Areas of suitable habitat were walked or driven by qualified zoologists over four separate days during the known flight season (i.e. November to early January). Surveys were undertaken at a time which is considered suitable for detecting the species (i.e. when adult males are flying), and when Golden Sun Moth was observed

flying at a nearby reference site (Merrimu). The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days.

Surveys were undertaken during weather conditions suitable for detecting the species (i.e. between 10am and 3pm on warm (over 20°C by 10am) days with minimal cloud cover and still conditions), with 10 to 50-metre wide parallel transects surveyed across all areas of suitable habitat.

Striped Legless Lizard *Delma impar*

The Striped Legless Lizard is listed as Endangered in Victoria and Vulnerable under the Commonwealth EPBC Act (DSE 2013) (Plate 8). The species is also listed as a threatened taxon under the Victorian FFG Act. An FFG Act Action Statement (Webster *et al.* 2003) and a National Recovery Plan 1999-2003 (Smith and Robertson 1999) have been developed for the species. A National Recovery Team also exists for this species. Overall the species is of national conservation significance and is also protected under the Victorian *Wildlife Act 1975*.

Plate 8. Striped Legless Lizard (Ecology and Heritage Partners Pty Ltd)

The Striped Legless Lizard is restricted to the lowland tussock grassland habitats (Coulson 1990) in temperate south-eastern Australia where the species has a limited and patchy distribution. Since European settlement the distribution of Striped Legless Lizard is believed to have declined and the species is known to have disappeared from many sites. It has been estimated that 95% of Victoria's native lowland grasslands have been grossly altered since European settlement. The major type of grassland known to support Striped Legless Lizard is the Western (Basalt) Plains Grassland community, and the majority of sites in Victoria occur on cracking clay soils with at least some surface rock which provides shelter (Cogger *et al.* 1996; Coulson 1995).

A small percentage of the original habitat for Striped Legless Lizard now exists, and therefore this species is thought to probably occur in small, isolated populations because remaining habitat is very limited in area and severely fragmented (Webster *et al.* 2003).

Suitable habitat for Striped Legless Lizard is present in areas of native and introduced grassland throughout the study area, particularly where a high percentage of native tussock grasses are present: Kangaroo Grass *Themeda triandra*, Spear Grass *Austrostipa spp*. There are areas of mapped Plains Grassland (EVC 132) within the study area; including grassland which meets the classification of the EPBC Act listed ecological community NTGVVP. Areas of native grassland support grass species such as Kangaroo Grass *Themeda triandra*, Wallaby-grasses *Rytidosperma* spp. and Spear-grasses *Austrostipa* spp. Dominant exotic species within suitable habitat that may be used by Striped Legless Lizard include Chilean Needle-grass *Nassella neesiana* and Serrated Tussock *Nassella trichotoma*.

Targeted surveys for Striped Legless Lizard were undertaken within the preferred alignment and alternative alignment (Figure 1, Figure 5) between October and November of 2018 using the tile grid methodology, comprising ten grids (50 tiles per grid). Tiles were laid out along the preferred and alternative alignment within the month of August 2018, approximately 2 months prior to Striped Legless Lizard monitoring. Six tile

monitoring checks were undertaken in approximately weekly intervals: 02, 08, 25, 31 October and 08, 13 November 2018. Weather data and tile temperature was also recorded.

Growling Grass Frog *Litoria raniformis*

Growling Grass Frog is listed as endangered in Victoria (DELWP 2013) and vulnerable nationally (Tyler 1997) (Plate 9). It is also listed as a threatened taxon under the EPBC Act and the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act). Overall the species is of national conservation significance.

Plate 9. Growling Grass Frog (Source: Ecology and Heritage Partners Pty Ltd)

Although formerly widely distributed across southern eastern Australia, including Tasmania (Littlejohn 1963, 1982; Hero *et al.* 1991), the species has declined markedly across much of its former range. This has been most evident over the past two decades and in many areas, particularly in south and central Victoria, populations have experienced apparent declines and local extinctions (Mahony 1999; Organ pers. obs.).

The species is largely associated with permanent or semi-permanent still or slow flowing waterbodies (i.e. streams, lagoons, farm dams and old quarry sites), supporting an extensive cover of emergent, submerged and floating vegetation (Robertson *et al.* 2002; Organ 2003). This species is also known to inhabit temporarily inundated waterbodies for breeding purposes providing they contain water over the breeding season (Organ 2003).

There is suitable habitat for this species occurring within the Werribee River, and artificial dams (Figure 3). Targeted surveys were undertaken on 29 November and 5 December 2018, during the species' breeding season.

2.3 Guidelines for the Removal of Native Vegetation (Guidelines)

Under the *Planning and Environment Act 1987* (P&E Act), Clause 52.17 of the Planning Schemes requires a planning permit from the relevant local Council to remove, destroy or lop native vegetation. The assessment process for the clearing of vegetation follows the 'Guidelines for the removal, destruction or lopping of native vegetation' (the Guidelines) (DELWP 2017a). The '*Assessor's handbook – applications to remove, destroy or lop native vegetation'* (Assessor's handbook) (DELWP 2017b) provides clarification regarding the application of the Guidelines.

2.3.1 Assessment Pathway

Guidelines manage the impacts on biodiversity from native vegetation removal (DELWP 2017a). The assessment pathway for an application to remove native vegetation reflects its potential impact on biodiversity and is determined from the location and extent of the native vegetation to be removed. The location risk (1, 2 or 3) has been determined for all areas in Victoria and is available on DELWP's Native Vegetation Information Management (NVIM) Tool (DELWP 2020a). Determination of assessment pathway is summarised in Table 1.

Table 1. Assessment pathways for applications to remove native vegetation (DELWP 2017a)

Extent	Location category		
	1	2	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
0.5 hectare or more	Detailed	Detailed	Detailed

Notes: Large trees include trees within a patch or a large scattered tree. The extent of native vegetation is in hectares and includes the extent of any patches and scattered trees proposed to be removed and the extent of any other native vegetation that was permitted to be removed on the same contiguous parcel of land with the same ownership as the native vegetation to be removed, where the removal occurred in the five-year period before an application to remove native vegetation is lodged.

2.3.2 Vegetation Assessment

Native vegetation (as defined in Table 2) is assessed using two key parameters: extent (in hectares) and condition. Extent is determined through a field assessment. The condition score Detailed pathway must be assessed through a habitat hectare[1] assessment conducted by a qualified ecologist. The condition score for Basic and Intermediate pathways may be based on either modelled data available on the NVIM Tool (DELWP 2020a), or through a habitat hectare assessment.

Table 2. Determination of remnant native vegetation (DELWP 2017a)

Category	Definition	Extent	Condition
Patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native. OR An area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy. OR Any mapped wetland included in the *Current wetlands map* available in DELWP systems and tools.	Measured in hectares. Based on hectare area of the remnant patch.	Vegetation Quality Assessment Manual (DSE 2004) OR modelled condition score for mapped wetlands.
Scattered tree	A native canopy tree that does not form part of a patch.	Measured in hectares. Each scattered tree is assigned an extent of 0.071 hectares (30m diameter).	Scattered trees are assigned a default condition score of 0.2.

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

2.3.3 Offsets

Offsets are required to compensate for any permitted removal of native vegetation. The project will be assessed under the Detailed Assessment Pathway under Clause 52.17.

[1] A 'habitat hectare' is a unit of measurement which combines the condition and extent of native vegetation.

2.4 Assessment Qualifications and Limitations

Data and information held within the ecological databases and mapping programs reviewed in the desktop assessment (e.g. VBA, PMST, NatureKit etc.) are unlikely to represent all flora and fauna observations within, and surrounding, the study area. It is therefore important to acknowledge that a lack of documented records does not necessarily indicate that a species or community is absent.

Ecological values identified on site are recorded using a hand-held GPS or tablet with an accuracy of +/-5 metres. This level of accuracy is considered adequate to provide an accurate assessment of the ecological values present within the study area. However, this data should not be used for detailed surveying purposes.

The targeted surveys for all species listed above were conducted within the peak flowering period and fauna activity periods using the appropriate survey methods.

3 RESULTS

3.1 Vegetation Condition

3.1.1 Remnant Patches

Remnant native vegetation in the study area is representative of four EVCs: *Low Rainfall* Plains Grassland (EVC 132_63), Riverina Plains Grassy Woodland (EVC 55_62), Floodplain Riparian Woodland (EVC 56) and Lignum Swamp (EVC 104). The presence of these EVCs is generally consistent with the modelled pre-1750s native vegetation mapping for the Victorian Volcanic Plain bioregion (DELWP 2020b). Historical clearing and grazing activities have resulted in large sections of the study area being dominated by introduced vegetation (i.e. crop and pasture).

Plains Grassland (Low Rainfall) (EVC 132_63)

Low Rainfall Plains Grassland is described as a mostly treeless vegetation community dominated by grasses and herbs usually less than 1 metre in height. The EVC occupies cracking basalt soils and is prone to seasonal waterlogging in areas receiving less than 500 millimetres rainfall (DELWP 2020c).

Low Rainfall Plains Grassland is present throughout the alignment and was classified into three habitat zones; PG1, PG2 and PG3 (Figure 2). Habitat zone PG1 has up to 70% cover of indigenous perennial grasses, with Spear-grass *Austrostipa* spp. and Wallaby-grass Rytidosperma spp. being particularly prevalent (Plate 10; Plate 11). The PG2 patches contained a moderate cover of native grasses (> 50%), whereas the PG3 patches were lower quality, containing 30% - 40% native vegetation cover (Plate 12; Plate 13).

A moderate diversity of herbs and shrubs were present, varying in cover across the habitat zones, but overall cover was low. Native herbs observed commonly included Grassland Wood-sorrel *Oxalis perennans*, Kidney-weed *Dichondra repens*, Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa,* Blushing Bindweed *Convolvulus angustissimus* and Berry Saltbush *Atriplex semibaccata*. Weed cover varied between 30% to 70%, with common weeds being Ribwort *Plantago lanceolata,* Wild Oat *Avena fatua*, Rye *Lolium* spp., Barley *Hordeum* spp., and Serrated Tussock *Nassella trichotoma*, a Weed of National Significance.

Habitat zones PG1 and PG2 met the condition thresholds that define the nationally significant ecological community *Natural Temperate Grasslands of the Victorian Volcanic Plain* (NTGVVP). In total, 9.749 hectares of NTGVVP is present within the construction footprint (Figure 2).

Plate 10. Plains Grassland (PG1) within the study area adjacent to Green Hill Road, qualifying as NTGVVP (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 11. Plains Grassland (PG1) patches present along Nerowie road, qualifying as NTGVVP (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 12. Plains Grassland (PG3) within the study area (Figure 2d) (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 13. Plains Grassland (PG3) with high weed cover (Figure 2b) (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Riverina Plains Grassy Woodland (EVC 55_62)

Riverina Plains Grassy Woodland is characterised by an open eucalypt canopy up to 15 metres tall, with a grassy or sedgy understory occurring in areas receiving <600 mm rainfall per annum (DELWP 2020c).

The construction footprint intersects four patches of Riverina Plains Grassy Woodland, varying in quality from a relatively disturbed understory to a high quality understory, shown as PGW1, PGW2 and PGW3 on Figure 2.

PGW1 forms the largest of the woodland patches and was characterised by a sparse Grey Box overstory with a high level of recruitment from both Grey Box and Golden Wattle (Plate 14). This patch met the listing criteria for the nationally significant *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia*. The ground layer is dominated by Rough Spear-grass *Austrostipa scabra* and Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa* over a high cover of predominantly native organic

litter. The WONS listed African Boxthorn *Lycium ferocissimum* was recorded throughout the understory in moderate to low cover.

PGW 2 and PGW3 were of lower quality due to a lower cover of native species in the understory, although PGW2 patches did contain several large trees (Plate 15).

Plate 14. PGW1 within the study area (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 15. Large tree within PGW2 within the study area (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Floodplain Riparian Woodland (EVC 56)

Floodplain Riparian Woodland is described as an open eucalypt dominated woodland to 20 metres tall, with an understory consisting of tall shrubs and aquatic herbs and sedges. Typically, this environment occurs on larger riversides often in conjunction with one or more floodplain wetland communities. Elevation and rainfall is characteristically low with relatively fertile alluvial soils subject to periodic flooding and inundation (DELWP 2020c).

Three patches of Floodplain Riparian Woodland were found to occur along the banks of the Werribee River at both the northern and southern alignment crossings (Figure 2). The patches were characterised by a heavily grazed understory, where the eucalypt canopy was predominantly absent due to eucalypt dieback most likely caused by altered flooding regimes following construction of Melton Reservoir (Plate 16).

Lignum Swamp (EVC 104).

One small patch of Lignum Swamp was recorded within the eastern end of the study area, adjacent to the Werribee River. The patch was in a degraded state, containing several Tangled Lignum *Duma florulenta* individuals and a high cover of weeds (Plate 17). The construction footprint passes along the southern tip of the patch (Figure 2g).

Plate 16. Floodplain Riparian Woodland along Werribee River at the proposed pipeline crossing (Figure 2g) (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 17. Low quality Lignum Swamp patch within the study area (Figure 2g) (Ecology and Heritage Partners Pty Ltd 13/10/2020).

3.1.2 Large Trees

The preferred alignment will impact four Large Trees located in the eastern extent of the study area (Figure 2f & g). These large trees are within patches of mapped Riverina Plains Grassy Woodland (EVC 55_62) (Plate 18).

3.1.3 Scattered Trees

One small scattered tree falls within the preferred alignment and is proposed to be impacted (Plate 19; Figure 2g). This tree would have previously been a part of the Riverina Plains Grassy Woodland patch, however the understory was predominately exotic so was excluded from the nearby patch. Additional scattered trees are located throughout the boarder region surrounding the alignment, however are not proposed to be impacted.

Plate 18. Large tree within the study area (Ecology and Heritage Partners Pty Ltd 13/10/2020).

Plate 19. Scattered trees within the study area (Ecology and Heritage Partners Pty Ltd 20/02/2018).

3.2 Introduced and Planted Vegetation

3.2.1 Planted Vegetation

Planted native vegetation occurs primarily adjacent to the western extent of the preferred alignment (Plate 20). While the planted vegetation was not mapped, remnant patches characteristic of Plains Grassland (EVC 132_63) and scattered remnant Grey Box trees were found amongst the plantings.

Two additional areas were identified, one at the western extent that consisted of the commonly planted Sugar Gum *Eucalyptus cladyocalyx* (Plate 21), and the eastern extent of the alignment, which intersect the road reserves adjacent to Eynesbury Road.

Plate 20. Planted vegetation within the study area (Ecology and Heritage Partners Pty Ltd 19/02/2018).

Plate 21. GW1 within the study area (Ecology and Heritage Partners Pty Ltd 19/02/2018).

3.2.2 Introduced Vegetation

Areas not supporting remnant native vegetation have a high cover (>80%) of exotic grass species, many of which have been direct-seeded for use as pasture grasses. There is evidence of historical clearing attributing to the areas of poorest quality, in terms of high weed cover and low native diversity (Plate 22). Scattered native grasses are present in these areas, although they do not have the required 25% cover to be considered a remnant patch according to the Guidelines (DELWP 2017a).

All areas dominated by introduced species showed at least a moderate level of disturbance, with varying cover of weedy species. However, the dominant species throughout the study area were typically Rye-grass, Galenia *Galenia pubescens* var. *pubescens*, Ribwort, Couch *Cynodon dactylon* var. *dactylon*, Rape *Brassica X napus,* and Wild Oat. Two Weeds of National Significance (WONS) were recorded within the study area, Serrated Tussock and African Box-thorn *Lycium ferocissimum* (Plate 23).

Plate 22. Introduced grassland within the study area (Ecology and Heritage Partners Pty Ltd 20/02/2018).

Plate 23. WONS listed Serrated Tussock within the study area (Ecology and Heritage Partners Pty Ltd 20/02/2018).

3.3 Fauna Habitat

3.3.1 Native and Introduced Grasslands

The study area consists of native and introduced grasslands which are used as a foraging resource by common generalist bird species that are tolerant of modified grassland areas. Native fauna observed using this habitat included; Australian Magpie *Cracticus tibicen*, Little Raven *Corvus mellori*, Magpie-lark *Grallina cyanoleuca*, Willie Wagtail *Rhipidura leucophrys*, Australasian Pipit *Anthus novaeseelandiae*, Eastern Grey Kangaroo Macropus *Macropus giganteus*, as well as Nankeen Kestrel *Falco cenchroides*, Black-shouldered Kite *Elanus axillaris* and Whistling Kite *Haliastur sphenurus* which were observed flying over the study area. Introduced species recorded were European Rabbit *Oryctolagus cuniculus*, House Mouse *Mus musculus* and Common Blackbird *Turdus merula*.

Patches of native grassland occur within the study area and vary in quality and floristic composition. Habitat attributes of the native grassland are suitable for an array of common native fauna, including snakes, lizards, skinks and grassland birds.

Areas of native grassland, particularly those with a high cover of Wallaby-grasses and Spear-grasses, as well as the introduced Chilean Needle Grass provided habitat for the nationally significant Golden Sun Moth, which

was recorded along most of the preferred alignment. Cracking clay soils were present, particularly within the Plains Grassland EVC and may provide sheltering habitat for a range of reptiles including the EPBC-listed Striped Legless Lizard, as well as small mammals.

3.3.2 Woodland and Scattered Trees

Woodland and scattered remnant trees occur throughout the study area and provide an important resource for arboreal fauna. When in flower, eucalypt trees provide a rich nectar source for a high diversity of nectar-feeding birds and mammals. Mature eucalypts and scattered trees present throughout the woodland EVCs provide an array of small, medium and large hollows. These are likely to be used for shelter and nesting, by a range of hollow-dependent fauna including parrots, microbats, possums, gliders and owls. Bark fissures and crevices, as well as the understorey of woodland habitats contains ground-cover dominated by leaf litter, exposed surface (basalt) rocks and fallen timber, providing good quality habitat for reptiles.

Scattered trees provide habitat for more mobile fauna species, vantage points and nesting areas for diurnal and nocturnal raptors, as well as stepping stones for more mobile fauna moving through the study area, enhancing landscape permeability for native fauna.

Species observed utilising woodland and scattered trees within the study area including adjacent to the Werribee River, were: White-plumed *Honeyeater Lichenostomus penicillatus,* Red Wattlebird *Anthochaera carunculata,* Crimson Rosella *Platycercus elegans,* Silvereye *Zosterops lateralis*, Superb Fairy-wren *Malurus cyaneus*, Striated Thornbill *Acanthiza lineata*, Brown Thornbill *Acanthiza pusilla*, Sulphur-crested Cockatoo *Cacatua galerita,* Galah *Eolophus roseicapilla*, Australian Pelican *Pelecanus conspicillatus* (fly-over), Pacific Black Duck *Anas superciliosa*, Australian Wood Duck *Chenonetta jubata* and White-faced Heron *Egretta novaehollandiae*. During targeted Growling Grass Frog surveys, Eastern Banjo Frog *Limnodynastes dumerlii* and Common Froglet *Crinea signifera* were recorded calling by the Werribee River.

3.4 Removal of Native Vegetation (the Guidelines)

The below vegetation impacts are based off the final construction footprint provided by Western Water on 17 December 2020, which includes a corridor for the pipeline, construction access and lay down areas.

3.4.1 Vegetation proposed to be Removed

In accordance with the Guidelines (2017a), the assessment pathway for a permit for the removal of native vegetation is determined by the extent of native vegetation and the modelled location category where native vegetation is proposed to be removed (Table 3).

The study area is within Location 3 and 8.924 hectares of native vegetation is proposed to be removed, which includes 8.893 hectares of native vegetation patches and one scattered tree. As such, the permit application falls under the Detailed Assessment pathway (Table 4). Of the native vegetation proposed to be removed, 1.239 hectares falls within Moorabool Shire Council, along Nerowie road, and 7.685 hectares falls within Melton City Council.

Table 3. Determination of the assessment pathway under the Guidelines (DELWP 2017a).

Extent of native vegetation	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
0.5 hectares or more	Detailed	Detailed	Detailed

As the application falls under the Detailed Assessment Pathway, condition scores for vegetation proposed to be removed are based on a habitat hectare assessment (DELWP 2018a). Habitat hectare scores and the location, number, circumference and species of scattered trees are provided in Appendix 1.

Table 4. Removal of Native Vegetation (the Guidelines)

Assessment pathway	Detailed
Total Extent	8.924
Remnant Patch (ha)	8.924
Scattered Trees (no.)	1
Large Trees within patches (no.)	4
Location Category	3

3.4.2 Offset Targets

The total offset requirement for the native vegetation removal is 3.645 GHUs and four Large Trees.

A summary of proposed vegetation losses and associated offset requirements is presented in Table 5. The offsets requirements are also split by the relevant council, with offset requirements for Melton City Council provided in Table 6, and offset requirements for Moorabool Shire Council provided in Table 7. The Native Vegetation Removal Report provided by DELWP is presented in Appendix 3.

Table 5. Summary of total offset targets

General Offsets Required	3.645 GHUs
Large Trees	4
Vicinity (catchment/council)	Port Phillip and Westernport CMA / Melton Shire Council and Moorabool Shire Council
Minimum Strategic Biodiversity Value*	0.532

Note: GHU = General Habitat Units

Table 6. Offset targets for Melton City Council

General Offsets Required	2.901 General Habitat Units
Large Trees	4
Vicinity (catchment/council)	Port Phillip and Westernport CMA / Melton Shire Council and Moorabool Shire Council
Minimum Strategic Biodiversity Value*	0.530

*The minimum Strategic Biodiversity Value is 80% of the weighted average score across habitat zones where a General offset is required.

Table 7. Offset targets for Moorabool Shire Council

General Offsets Required	0.745 General Habitat Units
Large Trees	4
Vicinity (catchment/council)	Port Phillip and Westernport CMA / Melton Shire Council and Moorabool Shire Council
Minimum Strategic Biodiversity Value*	0.548

***The minimum Strategic Biodiversity Value is 80% of the weighted average score across habitat zones where a General offset is required.

3.5 Significance Assessment

3.5.1 Flora

Seventy-four flora species (42 indigenous and 32 non-indigenous or introduced) were recorded within the study area during the field assessment.

The VBA contains records of six nationally significant and 69 State significant flora species previously recorded within 10 kilometres of the study area (DELWP 2018a) (Appendix 2.1; Figure 3). The PMST nominated an additional eight nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2020). Most records are confined to existing road reserves or conservation reserves within the local area, including recent (post- 2007) records for the nationally significant Matted Flax-lily *Dianella amoena,* Small Golden Moths *Diuris basaltica*, Spiny Rice-Flower, and Large-headed Fireweed (Figure 3).

Of these species, there is potential habitat within the study area for flora species of national significance, including Spiny Rice-flower, Matted Flax-lily, Small Golden Moths, and Large-headed Fireweed (Table) and State significance, including Bacchus Marsh Wattle *Acacia rostriformis*, Buloke *Allocasuarina luehmannii*, Plains Joyweed *Alteranthera* sp. 1 (Plains), Buloke mistletoe *Amyema linophylla* subsp. *orientalis*, Cane Spear-grass *Austrostipa breviglumis,* Heath Spear-grass *Austrostipa exilis*, Yellow Burr-daisy *Calotis lappulacea*, Frosted Goosefoot *Chenopodium desertorum* subsp. *desertorum*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis,* Small Scurf-pea *Cullen parvum*, Slender Tick-trefoil *Desmodium varians,* Late-flower Flax-lily *Dianella tarda*, Pale Spike-sedge *Eleocharis pallens,* Werribee Blue-box *Eucalyptus baueriana* subsp. *thalassina*, Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*, Brittle Greenhood *Pterostylis truncata,* Fragrant Saltbush *Rhagodia parabolica*, Rye Beetle-grass *Tripogon loliiformis*.

The site assessments recorded eight species protected under the FFG Act, including Golden Wattle, Varnish Wattle, Buloke, Common Cassinia, Jersey Cudweed, Nardoo, Cotton Fireweed and Fuzzy New Holland Daisy. Additionally, one state significant ecological community, Western (Basalt) Plains Grasslands, was recorded within all mapped patches of *Low Rainfall* Plains Grassland.

Table 8. Nationally significant flora species with the potential to occur within the study area.

Common Name	Scientific Name	Habitat
National Significance		
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	There are 132 records of Spiny Rice-flower recorded in the VBA within the local area, with the most recent from 2015 located east of the study area in private land along Boundary road. There is suitable habitat within Plains Grassland present within the study area, however no individuals were identified during targeted surveys.
Matted Flax-lily	*Dianella amoena*	There are two records of Matted Flax-lily recorded in the VBA within 10 kilometres of the study area. There is suitable habitat within Plains Grassland EVCs found across the study area, however no individuals were identified during the targeted surveys.
Large-headed Fireweed	*Senecio macrocarpus*	There are four records of Large-headed Fireweed recorded in the VBA within 10 kilometres of the study area. There is suitable habitat (Plains Grassland) within the study area, however no individuals were identified during targeted surveys.
Button Wrinklewort	*Rutidosis Leptorhynchoides*	There were no records of Button Wrinklewort recorded in the VBA within 10 kilometres of the study area, however the study area is within its historical distribution. There is suitable habitat (Plains Grassland) within the study area, however no individuals were identified during targeted surveys.
Small Golden Moths Orchid	*Diuris basaltica*	There are seven records of Small Golden Moths recorded in the VBA within 5 kilometres of the study area, with the most recent record from 2011 located within the rail reserve (between Melton and Bacchus Marsh stations). There is suitable habitat (Plains Grassland) within the study area, however the species is now restricted to two isolated populations in the local area (west of Melbourne) (Biosis 2012) and no individuals were identified during targeted surveys.

Targeted Flora Survey Results

Targeted surveys were undertaken for Matted Flax-lily, Spiny Rice-flower, Large-headed Fireweed, Small Golden Moths Orchid and Button Wrinklewort, with no individuals recorded within the study area.

Targeted surveys for State significant fauna are not required under the Guidelines (DELWP 2017a).

Two Matted Flax-lily specimens were recorded within native planted roadside vegetation approximately two kilometres north of the alignment. Although the targeted surveys were undertaken during the known flowering period when the species was known to be flowering within the locality, no other specimens were recorded in areas considered to support suitable habitat.

Spiny Rice-Flower, Large-headed Fireweed, Button Wrinklewort and Small Golden Moths Orchid were not detected during targeted surveys that were undertaken within the study area.

3.5.2 Fauna

The VBA contains records of 14 nationally significant, 40 State significant and 16 regionally significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2018a) (Appendix 3.2; Figure 4). The PMST nominated an additional six nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2020). Of these species, there is suitable habitat within the study area for many fauna species including national and state significant species.

Areas of native grassland within the study area (including areas with a high cover of wallaby grass), provide known habitat for the nationally significant Golden Sun Moth. Suitable habitat was identified for Striped Legless Lizard and targeted surveys were undertaken in 2018. A total of six tile checks were undertaken, with no individuals recorded.

Woodlands and scattered trees within the study area provide suitable habitat, albeit suboptimal due to historic disturbance, for a range of state significant birds [e.g. Grey Goshawk *Accipiter novaehollandiae novaehollandiae,* Black Falcon *Falco subniger*, and Brown Treecreeper (south-eastern ssp.) *Climacteris picumnus victoriae*]. This is due to the study area supporting some characteristics of the species preferred habitat and records within the study area and in the local area. Given the low to moderate condition of the woodland vegetation within the study area these species are considered to have a moderate likelihood of occurrence.

All other significant fauna species are considered to have a low likelihood or unlikely to occur within the study area (Appendix 3.2).

Table 9. Nationally significant fauna species with the potential to occur within the study area.

Common Name	Scientific Name	Habitat
National Significance		
Golden Sun Moth	*Synemon plana*	There are approximately 1000 records of Golden Sun Moth recorded by Ecology and Heritage Partners within the study area. 10.357 hectares of Golden Sun Moth habitat is proposed to be impacted during the construction of the pipeline.
Striped Legless Lizard	*Delma impar*	There are 27 records of Striped Legless Lizard within 10 kilometres of the study area registered in the VBA (2018d). Suitable grassland habitat exists in the study area and tile monitoring grids were used to determine species presence. Targeted surveys did not identify any individuals within the study area.
Growling Grass Frog	*Litoria raniformis*	There are 48 records of Growling Grass Frog within 10 kilometres of the study area, according to the VBA (2018d). Suitable habitat along the Werribee River occurs in the study area, however targeted surveys did not identify any individuals (Figure 3).

Targeted Fauna Survey Results

Targeted surveys were undertaken for Golden Sun Moth in November 2017, January 2018 and November/December 2020. Additional details are provided below.

Targeted surveys for Striped Legless Lizard (October – November 2018) and Growling Grass Frog (November – December 2018) were undertaken to determine species presence within the study area, and any implications under relevant legislation (i.e. EPBC Act). No Striped Legless Lizard or Growling Grass Frog were identified within the study area.

Golden Sun Moth

A total of approximately 1000 Golden Sun Moth individuals were recorded within the study area during the targeted surveys (Table 10, Figure 6).

Table 10. Golden Sun Moth survey results from 2017, 2018 and 2020 survey efforts

Date	Survey times	Temperature (°C) *	Wind (km/hr) Direction *	Cloud cover (%)	Days since rain *	No. GSM
14/11/2017	13:00 – 14:20	33.7	19 km/hr N	1	7	1
23/11/2017	11:50 – 15:50	26.9	5-15 km/hr S	5 - 90	0	990
15/12/2017	11:30 – 14:30	24.2	22 km/hr WSW	2	-	0
22/12/2017	11:50 – 13:00	27.1	5 km/hr NE	15	3	0
11/01/2018	10:15 – 12:30	26	10 km/hr E	1	-	0
18/11/2020	13:00 – 15:00	29.5	20 km/hr E	5%	<6	0
27/11/2020	12:00 – 14:00	34	21 km/hr SW	0%	<4	0
02/12/2020	12:30 – 14:20	21.0	21 km/hr NE	5%	2	1
09/12/2020	13:00 – 14:30	24.0	16 km/hr SW	25%	1	8

Note. * Bureau of Meteorology (BOM) weather for Melbourne Airport, Victoria (Station 086282 –December 2017; January 2018), Australian Government, ACT

Striped Legless Lizard

Targeted surveys for Stiped Legless Lizard were undertaken from October – November 2018 using 10 tile monitoring grids within the study area. Weather data was taken, however no Striped Legless Lizards were recorded within the study area.

Growling Grass Frog

Growling Grass Frog (Werribee River) targeted surveys were also undertaken in December 2018. A summary of the survey results and weather data is provided in Table 11 and the survey locations presented in Figure 5. A reference site, where known habitat for Growling Grass Frog exists, was visited on the same night as the second check. The species was recorded calling at the reference site located in Pakenham, confirming that environmental conditions were suitable.

Table 11. Growling Grass Frog survey results

Date	Survey times	Ambient Temperature (°C) *	Wind (km/hr) Direction *	Cloud cover (%)	Number of GGF	Other species
29.11.2018	21.40 - 22.20	15	14 SE	30	0	E. Banjo Frog, Striped Marsh Frog, Spotted Marsh Frog (Heard)
05.12.2018	09.04 - 22.30	18	Calm	70	0	E. Banjo Frog (Heard)

Note. * Bureau of Meteorology (BOM) weather for Melbourne Airport, Victoria (Station 086282 –November & December 2018) and Laverton, Victoria (Station 087031 – December 2018), Australian Government, ACT

3.5.3 *Ecological Communities*

Nationally significant communities

Five nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DoEE 2017):

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain;
- Grey Box (*Eucalyptus microcarpa*) 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; and
- White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Following the field surveys, two EPBC listed communities were found to occur within the study area.

Habitat Zones PG1 and PG2 (outlined in blue) met the condition thresholds that define the nationally significant ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* listed under the EPBC Act (Figure 2). This is due to the high cover (>50%) of perennial native grasses present within the alignment, such as Wallaby-grass and Spear-grass. A total of 4.961 hectares of NTGVVP is proposed to be impacted within the construction footprint.

Habitat Zone PGW1 within the study area meets the description of nationally significant Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia EPBC listed community. The habitat zone was dominated by Grey Box, most of which were considered Large Trees (DBH >70 centimetres) with a predominantly native grass and herb understory. One woody weed, African Boxthorn, was present within the PGW1 patch.

A total of 0.266 hectares of Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia is proposed to be impacted by the alignment (Figure 2), with impacts restricted to the understory and no removal of large Grey Box to occur.

Due to the absence of key indicator species, and a lack of species diversity within the ground-layer, no other nationally significant communities were assessed as present within the study area.

State significant communities

All *Low Rainfall* Plains Grassland patches within the study area met the description of the Western (Basalt) Plains Grasslands Community, State-listed as Threatened under the FFG Act. The majority of the patches were located in private land, and therefore do not require a permit for their removal. However, a few patches were recorded along Nerowie Road, and will require a permit for their removal.

4 LEGISLATIVE AND POLICY IMPLICATIONS

4.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of National Environmental Significance (NES).

For species listed under the EPBC Act, a 'significant impact' is defined as an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE 2013). If an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is affected, and upon the intensity, duration, magnitude and geographic extent of the impacts. Importantly, for a 'significant impact' to be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility (DoE 2013).

4.1.1 Flora

Two Matted Flax-lily were identified outside of the alignment footprint and therefore will not be impacted.

No Spiny Rice-flower, Large-headed Fireweed, Small Golden Moths and Button Wrinkle-wort were recorded within the study area despite surveys conducted during the flowering season for these species.

A total of 4.961 hectares of NTGVVP and 0.266 hectares of the nationally significant ecological community Grey Box (*Eucalyptus microcarpa*) Grassy Woodland are proposed to be impacted by the proposed pipeline alignment.

According to the significant impact criteria for critically endangered ecological communities (DoE 2013), an action is likely to be significant where there is a real chance or possibility that it will reduce the extent of the ecological community.

4.1.2 Fauna

Targeted surveys for Golden Sun Moth were undertaken in the Summer 2017/18 and 2020 flying season and a total of approximately 1000 Golden Sun Moth were recorded within the study area (Table 8, Figure 6). This comprised 10.357 hectares of habitat within the alignment. According to the significant impact criteria for critically endangered ecological communities (DoE 2013), an action is likely to be significant where there is a real chance or possibility that it will impact > 0.5 hectares of contiguous habitat greater than 10 hectares.

Targeted surveys (October – November 2018) within suitable habitat in the study area did not record Striped Legless Lizard (Figure 5). Similarly, no Growling Grass Frog were recorded within the study area during the targeted surveys (November – December 2018) (Figure 5).

4.1.3 Implications

An EPBC Act referral (2018/8260) was submitted to the Commonwealth Minister of the Environment and Energy for the proposed impacts to the three matters of NES; Golden Sun Moth, NTGVVP, and Grey Box Woodland.

On the 8 November 2018, the project was determined a 'Controlled Action' under the EPBC Act. As such, the project is being assessed through Preliminary Documentation.

4.2 *Flora and Fauna Guarantee Act 1988* (Victoria)

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

There is suitable habitat within the study area for eight species listed or protected under the FFG Act, including Golden Wattle, Varnish Wattle, Buloke, Common Cassinia, Jersey Cudweed, Nardoo, Cotton Fireweed and Fuzzy New Holland Daisy. Additionally, one state significant ecological community, Western (Basalt) Plains Grasslands, was recorded where all Low Rainfall Plains Grassland was mapped.

The majority of the study area is located within private land, and therefore a permit is not required for these areas. The vegetation present along Nerowie Road is located on public land and will require a permit under the FFG Act for impacts to species and ecological communities. Within this area, Fuzzy New Holland Daisy and Western (Basalt) Plains Grassland were recorded and are within the construction footprint, with a total of 1.2394 hectares of Western (Basalt) Plains Grassland recorded and approximately 75 – 100 Fuzzy New Holland Daisy individuals.

4.3 *Environment Effects Act 1978* (Victoria)

The *Environment Effects Act 1978* provides for assessment of proposed actions that are capable of having a significant effect on the environment via the preparation of an Environment Effects Statement (EES). A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred. An action may be referred for an EES decision where:

- one of the following occurs:
    - Potential clearing of 10 hectares or more of native vegetation from an area that:
        - is of an EVC identified as endangered by DELWP;
        - is of Very High conservation significance; or,
        - is not authorised under an approved Forest Management Plan or Fire Protection Plan.
    - Potential long-term loss of a significant proportion (1-5% depending on conservation status of species) of known remaining habitat or population of a threatened species within Victoria.
- or where two or more of the following occur:
    - Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Act or Fire Protection Plan;
    - Matters listed under the FFG Act:
        - Potential loss of a significant area of a listed ecological community;
        - Potential loss of a genetically important population of an endangered or threatened species;

- Potential loss of critical habitat; or,
- Potential significant effects on habitat values of a wetland supporting migratory birds.

- Potential exposure of a human community to severe or chronic health hazards or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport;
- Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term;
- Potential significant effects on the amenity of a substantial number of residents, due to extensive, or major long term changes in visual, noise and traffic conditions.

4.3.1 Implications

The final alignment for the proposed pipeline includes impacts to four endangered ecological community, *Low Rainfall* Plains Grassland, Riverina Plains Grassy Woodland, Lignum Swamp and Floodplain Riparian Woodland. While the alignment intersects several vegetation patches, it does not remove any patches in their entirety.

The total proposed impacts to native vegetation is below the 10 hectare impact threshold, with the impacts having been reduced through a revision of the impact footprint. Therefore, a referral under the EES Act is not required.

4.4 *Planning and Environment Act 1987* (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies or a subdivision is proposed with lots less than 0.4 hectares[2]. Local planning schemes may contain other provisions in relation to the removal of native vegetation (Section 4.4.1).

4.4.1 Local Planning Schemes

The study area is located within the Moorabool Shire Council and Melton City Council municipalities. The following zoning and overlays apply (DELWP 2020d):

Moorabool Shire Council

- Road Zone – Category 2 (RDZ2)

Melton City Council

- Road Zone – Category 2 (RDZ2)
- Design and Development Overlay - Schedule 2 (DDO2)
- Incorporated Plan Overlay – Schedule 1 (IPO1)

[2] In accordance with the Victorian Civil and Administrative Tribunal's (VCAT) decision Villawood v Greater Bendigo CC (2005) VCAT 2703 (20 December 2005) all native vegetation is considered lost where proposed lots are less than 0.4 hectares in area and must be offset at the time of subdivision.

- Environmental Significance Overlay – Schedule 1 (ESO1)
- Environmental Significance Overlay – Schedule 2 (ESO2)
- Environmental Significance Overlay – Schedule 4 (ESO4)
- Green Wedge Zone (GWZ)

4.4.2 Implications

Environmental Significance Overlay – Schedule 1 (ESO1)

The ESO1 of the Melton City Council Planning Scheme aims to protect and conserve remnant native woodlands, open forests, grasslands and associated understory and discourage inappropriate use and development.

Environmental Significance Overlay – Schedule 2 (ESO2)

The ESO2 of the Melton City Council Planning Scheme aims to protect and conserve wetlands and to discourage inappropriate use and development. This overlay applies to the alignment crossing the Werribee River.

Environmental Significance Overlay – Schedule 4 (ESO4)

The ESO4 of the Melton City Council Planning Scheme aims to prevent a decline in the extent and quality of native vegetation and native fauna habitat of the Victorian Volcanic Plain.

Application Requirements:

- A description of any proposed disturbance of surface soil or rocks associated with the proposal.
- The total extent of vegetation on the property and the extent of native vegetation proposed to be removed, lopped or destroyed.
- A description of the steps that have been taken to avoid and minimise the removal of native vegetation including the practicality of alternative options which do not require removal of the native vegetation.
- A flora and fauna assessment of the land prepared by a suitably qualified and experienced person to the satisfaction of the responsible authority. The assessment must include:
    - A flora and fauna survey
    - A habitat hectare assessment
    - Identification of the vegetation and habitat significance of the property
    - A description of the effect of the proposed development in relation to other areas of native vegetation or native fauna habitat, including any proposed conservation reserves, streams and waterways
- An Environmental Management Plan prepared by a suitably qualified person identifying as appropriate:
    - Any proposals for revegetation, including proposed species, and ground stabilisation;
    - How any vegetation removal will be offset (an offset plan), in accordance with Victoria's Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017);

- Weed management, including species to be targeted and proposed management techniques, and;
- Pest animal management, including species to be targeted and proposed management techniques

Green Wedge Zone (GWZ)

A permit is required for a utility installation under the green wedge zone

Relevant Exemptions

Planted vegetation in the study area native to Victoria is exempt from planning permit requirements under Clause 52.17-7 (Table of Exemptions) as it is planted on private land for amenity purposes (DELWP 2018f).

4.4.3 Requirements

The study area is within Location 3 and 8.924 hectares of native vegetation is proposed to be removed, which includes 8.893 hectares of native vegetation patches and one scattered tree. As such, the permit application falls under the Detailed Assessment pathway

A Planning Permit from Moorabool Shire Council and Melton City Council is required to remove, destroy or lop any native vegetation. In this instance, the application will be referred to DELWP as the application is within the Detailed Assessment Pathway.

4.5 Wildlife Act 1975 and Wildlife Regulations 2013 (Victoria)

The *Wildlife Act 1975* (and associated Wildlife Regulations 2013) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the P&E Act. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*, issued by DELWP.

4.6 Catchment and Land Protection Act 1994 (Victoria)

The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species to minimise their spread and impact on ecological values.

Weeds listed as noxious under the CaLP Act were recorded during the assessment (Soursob *Oxalis pes-caprae*, African Boxthorn, Spear Thistle, and Serrated Tussock). A Weed Management Plan and a pest fauna eradication plan may be required.

5 IMPACT AND MITIGATION MEASURES

5.1 Likely and Potential Impacts

The study area is within Location 3 and 8.924 hectares of native vegetation is proposed to be removed, which includes 8.893 hectares of native vegetation patches and one scattered tree. As such, the permit application falls under the Detailed Assessment pathway

A Planning Permit from Moorabool Shire Council and Melton City Council is required to remove, destroy or lop any native vegetation. In this instance, the application will be referred to DELWP as the application is within the Detailed Assessment Pathway. State offset requirements are detailed in Section 5.4.

Matters of National Environmental Significance were recorded in the study area during the biodiversity assessment and targeted surveys. A referral has been submitted to the Commonwealth Environment Minister for assessment, and Preliminary Documentation is currently being drafted (EPBC Referral No.: 2018/8260).

5.2 Best Practice Mitigation Measures

Recommended measures to mitigate impacts upon terrestrial and aquatic values present within the study area may include:

- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation within wetlands should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Habitat Zones (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Tree Retention Zones (TRZs) should be implemented within patches of Plains Grassy Woodland and Floodplain Riparian Woodland where trees are located to prevent indirect losses of native vegetation during construction activities (DSE 2011). A TRZ applies to a tree and is a specific area above and below the ground, with a radius 12 x the DBH. At a minimum standard a TRZ should consider the following:
    - A TRZ of trees should be a radius no less than two metres or greater than 15 metres;
    - Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) should be excluded from the TRZ;
    - Where encroachment exceeds 10% of the total area of the TRZ, the tree should be considered as lost and offset accordingly;
    - Directional drilling may be used for works within the TRZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;
    - The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained and no offset would be required; and,
    - Where the minimum standard for a TRZ has not been met an offset may be required.

- Removal of any habitat trees or shrubs (particularly hollow-bearing trees) should be undertaken between February and September to avoid the breeding season for most of fauna species. If any habitat trees or shrubs are proposed to be removed, this should be undertaken under the supervision of an appropriately qualified zoologist to salvage and translocate any displaced fauna. A Fauna Management Plan may be required to guide the salvage and translocation process;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation, LOTs and/or wetlands;
- Ensure that best practice sedimentation and pollution control measures are undertaken in accordance with Environment Protection Authority guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

In addition to these measures, the following documents should be prepared and implemented prior to any construction activities:

- Construction Environmental Management Plan (CEMP). The CEMP should include specific species/vegetation conservation strategies, daily monitoring, sedimentation management, site specific rehabilitation plans, weed and pathogen management measures, etc.;
- Significant Species Offset Management Plan. This will need to be prepared as part of the EPBC Act approvals for the project.
- An Offset Strategy under the Guidelines (DELWP 2017a)
- Weed Management Plan. This plan should follow the guidelines set out in the CaLP Act, and clearly outline any obligations of the project team in relation to minimising the spread of weeds because of this project. This may include a pre-clearance weed survey undertaken prior to any construction activities to record and map the locations of all noxious and environmental weeds; and,
- Fauna Management Plan. This may be required if habitat for common fauna species is likely to be impacted and salvage and translocation must be undertaken to minimise the risk of injury or death to those species.

5.3 Avoid and Minimise Impacts

5.3.1 Avoid and Minimise Statement

Under the Guidelines (DELWP 2017a), the three-step approach (avoid, minimise, offset) is the key policy in relation to the removal of native vegetation to achieve no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. Efforts to avoid the removal of, and minimise the impacts on, native vegetation should be commensurate with the biodiversity and other values of the native vegetation and focused on areas of native vegetation that have the most value. Areas of native vegetation to be retained must be able to maintain the same values in the future and should not be degraded over time by a proposed use or development associated with the removal.

Western Water considered several alignment options before deciding on the final alignment, with a number of factors influencing the decision making process. The key considerations included:

- Minimising impact on landholders – the alignment is predominately located within private agricultural land, and therefore had to give consideration to the location as to not greatly influence the current land use. This was achieved by running the new pipeline parallel to the existing gas pipeline, meaning the water pipeline was within the gas pipeline easement and previously disturbed land;
- Consideration of Cultural Heritage values;
- Presence of existing infrastructure (e.g. the selected river crossing contains four other utility installations); and,
- Shorter route compared to previous revisions.

The final chosen alignment follows an existing gas easement for the majority of the alignment, containing pre-disturbed vegetation, despite these areas having now recovered to a condition that qualifies as a 'patch' under the Guidelines. Where possible, ecological values will be avoided, specifically the Buloke located within the large lay down area adjacent to Green Hill Road (Figure 2e) and all patches of native vegetation adjacent to the construction footprint.

5.3.2 Offset Options

To meet the state offset requirements, the proponent may elect to secure offsets on-site, as "first party" offsets or to protect equivalent native vegetation elsewhere as "third-party" offsets.

5.3.3 Offset Strategy

The applicant has state offset requirements for 3.645 General Habitat Units and four large trees. State offsets for the project are proposed to be primarily met at a first party offset site, Pinkerton Forest, which has the required general habitat units available and the required number of large trees.

Commonwealth offsets are being secured at a third party offset site for NTGVVP and GSM.

6 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 12.

Table 12. Further requirements associated with the proposed development.

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	Matters of National Environmental Significance were recorded in the study area during the field surveys. A referral to the Commonwealth Environment Minister is therefore required as part of the proposed development	EPBC Act Referral submitted. On 8/11/2018 determined a 'controlled action' and the project is being assessed through Preliminary Documentation.
Flora and Fauna Guarantee Act 1988	There is suitable habitat within the study area for eight species listed or protected under the FFG Act, including Golden Wattle, Varnish Wattle, Buloke, Common Cassinia, Jersey Cudweed, Nardoo, Cotton Fireweed and Fuzzy New Holland Daisy. Additionally, one state significant ecological community, Western (Basalt) Plains Grasslands, was recorded where all Low Rainfall Plains Grassland was mapped. The majority of the study area is located within private land, and therefore a permit is not required for these areas. The vegetation present along Nerowie Road is located on public land and will require a permit under the FFG Act for impacts to species and ecological communities. Within this area, Fuzzy New Holland Daisy and Western (Basalt) Plains Grassland were recorded and are within the construction footprint, with a total of 1.2394 hectares of Western (Basalt) Plains Grassland recorded and approximately 75 – 100 Fuzzy New Holland Daisy individuals.	Submit a FFG Act permit for impacts to protected flora and Western (Basalt) Plains Grasslands community.
Environmental Effects Act 1987	The final alignment for the proposed pipeline includes impacts to four endangered ecological community, *Low Rainfall* Plains Grassland, Riverina Plains Grassy Woodland, Lignum Swamp and Floodplain Riparian Woodland. While the alignment intersects several vegetation patches, it does not remove any patches in their entirety.	As the proposed extent of native vegetation proposed to be removed (i.e. over 10 hectares) Western Water may choose to refer the project under the *Environment Effects Act 1978*. However, given the modified nature of the vegetation and the extent of past disturbance a formal assessment under the EEA Act (i.e. preparation of an Environment Effects Statement) is not likely to be required for the project.
Planning and Environment Act 1987	The study area is within Location 3 and 8.924 hectares of native vegetation is proposed to be removed, which includes 8.893 hectares of native vegetation patches and one scattered tree. As such, the permit application falls under the Detailed Assessment pathway A Planning Permit from Moorabool Shire Council and Melton City Council is required to remove, destroy or lop any native vegetation. In this instance, the	Prepare and submit a Planning Permit application to Melton City Council and Moorabool Shire Council

Relevant Legislation	Implications	Further Action
	application will be referred to DELWP as the application is within the Detailed Assessment Pathway. The property is partially covered by a Bushfire Management Overlay.	
Catchment and Land Protection Act 1994	Several weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Planning Permit conditions are likely to include a requirement for a Weed Management Plan.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.

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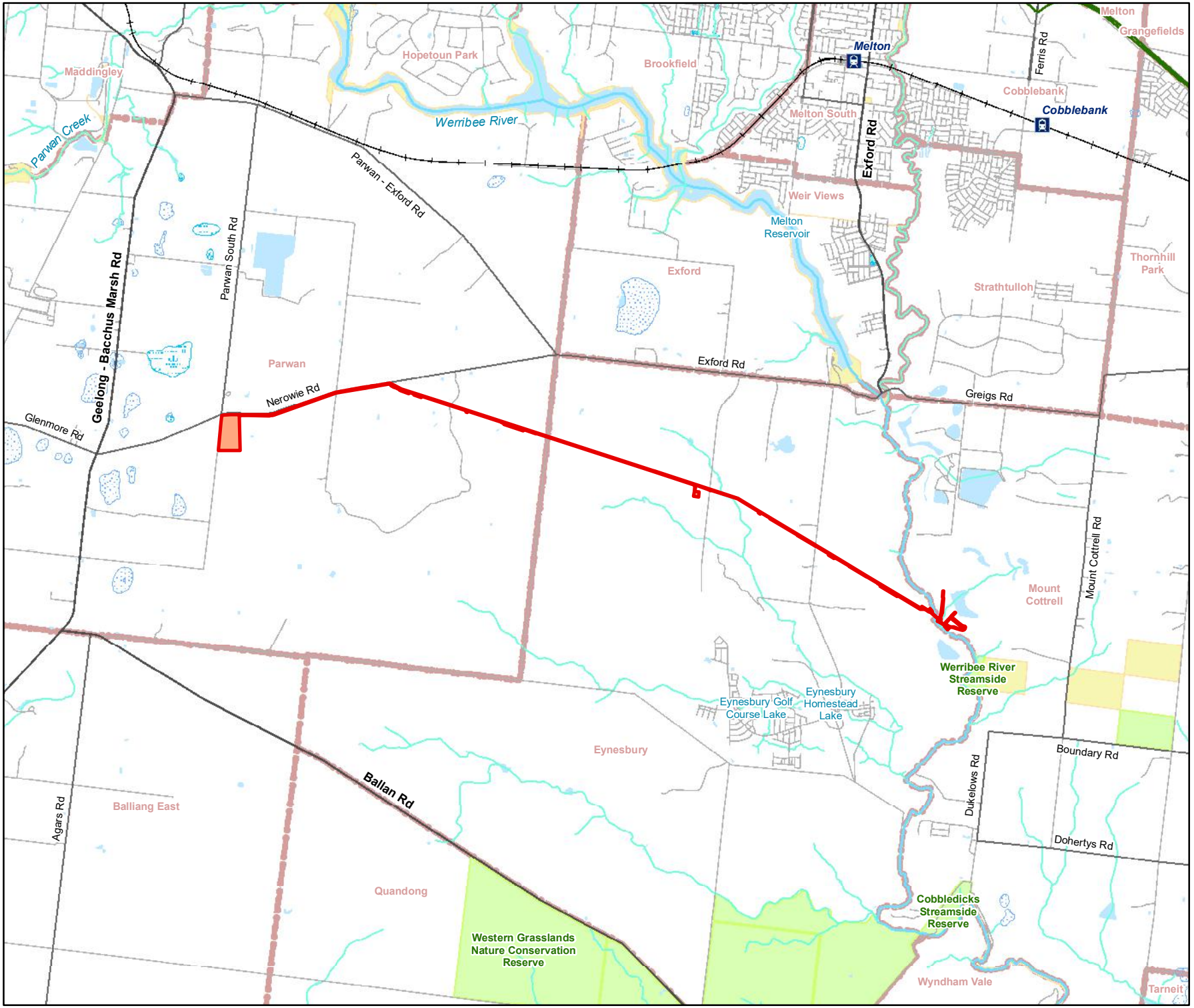


Legend

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities

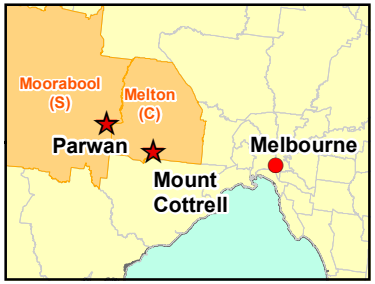


Figure 1

Location of the study area

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 1,000 2,000

Metres

ecology & heritage partners

Legend

- Study Area
- Previous Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Impacted vegetation

EPBC Act vegetation communities

- Natural Temperate Grassland of the Victorian Volcanic Plain

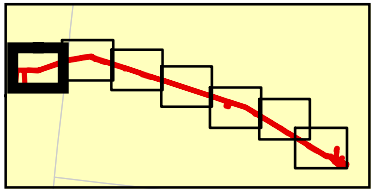


Figure 2a

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study Area
- Scattered Large Tree

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Plains Grassy Woodland *(Riverina)* (EVC 55_62)
- Impacted vegetation

EPBC Act vegetation communities

- Grey Box Grassy Woodland
- Natural Temperate Grassland of the Victorian Volcanic Plain

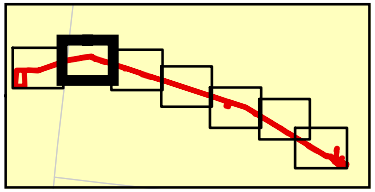


Figure 2b

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

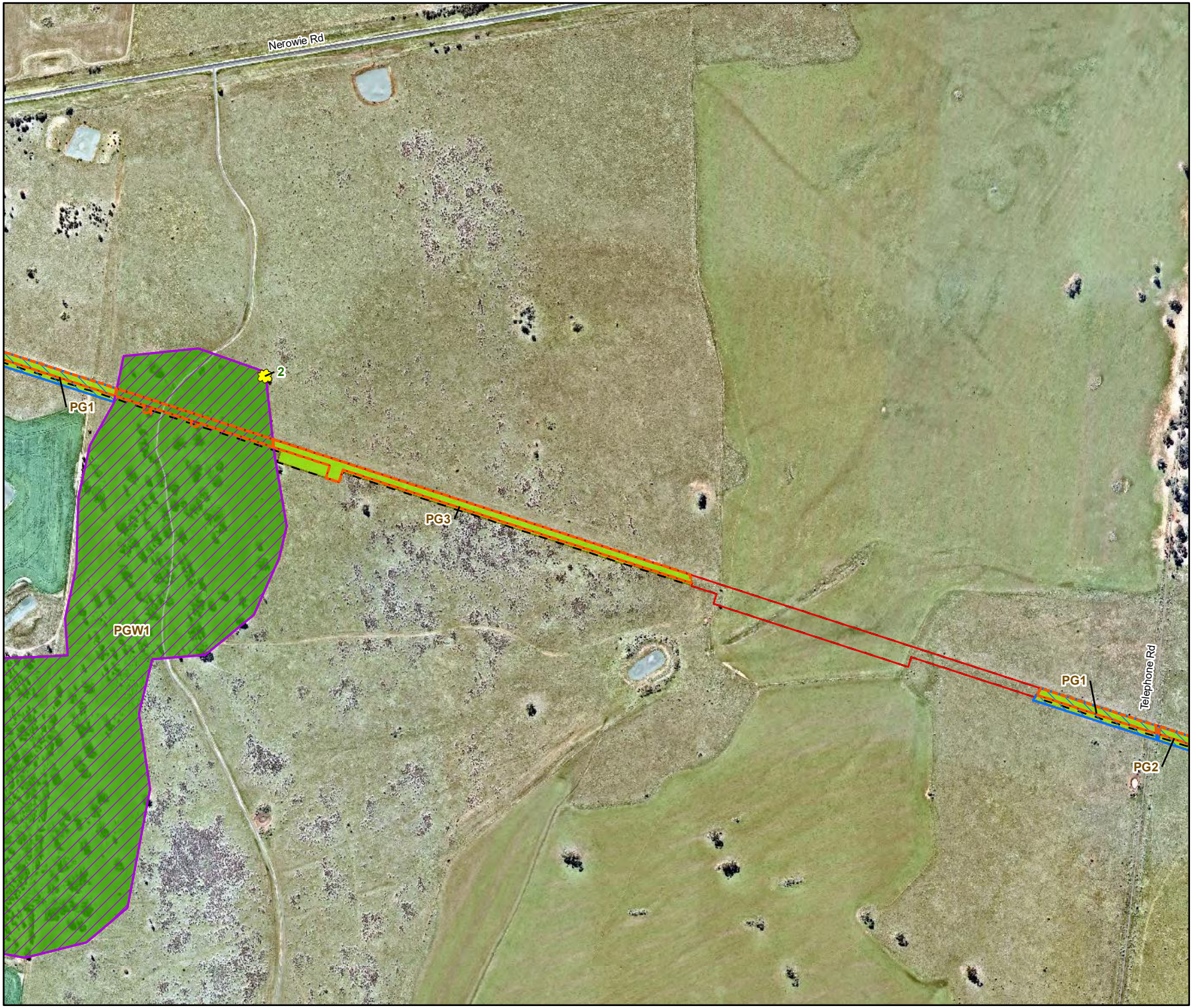
N

0 100 200

Metres

ecology & heritage partners

Aerial source: Nearmap 2020



Legend

- Study Area
- Previous Study Area
- Scattered Small Tree

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Plains Grassy Woodland *(Riverina)* (EVC 55_62)
- Impacted vegetation

EPBC Act vegetation communities

- Grey Box Grassy Woodland
- Natural Temperate Grassland of the Victorian Volcanic Plain

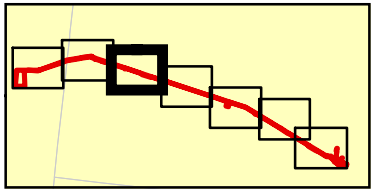


Figure 2c

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig02_EcolFeats_MB 17/12/2020 lroy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Impacted vegetation

EPBC Act vegetation communities

- Natural Temperate Grassland of the Victorian Volcanic Plain

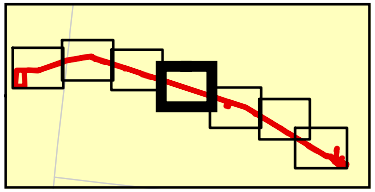


Figure 2d

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig02_EcolFeats_MB 17/12/2020 lroy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study Area
- Current Wetlands
- Scattered Large Tree
- Stag
- Tree Protection Zone

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Impacted vegetation

EPBC Act vegetation communities

- Natural Temperate Grassland of the Victorian Volcanic Plain

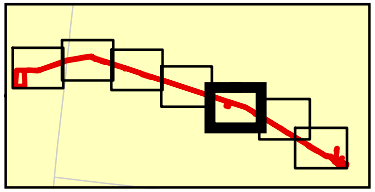


Figure 2e

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig02_EcolFeats_MB 17/12/2020 lroy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study Area
- Current Wetlands
- Large Tree within a patch
- Scattered Large Tree
- Scattered Small Tree
- Impacted tree

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Plains Grassy Woodland *(Riverina)* (EVC 55_62)
- Impacted vegetation

EPBC Act vegetation communities

- Natural Temperate Grassland of the Victorian Volcanic Plain

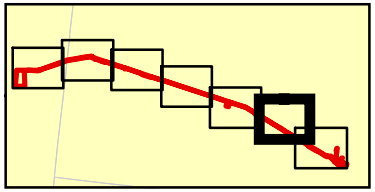


Figure 2f

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

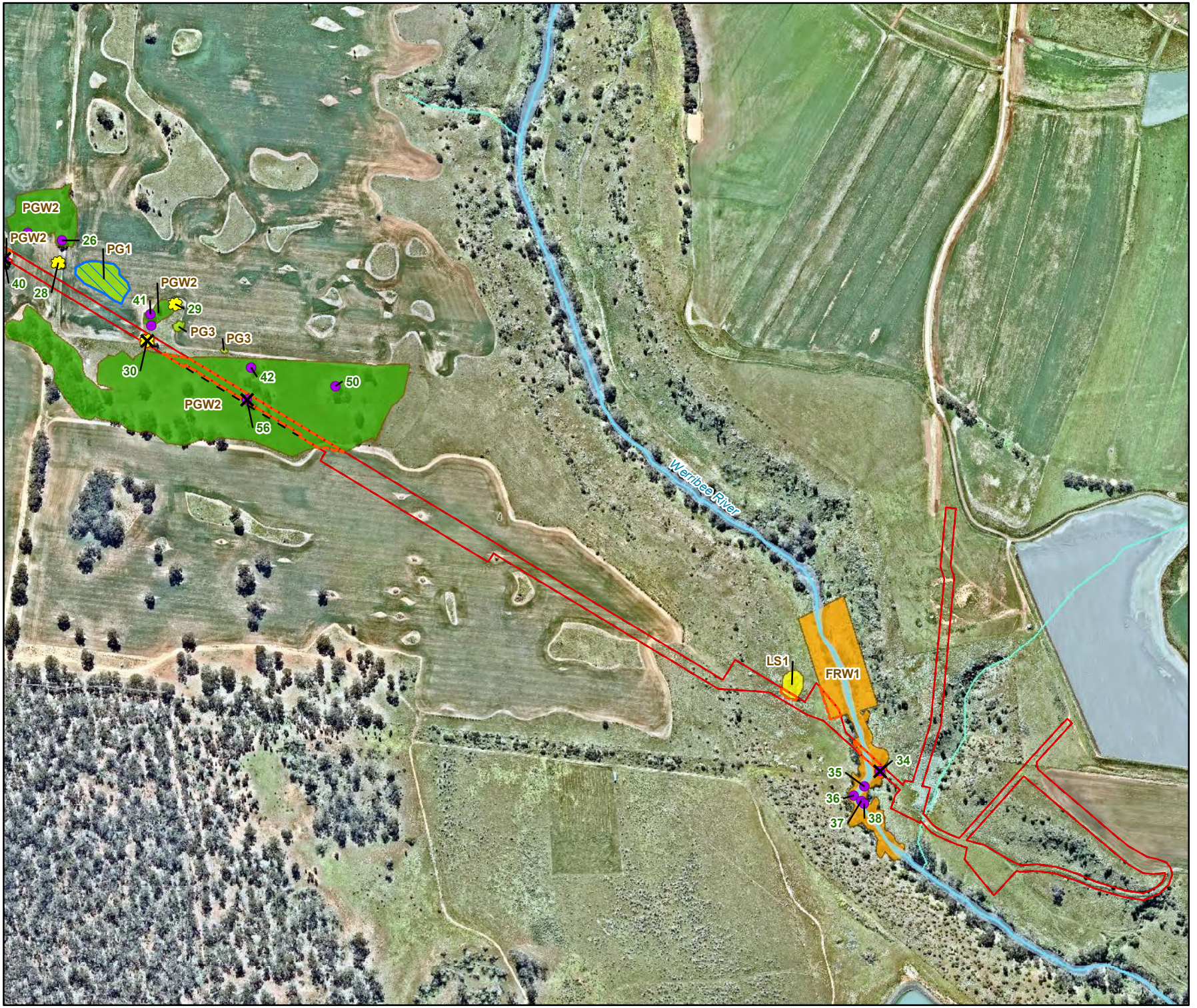
N

0 100 200

Metres

ecology & heritage partners

Aerial source: Nearmap 2020



Legend

- Study Area
- Previous Study Area
- Large Tree within a patch
- Scattered Small Tree
- Impacted tree

Ecological Vegetation Classes

- Floodplain Riparian Woodland (EVC 56)
- Lignum Swamp (EVC 104)
- Plains Grassland *(Low Rainfall)* (EVC 132_63)
- Plains Grassy Woodland *(Riverina)* (EVC 55_62)
- Impacted vegetation

EPBC Act vegetation communities

- Natural Temperate Grassland of the Victorian Volcanic Plain

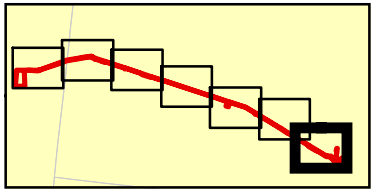


Figure 2g

Ecological features

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

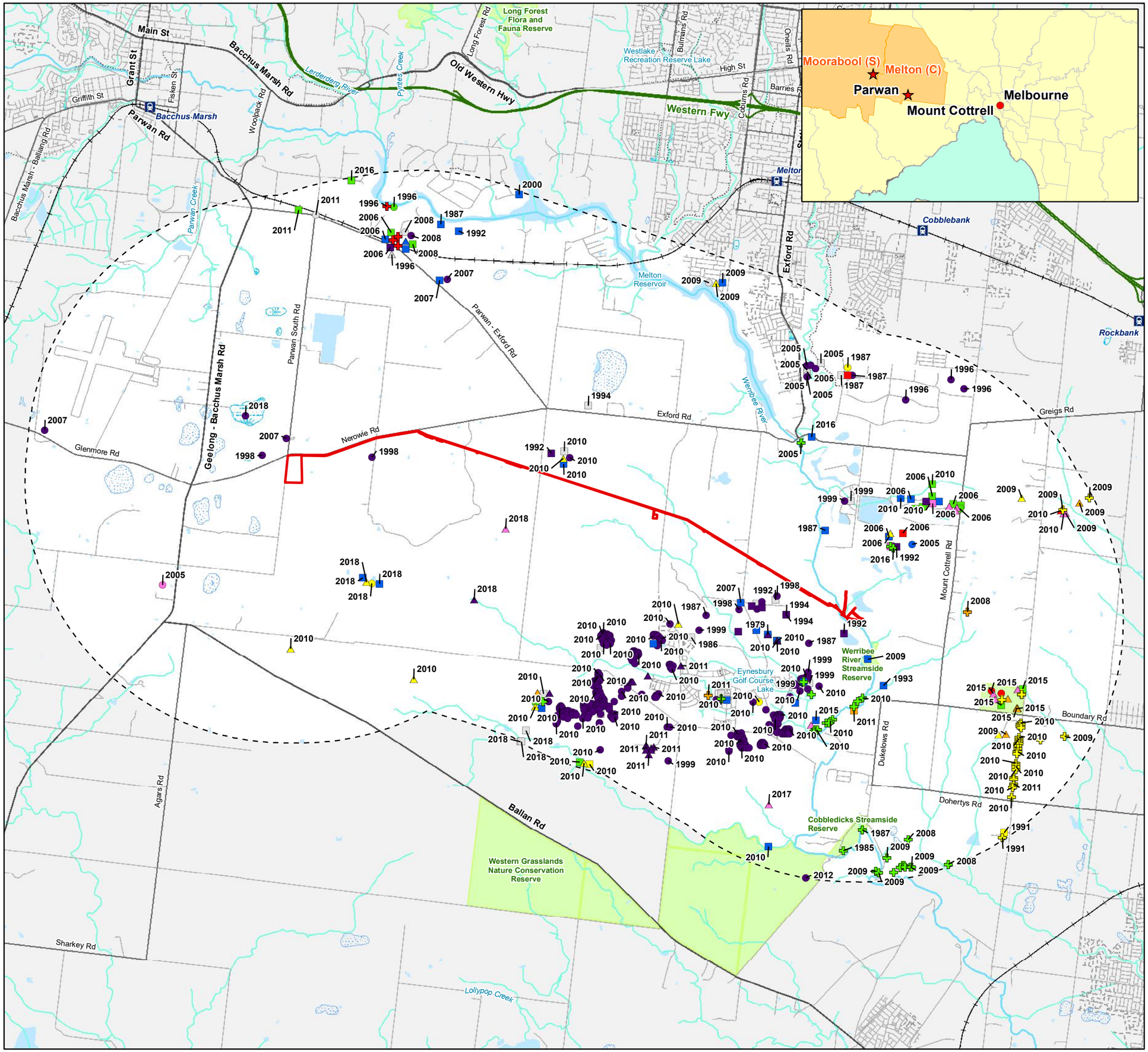
0 100 200

Metres

ecology & heritage partners

10223_Fig02_EcolFeats_MB 17/12/2020 lroy

Aerial source: Nearmap 2020



Legend

- Study Area

Significant Flora

- Austral Tobacco
- Austral Trefoil
- Bacchus Marsh Wattle
- Black Roly-poly
- Black-tip Greenhood
- Blue Burr-daisy
- Brittle Greenhood
- Buloke
- Buloke Mistletoe
- Clover Glycine
- Coast Twin-leaf
- Cut-leaf Burr-daisy
- Flax-lily
- Fragrant Saltbush
- Half-bearded Spear-grass
- Heath Spear-grass
- Leprechaun Greenhood
- Native Couch
- Pale Spike-sedge
- Plains Joyweed
- Rusty Velvet-bush
- Rye Beetle-grass
- Slender Bindweed
- Slender Tick-trefoil
- Small Golden Moths
- Small Scurf-pea
- Spiny Rice-flower
- Werribee Blue-box

Figure 3

Previously documented significant flora within 5km of the study area

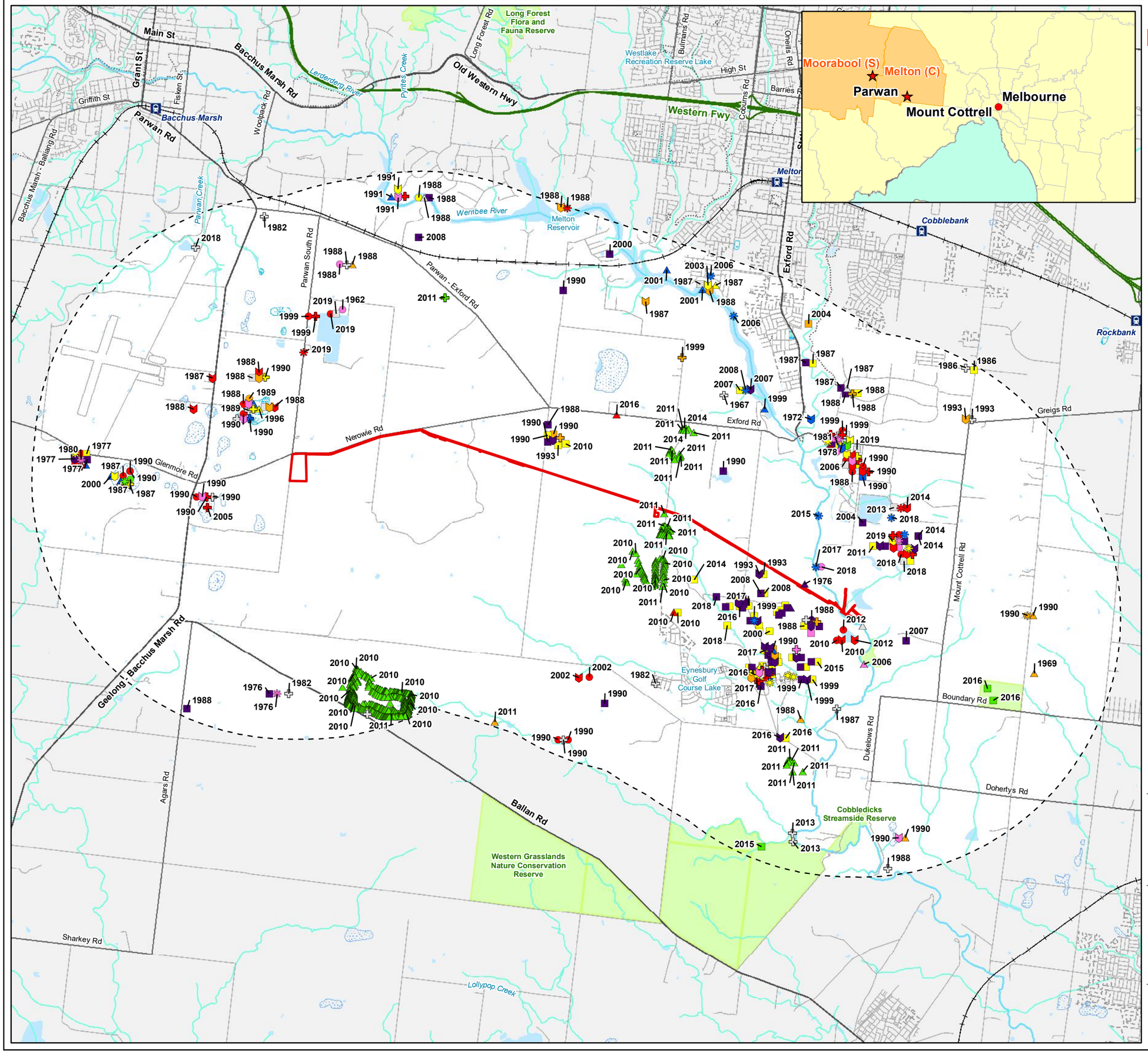
Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 2 4

Kilometres

ecology & heritage partners



Legend

- Study Area

Significant Fauna

- Australasian Bittern
- Australasian Shoveler
- Australian Painted-snipe
- Azure Kingfisher
- Baillon's Crake
- Barking Owl
- Black Falcon
- Black-eared Cuckoo
- Blue-billed Duck
- Brolga
- Brown Toadlet
- Brown Treecreeper
- Common Bent-wing Bat (eastern ssp.)
- Common Sandpiper
- Crested Bellbird
- Diamond Firetail
- Eastern Snake-necked Turtle
- Emu
- Fat-tailed Dunnart
- Freckled Duck
- Golden Sun Moth
- Great Egret
- Grey Goshawk
- Grey-crowned Babbler
- Growling Grass Frog
- Hardhead
- Hooded Robin
- Latham's Snipe
- Little Button-quail
- Little Egret
- Major Mitchell's Cockatoo
- Masked Owl
- Murray River Turtle
- Musk Duck
- Nankeen Night Heron
- Pied Cormorant
- Plumed Egret
- Powerful Owl
- Royal Spoonbill
- Speckled Warbler
- Spotted Harrier
- Striped Legless Lizard
- Swift Parrot
- Whiskered Tern
- White-bellied Sea-Eagle
- White-throated Needletail

Figure 4

Previously documented significant fauna within 5km of the study area

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 2 4

Kilometres

ecology & heritage partners

Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

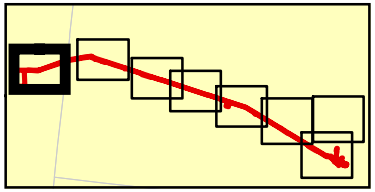


Figure 5a

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

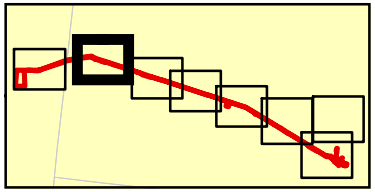


Figure 5b

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

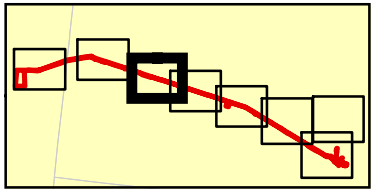


Figure 5c

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

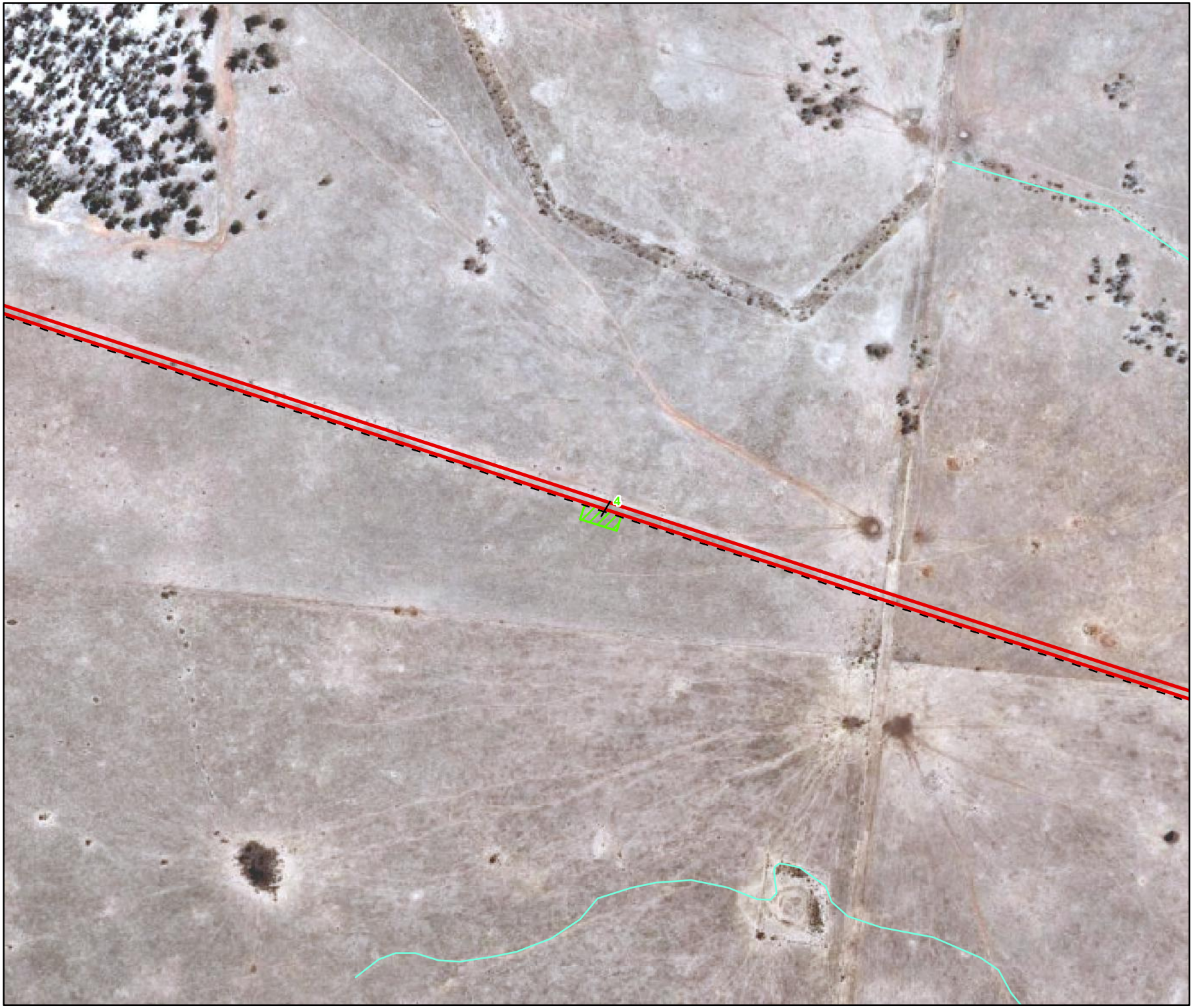
0 100 200

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018



Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

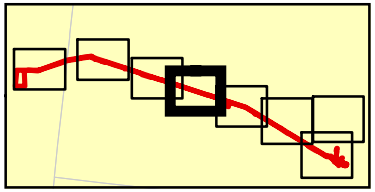


Figure 5d

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

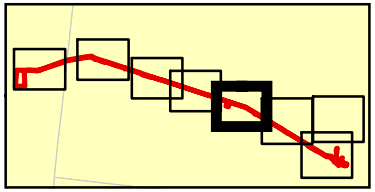


Figure 5e

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

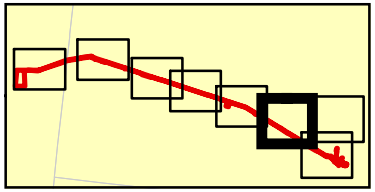


Figure 5f

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 105 210

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

- Study Area
- Previous Study Area
- Striped Legless Lizard tile grid

Growling Grass Frog survey date:

- 05/12/2018

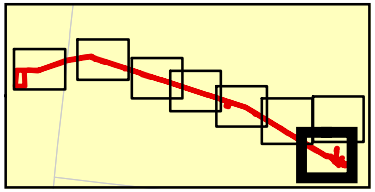


Figure 5g

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 105 210

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

Growling Grass Frog survey date:

- 28/11/2018
- 05/12/2018

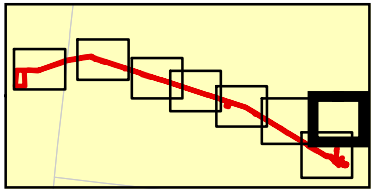


Figure 5h

Targeted Fauna Surveys

Proposed Parwan to Melton Interconnector Water Pipeline

N

0 105 210

Metres

ecology & heritage partners

10223_Fig05_TG_Loc 17/12/2020 lroy

Aerial source: Nearmap 2018

Legend

- Study Area
- Previous Study
- Golden Sun Moth habitat within the Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

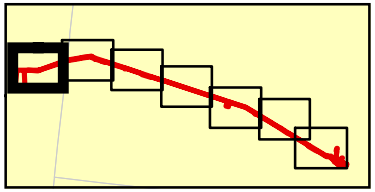


Figure 6a

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrpy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study
- Golden Sun Moth habitat within the Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

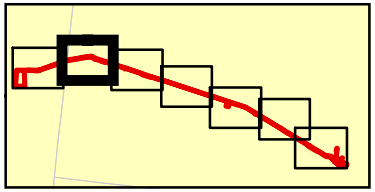


Figure 6b

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrpy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study
- Golden Sun Moth habitat within the Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

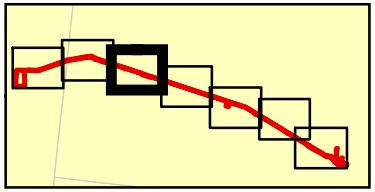


Figure 6c

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

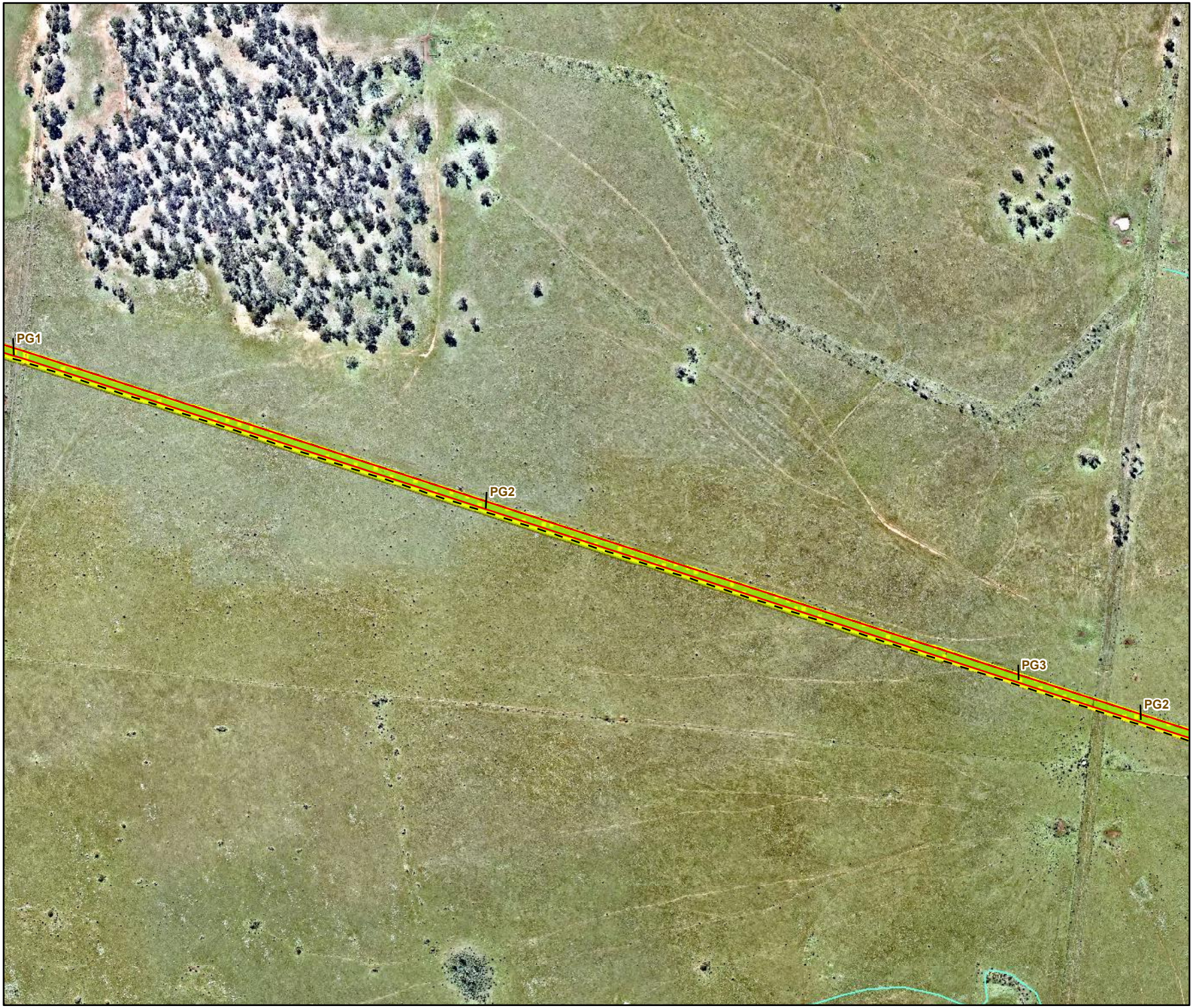
0 100 200

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrpy

Aerial source: Nearmap 2020



Legend

- Study Area
- Previous Study
- Golden Sun Moth habitat within the Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

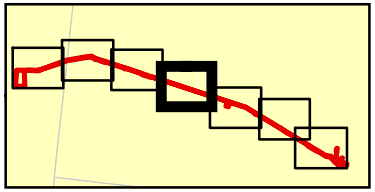


Figure 6d

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrpy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study
- Golden Sun Moth habitat within the Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

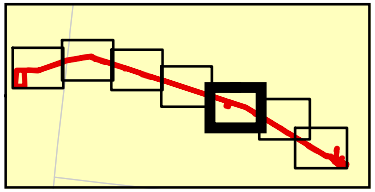


Figure 6e

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrpy

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study
- Golden Sun Moth habitat within the Study Area

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

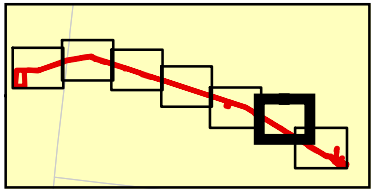


Figure 6f

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 100 200

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrov

Aerial source: Nearmap 2020

Legend

- Study Area
- Previous Study

Ecological Vegetation Classes

- Plains Grassland *(Low Rainfall)* (EVC 132_63)

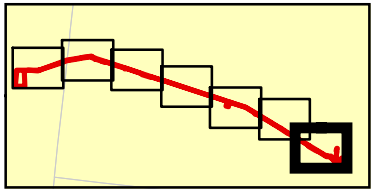


Figure 6g

Golden Sun Moth Habitat

Biodiversity Assessment for the proposed Parwan to Melton Interconnector Water Pipeline

N

0 105 210

Metres

ecology & heritage partners

10223_Fig06_GSM_Hab_MB 17/12/2020 lrov

Aerial source: Nearmap 2020

Appendix 1 – Flora

Appendix 1.1 – Flora Results

Legend:
I Protected under the FFG Act.

v/r Listed as vulnerable/rare in Victoria under the Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014);

***** Listed as a noxious weed under the CaLP Act;

w Weed of National Significance;

- Not applicable

Table A2.1. Flora recorded within the study area.

Scientific Name	Common Name	Conservation Status/Notes
INDIGENOUS SPECIES		
Acacia pycnantha	Golden Wattle	I
Acacia verniciflua (typical variant)	Varnish Wattle	I
Acaena spp.	Sheep's Burr	-
Allocasuarina luehmannii	Buloke	I
Allocasuarina verticillata	Drooping Sheoak	-
Atriplex semibaccata	Berry Saltbush	-
Austrostipa elegantissima	Feather Spear-grass	-
Austrostipa scabra	Rough Spear-grass	-
Bothriochloa macra	Red-leg Grass	-
Bursaria spinosa	Sweet Bursaria	-
Cassinia aculeata	Common Cassinia	I
Chloris truncata	Windmill Grass	-
Clematis microphylla s.l.	Small-leaved Clematis	-
Convolvulus angustissimus	Blushing Bindweed	-
Dianella revoluta s.l.	Black-anther Flax-lily	-
Dianella sp. aff. *longifolia (Benambra)*	Arching Flax-lily	v
Dichondra repens	Kidney-weed	-
Duma spp.	Lignum	-
Eleocharis acuta	Common Spike-sedge	-
Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush	-
Eryngium ovinum	Blue Devil	-
Eucalyptus microcarpa	Grey Box	-

Scientific Name	Common Name	Conservation Status/Notes
Euphorbia australis	Hairy Caustic Weed	-
Glycine clandestina	Twining Glycine	-
Haloragis heterophylla	Varied Raspwort	-
Helichrysum luteoalbum	Jersey Cudweed	I
Lomandra filiformis	Wattle Mat-rush	-
Marsilea spp.	Nardoo	I
Melicytus dentatus s.l.	Tree Violet	-
Microlaena stipoides var. *stipoides*	Weeping Grass	-
Nicotiana suaveolens	Austral Tobacco	r
Oxalis perennans	Grassland Wood-sorrel	-
Poa sieberiana	Grey Tussock-grass	-
Rumex brownii	Slender Dock	-
Rytidosperma caespitosum	Common Wallaby-grass	-
Senecio quadridentatus	Cotton Fireweed	I
Themeda triandra	Kangaroo Grass	-
Tricoryne elatior	Yellow Rush-lily	-
Vittadinia cuneata	Fuzzy New Holland Daisy	I
Walwhalleya proluta	Rigid Panic	-
NON-INDIGENOUS OR INTRODUCED SPECIES		
Arctotheca calendula	Cape weed	-
Avena fatua	Wild Oat	-
Brassica oleracea	Cabbage	-
Brassica X napus	Rape	-
Calotropis procera	Apple Sodom	-
Centaurium erythraea	Common Centaury	-
Cirsium vulgare	Spear Thistle	*
Conyza spp.	Fleabane	*
Cynara cardunculus subsp. *flavescens*	Artichoke Thistle	*
Echium plantagineum	Paterson's Curse	*
Eucalyptus cladocalyx	Sugar Gum	-
Foeniculum vulgare	Fennel	*
Galenia pubescens var. *pubescens*	Galenia	-
Hordeum (monospecific)	Barley	-
Hypochaeris radicata	Flatweed	-
Lepidium africanum	Common Peppercress	-
Lolium spp.	Rye	-
Lycium ferocissimum	African Box-thorn	W*

Scientific Name	Common Name	Conservation Status/Notes
Marrubium vulgare	Horehound	*
Nassella neesiana	Chilean Needle-grass	W*
Nassella trichotoma	Serrated Tussock	W*
Opuntia spp.	Prickly Pear	W*
Oxalis pes-caprae	Soursob	W*
Paspalum dilatatum	Paspalum	-
Physalis spp.	Ground Cherry	-
Plantago lanceolata	Ribwort	-
Prunella vulgaris	Self-heal	-
Romulea rosea	Onion Grass	-
Silybum marianum	Variegated Thistle	*
Solanum nigrum s.l.	Black Nightshade	-
Stachys byzantina	Lamb's Ears	-
Trifolium arvense var. *arvense*	Hare's-foot Clover	-
Vicia sativa	Common Vetch	-
Xanthium spinosum	Bathurst Burr	*

Appendix 1.2 – Significant Flora

Table A1.2 Significant flora recorded within 10 kilometres of the study area

Likelihood: Habitat characteristics of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings are defined below.

1 - Known occurrence
- Recorded within the study area recently (i.e. within ten years)

2 - High Likelihood
- Previous records of the species in the local vicinity; and/or,
- The study area contains areas of high quality habitat.

3 - Moderate Likelihood
- Limited previous records of the species in the local vicinity; and/or,
- The study area contains poor or limited habitat.

4 - Low Likelihood
- Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence.

5 – Unlikely
- No suitable habitat and/or outside the species range.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
NATIONAL SIGNIFICANCE							
Amphibromus fluitans #	River Swamp Wallaby-grass	VU	-	-	-	-	5
Dianella amoena	Matted Flax-lily	EN	L	e	2	2008	2
Diuris basaltica	Small Golden Moths	EN	L	e	7	2011	2
Diuris fragrantissima	Sunshine Diuris	EN	L	e	1	1770	3
Dodonaea procumbens #	Trailing Hop-bush	VU	-	v	-	-	4
Glycine latrobeana	Clover Glycine	VU	L	v	4	2006	3
Lachnagrostis adamsonii #	Adamson's Blown-grass	EN	L	v	-	-	4
Leucochrysum albicans var. *tricolor* #	Hoary Sunray	EN	-	e	-	-	4
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	L	e	132	2015	2

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Prasophyllum frenchii #	Maroon Leek-orchid	EN	L	e	-	-	4
Pterostylis cucullata #	Leafy Greenhood	VU	L	e	-	-	4
Rutidosis leptorhynchoides #	Button Wrinklewort	EN	L	e	-	-	3
Senecio macrocarpus	Large-headed Fireweed	VU	L	e	4	2015	2
Xerochrysum palustre #	Swamp Everlasting	VU	L	v	-	-	4
STATE SIGNIFICANCE							
Acacia aspera subsp. *parviceps*	Rough Wattle	-	-	r	1	1973	3
Acacia rostriformis	Bacchus Marsh Wattle	-	L	v	76	2014	3
Acacia uncifolia	Coast Wirilda	-	-	r	1	2015	3
Allocasuarina luehmannii	Buloke	-	L	e	449	2012	2
Alternanthera sp. 1 (Plains)	Plains Joyweed	-	-	k	50	2013	2
Amyema linophylla subsp. *orientalis*	Buloke Mistletoe	-	-	v	18	2011	2
Asperula wimmerana	Wimmera Woodruff	-	-	r	4	2010	3
Atriplex pseudocampanulata	Mealy Saltbush	-	-	r	1	2008	3
Austrostipa breviglumis	Cane Spear-grass	-	-	r	5	2014	3
Austrostipa exilis	Heath Spear-grass	-	-	r	15	2012	2
Austrostipa hemipogon	Half-bearded Spear-grass	-	-	r	2	2006	3
Austrostipa mundula	Neat Spear-grass	-	-	r	1	2010	3
Austrostipa puberula	Fine-hairy Spear-grass	-	-	r	1	2010	3
Calotis cuneifolia	Blue Burr-daisy	-	-	r	1	2005	3
Calotis lappulacea	Yellow Burr-daisy	-	-	r	6	2001	3
Ceratophyllum demersum	Hornwort	-	-	k	1	1962	3

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Chenopodium desertorum subsp. *desertorum*	Frosted Goosefoot	-	-	r	2	2008	3
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed	-	-	k	75	2016	2
Corymbia maculata	Spotted Gum	-	-	v	2	2013	1 -Planted
Cullen parvum	Small Scurf-pea	-	L	e	50	2011	2
Cullen tenax	Tough Scurf-pea	-	L	e	7	2010	3
Cynodon dactylon var. *pulchellus*	Native Couch	-	-	k	1	2010	3
Desmodium varians	Slender Tick-trefoil	-	-	k	31	2011	2
Dianella sp. aff. *longifolia (*Benambra*)*	Arching Flax-lily	-	-	v	103	2016	1
Dianella tarda	Late-flower Flax-lily	-	-	v	1	2012	3
Dichondra sp. 1	Silky Kidney-weed	-	-	r	1	2011	3
Eleocharis macbarronii	Grey Spike-sedge	-	-	k	1	2012	3
Eleocharis pallens	Pale Spike-sedge	-	-	k	32	2015	2
Eleocharis plana	Flat Spike-sedge	-	-	v	6	2011	3
Eucalyptus baueriana subsp. *thalassina*	Werribee Blue-box	-	-	e	345	2016	2
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum	-	-	v	28	2011	2
Geranium solanderi var. *solanderi* s.s.	Austral Crane's-bill	-	-	v	3	2010	3
Geranium sp. 3	Pale-flower Crane's-bill	-	-	r	1	2011	3
Goodenia macbarronii	Narrow Goodenia	-	L	v	1	2009	3
Goodia medicaginea	Western Golden-tip	-	-	r	3	2008	3
Gratiola pumilo	Dwarf Brooklime	-	-	r	1	2012	3
Grevillea rosmarinifolia	Rosemary Grevillea	-	-	P	1	1959	4
Grevillea steiglitziana	Brisbane Range Grevillea	-	-	r	1	1966	4

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Haloragis glauca f. glauca	Bluish Raspwort	-	-	k	4	2008	3
Lasiopetalum ferrugineum	Rusty Velvet-bush	-	-	P	1	2010	3
Lepidium pseudohyssopifolium	Native Peppercress	-	-	k	2	2011	3
Lotus australis var. *australis*	Austral Trefoil	-	-	k	6	2015	3
Marsilea mutica	Smooth Nardoo	-	-	k	1	2000	3
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle	-	-	r	3	2013	1 – Planted
Myoporum montanum	Waterbush	-	-	r	1	1853	4
Nicotiana suaveolens	Austral Tobacco	-	-	r	29	2013	1
Olearia minor	Satin Daisy-bush	-	-	r	1	1929	4
Paspalidium flavidum	Yellow Watercrown Grass	-	-	e	1	1927	4
Philotheca angustifolia subsp. *montana*	Narrow-leaf Wax-flower	-	-	v	1	1987	4
Pimelea curviflora var. aff. *subglabrata*	Curved Rice-flower	-	-	k	3	2001	3
Pimelea hewardiana	Forked Rice-flower	-	-	r	9	2011	3
Pimelea spinescens	Spiny Rice-flower	-	L	P	1	2014	2
Poa labillardierei var. *(*Volcanic Plains*)*	Basalt Tussock-grass	-	-	k	2	2012	3
Podolepis linearifolia	Basalt Podolepis	-	-	e	3	2000	3
Prostanthera nivea var. *nivea*	Snowy Mint-bush	-	-	r	2	2011	3
Pterostylis bicolor	Black-tip Greenhood	-	-	k	1	1996	4
Pterostylis conferta	Leprechaun Greenhood	-	L	e	2	1996	4
Pterostylis truncata	Brittle Greenhood	-	L	e	51	2006	3
Ptilotus erubescens	Hairy Tails	-	L	v	1	1984	3
Ranunculus diminutus	Brackish Plains Buttercup	-	-	r	1	1990	3

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DEPI	Likely occurrence in study area
Rhagodia parabolica	Fragrant Saltbush	-	-	r	387	2016	2
Sclerolaena muricata var. *muricata*	Black Roly-poly	-	-	k	9	2010	2
Sclerolaena muricata var. *semiglabra*	Dark Roly-poly	-	-	k	1	2008	3
Sclerolaena uniflora	Two-spined Copperburr	-	-	r	1	2007	3
Senecio cunninghamii var. *cunninghamii*	Branching Groundsel	-	-	r	2	1994	3
Tripogon loliiformis	Rye Beetle-grass	-	-	r	25	2012	2
Verbena officinalis var. *gaudichaudii*	Native Verbena	-	-	k	1	2012	3
Westringia glabra	Violet Westringia	-	-	r	1	1904	4
Zygophyllum billardierei	Coast Twin-leaf	-	-	r	5	2011	3

Notes: EPBC = *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), FFG = *Flora and Fauna Guarantee Act 1988* (FFG Act), DEPI= Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014), L = Listed, # = Records identified from EPBC Act Protected Matters Search Tool, Data source: Victorian Biodiversity Atlas (DELWP 2018); Protected Matters Search Tool (DAWE 2020). Order: Alphabetical.

Appendix 1.3 – Habitat Hectare Results

Table A1.3. Habitat Hectares results for remnant vegetation recorded within the study area, including the alternative (northern) alignment.

Vegetation Zone		PG1	PG2	PGW1	PGW2	PGW3	CGW1	CGW2	PGWet1
Bioregion		VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC / Tree		PG	PG	PGW	PGW	PGW	CGW	CGW	PGWet
EVC Number		132_63	132_63	55_61	55_61	55_61	68	68	125
EVC Conservation Status		En	En	En	En	En	En	En	En
Patch Condition	Large Trees /10	na	na	0	na	10	7	0	na
	Canopy Cover /5	na	na	3	na	5	4	0	Na
	Under storey /25	5	5	5	5	5	10	5	5
	Lack of Weeds /15	7	0	4	15	4	7	4	0
	Recruitment /10	3	3	5	1	1	6	0	1
	Organic Matter /5	2	2	2	2	2	3	2	4
	Logs /5	na	na	0	0	0	2	0	0
	Treeless EVC Multiplier	1.36	1.36	1.00	1.36	1.00	1	1	1.36
	Subtotal =	23.12	13.60	19.00	31.28	27.00	39.0	11.00	13.60
Landscape Value /25		14	8	6	6	6	6	6	-
Habitat Points /100		37	22	25	27	37	39	17.00	14
Habitat Score		0.37	0.22	0.25	0.27	0.37	0.39	0.17	0.14

Notes: PG = Plains Grassland, PGW = Plains Grassy Woodland, VVP = Victorian Volcanic Plain, En = Endangered
LS = Lignum Swamp, FRW = Floodplain Riparian Woodland

Appendix 2 – Fauna

Appendix 2.1 – Significant Fauna

Table A2.1. Significant fauna within 10 kilometres of the study area

Likelihood: Habitat characteristics of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings are defined below.

1	High Likelihood	• Known resident in the study area based on site observations, database records, or expert advice; and/or, • Recent records (i.e. within five years) of the species in the local area (DELWP 2018d); and/or, • The study area contains the species' preferred habitat.
2	Moderate Likelihood	• The species is likely to visit the study area regularly (i.e. at least seasonally); and/or, • Previous records of the species in the local area (DELWP 2018d); and/or, • The study area contains some characteristics of the species' preferred habitat.
3	Low Likelihood	• The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or, • There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, • The study area contains few or no characteristics of the species' preferred habitat.
4	Unlikely	• No previous records of the species in the local area; and/or, • The species may fly over the study area when moving between areas of more suitable habitat; and/or, • Out of the species' range; and/or, • No suitable habitat present.

EPBC	*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
FFG	*Flora and Fauna Guarantee Act 1988* (FFG Act)
DSE	Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013); Advisory List of Threatened Invertebrate Fauna in Victoria (DSE 2009)
NAP	National Action Plan (Cogger et al 1993; Duncan et al. 1999; Garnet et al 2011; Woinarski et al 2014; Sands and New 2002; Tyler 1997)

EX	Extinct	DD	Data deficient (insufficiently or poorly known
RX	Regionally extinct	L	Listed as threatened under FFG Act
CR	Critically endangered	EN	Endangered
#	Listed on the Protected Matters Search Tool	NT	Near threatened

VU Vulnerable
LC least concern
CD Conservation dependent
RA Rare

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
NATIONAL SIGNIFICANCE								
Eastern Barred Bandicoot	*Perameles gunnii*	1883	16	EN	L	WX	CR	4
Greater Glider #	*Petauroides volans*	-	-	VU	-	VU	VU	4
Grey-headed Flying-fox	*Pteropus poliocephalus*	2010	3	VU	L	VU	VU	2 (fly over)
Australasian Bittern	*Botaurus poiciloptilus*	1973	2	EN	L	EN	VU	3
Plains-wanderer	*Pedionomus torquatus*	1988	11	CR	L	CR	EN	3
Australian Painted Snipe	*Rostratula australis*	1989	2	VU	L	CR	VU	4
Eastern Curlew #	*Numenius madagascariensis*	-	-	CR	-	VU	-	4
Curlew Sandpiper	*Calidris ferruginea*	1990	2	CR	-	EN	-	4
Superb Parrot	*Polytelis swainsonii*	1881	2	VU	L	EN	VU	4
Swift Parrot	*Lathamus discolor*	2008	17	CR	L	EN	EN	2 (fly over)
Regent Honeyeater	*Anthochaera phrygia*	1905	2	CR	L	CR	EN	4
Painted Honeyeater	*Grantiella picta*	1920	2	VU	L	VU	NT	4
Pink-tailed Worm-Lizard #	*Aprasia parapulchella*	-	-	VU	L	EN	-	4
Striped Legless Lizard	*Delma impar*	2016	27	VU	L	EN	VU	3
Grassland Earless Dragon #	*Tympanocryptis pinguicolla*	-	-	EN	L	CR	VU	4
Growling Grass Frog	*Litoria raniformis*	2013	48	VU	L	EN	VU	2 (waterbodies e.g. Werribee River)
Dwarf Galaxias #	*Galaxiella pusilla*	-	-	VU	L	EN	VU	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Australian Grayling #	*Prototroctes maraena*	-	-	VU	L	VU	VU	4
Macquarie Perch	*Macquaria australasica*	1930	4	EN	L	EN	DD	4
Golden Sun Moth	*Synemon plana*	2016	1027	CR	L	CR	-	1
STATE SIGNIFICANCE								
Brush-tailed Phascogale	*Phascogale tapoatafa*	1988	5	-	L	VU	NT	4
Common Bent-wing Bat (eastern ssp.)	*Miniopterus schreibersii oceanensis*	2016	3	-	L	VU	-	4
Magpie Goose	*Anseranas semipalmata*	1977	1	-	L	NT	-	4
Musk Duck	*Biziura lobata*	2012	34	-	-	VU	-	4
Freckled Duck	*Stictonetta naevosa*	2006	8	-	L	EN	-	4
Australasian Shoveler	*Anas rhynchotis*	2012	44	-	-	VU	-	2
Hardhead	*Aythya australis*	2006	37	-	-	VU	-	2
Blue-billed Duck	*Oxyura australis*	2006	17	-	L	EN	-	2 (waterbodies e.g. farm dams at eastern end of alignment)
Diamond Dove	*Geopelia cuneata*	1905	2	-	L	NT	-	4
White-throated Needletail	*Hirundapus caudacutus*	1990	9	-	-	VU	-	4
Eastern Great Egret	*Ardea modesta*	2002	23	-	L	VU	-	2
Intermediate Egret	*Ardea intermedia*	1980	3	-	L	EN	-	4
Little Egret	*Egretta garzetta nigripes*	1990	2	-	L	EN	-	4
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	2012	8	-	L	VU	-	3

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	2006	2	-	L	VU	-	3
Black Falcon	*Falco subniger*	2014	9	-	-	VU	-	1
Brolga	*Grus rubicunda*	1989	2	-	L	VU	-	4
Lewin's Rail	*Lewinia pectoralis pectoralis*	1889	2	-	L	VU	NT	4
Baillon's Crake	*Porzana pusilla palustris*	1987	1	-	L	VU	-	3
Major Mitchell's Cockatoo	*Lophocroa leadbeateri*	2004	1	-	L	VU	-	4
Australian Bustard	*Ardeotis australis*	1911	1	-	L	CR	NT	4
Bush Stone-curlew	*Burhinus grallarius*	1905	3	-	L	EN	NT	4
Common Sandpiper	*Actitis hypoleucos*	1990	1	-	-	VU	-	4
Common Greenshank	*Tringa nebularia*	1994	3	-	-	VU	-	4
Marsh Sandpiper	*Tringa stagnatilis*	1994	2	-	-	VU	-	4
Red-chested Button-quail	*Turnix pyrrhothorax*	1989	4	-	L	VU	-	3
Powerful Owl	*Ninox strenua*	2011	4	-	L	VU	-	4
Barking Owl	*Ninox connivens connivens*	2002	20	-	L	EN	NT	4
Masked Owl	*Tyto novaehollandiae novaehollandiae*	1989	1	-	L	EN	NT	4
Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	2014	86	-	-	NT	NT	1
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	2004	1	-	L	VU	-	4
Speckled Warbler	*Chthonicola sagittatus*	2011	53	-	L	VU	NT	4
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*	1987	6	-	L	EN	NT	4
Crested Bellbird	*Oreoica gutturalis gutturalis*	2002	14	-	L	NT	NT	4
Hooded Robin	*Melanodryas cucullata cucullata*	1999	8	-	L	NT	NT	4
Diamond Firetail	*Stagonopleura guttata*	2011	71	-	L	NT	NT	3

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Tussock Skink	*Pseudemoia pagenstecheri*	2016	35	-	-	VU	-	1
Brown Toadlet	*Pseudophryne bibronii*	2004	5	-	L	EN	DD	4
Caddisfly	*Archaeophylax canarus*	1982	1	-	L	DD	-	3
REGIONAL SIGNIFICANCE								
Fat-tailed Dunnart	*Sminthopsis crassicaudata*	2016	15	-	-	NT	-	1
Eastern Pygmy-possum	*Cercartetus nanus*	1933	2	-	-	NT	-	4
Emu	*Dromaius novaehollandiae*	2010	2	-	-	NT	-	4
Pied Cormorant	*Phalacrocorax varius*	2006	8	-	-	NT	-	4
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2000	14	-	-	NT	-	2
Glossy Ibis	*Plegadis falcinellus*	1986	1	-	-	NT	-	3
Royal Spoonbill	*Platalea regia*	2006	16	-	-	NT	-	3
Spotted Harrier	*Circus assimilis*	2014	8	-	-	NT	-	1
Latham's Snipe	*Gallinago hardwickii*	1997	11	-	-	NT	-	3
Pectoral Sandpiper	*Calidris melanotos*	1990	1	-	-	NT	-	4
Little Button-quail	*Turnix velox*	2011	3	-	-	NT	-	2
Australian Pratincole	*Stiltia isabella*	1992	2	-	-	NT	-	4
Whiskered Tern	*Chlidonias hybridus javanicus*	1990	4	-	-	NT	-	4
Black-eared Cuckoo	*Chrysococcyx osculans*	2000	10	-	-	NT	-	2
Azure Kingfisher	*Alcedo azurea*	1988	1	-	-	NT	-	3
Red-backed Kingfisher	*Todiramphus pyrropygia pyrropygia*	1986	1	-	-	NT	-	4

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: **11/01/2021**
Time of issue: **3:53 pm**

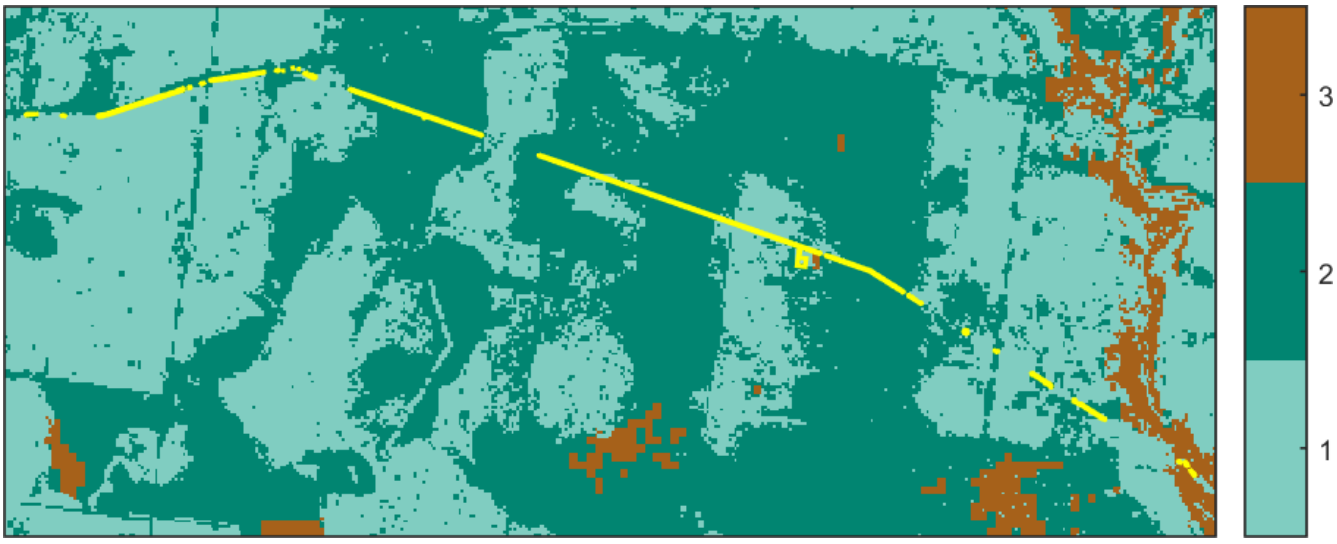
Report ID: EHP_2020_232_edit

Project ID	EHP10223_ParwonMeltonIWP_VG94

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	8.924 ha
Extent of past removal	0.000 ha
Extent of proposed removal	8.924 ha
No. Large trees proposed to be removed	4
Location category of proposed removal	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map).

1. Location map



Total Offset requirements if a permit is granted

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

General offset amount[1]	3.645 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Melton City, Moorabool Shire Council
Minimum strategic biodiversity value score[2]	0.532
Large trees	4 large trees

Offset requirements if a permit is granted: Moorabool Shire Council

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

General offset amount[1]	0.744 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Moorabool Shire Council
Minimum strategic biodiversity value score[2]	0.548
Large trees	0 large trees

Offset requirements if a permit is granted: Melton City Council

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

General offset amount[1]	2.901 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Melton City Council
Minimum strategic biodiversity value score[2]	0.530
Large trees	4 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

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

Next steps

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

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

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

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

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

Additional application requirements must be met including:

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

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

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

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

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

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

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

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

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

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

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
18-TR	Scattered Tree	vvp_0055_61	Endangered	0	no	0.200	0.031	0.031	0.680		0.008	General
5-G	Patch	vvp_0055_62	Endangered	0	no	0.330	0.102	0.102	0.690		0.043	General
6-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.009	0.009	0.440		0.002	General
7-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.015	0.015	0.430		0.004	General
15-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.013	0.013	0.430		0.003	General
27-B	Patch	vvp_0132_63	Endangered	0	no	0.510	0.001	0.001	0.860		0.000	General
29-B	Patch	vvp_0056	Endangered	1	no	0.340	0.060	0.060	0.990		0.030	General
30-B	Patch	vvp_0056	Endangered	0	no	0.340	0.052	0.052	0.990		0.026	General
10-A	Patch	vvp_0104	Endangered	0	no	0.230	0.019	0.019	0.990		0.006	General
1-B	Patch	vvp_0132_63	Endangered	0	no	0.510	0.414	0.414	0.679		0.266	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
2-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.856	0.856	0.794		0.253	General
3-C	Patch	vvp_0132_63	Endangered	0	no	0.310	1.602	1.602	0.451		0.541	General
4-B	Patch	vvp_0132_63	Endangered	0	no	0.510	0.199	0.199	0.859		0.141	General
8-F	Patch	vvp_0055_62	Endangered	2	no	0.290	0.269	0.269	0.649		0.097	General
9-F	Patch	vvp_0055_62	Endangered	1	no	0.290	0.324	0.324	0.661		0.117	General
11-E	Patch	vvp_0055_62	Endangered	0	no	0.250	0.283	0.283	0.820		0.096	General
12-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.014	0.014	0.770		0.004	General
13-B	Patch	vvp_0132_63	Endangered	0	no	0.510	0.054	0.054	0.650		0.034	General
14-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.002	0.002	0.650		0.001	General
16-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.013	0.013	0.870		0.004	General
17-B	Patch	vvp_0132_63	Endangered	0	no	0.510	0.091	0.091	0.853		0.065	General
19-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.005	0.005	0.580		0.001	General
20-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.020	0.020	0.860		0.006	General
21-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.622	0.622	0.510		0.155	General
22-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.099	0.099	0.760		0.029	General
23-B	Patch	vvp_0132_63	Endangered	0	no	0.510	1.043	1.043	0.679		0.670	General
24-D	Patch	vvp_0132_63	Endangered	0	no	0.310	0.746	0.746	0.859		0.322	General
25-C	Patch	vvp_0132_63	Endangered	0	no	0.310	1.554	1.554	0.681		0.608	General
26-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.249	0.249	0.624		0.067	General
28-B	Patch	vvp_0132_63	Endangered	0	no	0.510	0.002	0.002	0.710		0.001	General
18-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.116	0.116	0.710		0.033	General
32-D	Patch	vvp_0132_63	Endangered	0	no	0.220	0.045	0.045	0.710		0.013	General

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Small Golden Moths	*Diuris basaltica*	501473	Endangered	Dispersed	Habitat importance map	0.0046
Heath Spear-grass	*Austrostipa exilis*	503984	Rare	Dispersed	Habitat importance map	0.0040
Fragrant Saltbush	*Rhagodia parabolica*	502929	Rare	Dispersed	Habitat importance map	0.0031
Bacchus Marsh Wattle	*Acacia rostriformis*	505136	Vulnerable	Dispersed	Habitat importance map	0.0019
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	12922	Critically endangered	Dispersed	Habitat importance map	0.0016
Basalt Podolepis	*Podolepis linearifolia*	504658	Endangered	Dispersed	Habitat importance map	0.0016
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0013
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0011
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0010
Werribee Blue-box	*Eucalyptus baueriana subsp. thalassina*	507580	Endangered	Dispersed	Habitat importance map	0.0010
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0009
Brittle Greenhood	*Pterostylis truncata*	502821	Endangered	Dispersed	Habitat importance map	0.0009
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0009
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0009
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0009
Velvet Daisy-bush	*Olearia pannosa subsp. cardiophylla*	502317	Vulnerable	Dispersed	Habitat importance map	0.0007
Cane Spear-grass	*Austrostipa breviglumis*	503268	Rare	Dispersed	Habitat importance map	0.0007
Small Scurf-pea	*Cullen parvum*	502773	Endangered	Dispersed	Habitat importance map	0.0006

Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0006
Melbourne Yellow-gum	*Eucalyptus leucoxylon subsp. connata*	504484	Vulnerable	Dispersed	Habitat importance map	0.0006
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0005
Rye Beetle-grass	*Tripogon loliiformis*	503455	Rare	Dispersed	Habitat importance map	0.0005
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0005
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0005
Red-chested Button-quail	*Turnix pyrrhothorax*	10019	Vulnerable	Dispersed	Habitat importance map	0.0004
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0004
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Top ranking map ; special site	0.0004
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0004
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0004
Rosemary Grevillea	*Grevillea rosmarinifolia subsp. rosmarinifolia*	504066	Rare	Dispersed	Habitat importance map	0.0004
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0003
Large-flower Crane's-bill	*Geranium sp. 1*	505342	Endangered	Dispersed	Habitat importance map	0.0003
Dark Wire-grass	*Aristida calycina var. calycina*	503630	Rare	Dispersed	Habitat importance map	0.0003
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0003
Shiny Leionema	*Leionema lamprophyllum subsp. obovatum*	505478	Rare	Dispersed	Habitat importance map	0.0003
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map ; special site	0.0003
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0002
Tussock Skink	*Pseudemoia pagenstecheri*	12993	Vulnerable	Dispersed	Habitat importance map	0.0002
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0002
Silky Kidney-weed	*Dichondra sp. 1*	505786	Rare	Dispersed	Habitat importance map	0.0002

Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0002
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0002
Late-flower Flax-lily	*Dianella tarda*	505085	Vulnerable	Dispersed	Habitat importance map	0.0001
Dwarf Brooklime	*Gratiola pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0001
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0001
Buloke Mistletoe	*Amyema linophylla subsp. orientalis*	500217	Vulnerable	Dispersed	Habitat importance map	0.0001
Narrow Goodenia	*Goodenia macbarronii*	501513	Vulnerable	Dispersed	Habitat importance map	0.0001
Buloke	*Allocasuarina luehmannii*	500678	Endangered	Dispersed	Habitat importance map	0.0001
Waterbush	*Myoporum montanum*	502240	Rare	Dispersed	Habitat importance map	0.0001
Yellow Burr-daisy	*Calotis lappulacea*	500598	Rare	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Austral Crane's-bill	*Geranium solanderi var. solanderi s.s.*	505337	Vulnerable	Dispersed	Habitat importance map	0.0001
Australian Painted Snipe	*Rostratula australis*	10170	Critically endangered	Dispersed	Habitat importance map	0.0000
Australian Little Bittern	*Ixobrychus dubius*	10195	Endangered	Dispersed	Habitat importance map	0.0000
Werribee Blue-box	*Eucalyptus baueriana subsp. thalassina*	507580	Endangered	Dispersed	Top ranking map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	10226	Vulnerable	Dispersed	Habitat importance map	0.0000
Little Egret	*Egretta garzetta nigripes*	10185	Endangered	Dispersed	Habitat importance map	0.0000
Floodplain Fireweed	*Senecio campylocarpus*	507136	Rare	Dispersed	Habitat importance map	0.0000
Australasian Bittern	*Botaurus poiciloptilus*	10197	Endangered	Dispersed	Habitat importance map	0.0000
Blue-billed Duck	*Oxyura australis*	10216	Endangered	Dispersed	Habitat importance map	0.0000

Freckled Duck	*Stictonetta naevosa*	10214	Endangered	Dispersed	Habitat importance map	0.0000
Painted Honeyeater	*Grantiella picta*	10598	Vulnerable	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Eastern Great Egret	*Ardea modesta*	10187	Vulnerable	Dispersed	Habitat importance map	0.0000
Intermediate Egret	*Ardea intermedia*	10186	Endangered	Dispersed	Habitat importance map	0.0000
Musk Duck	*Biziura lobata*	10217	Vulnerable	Dispersed	Habitat importance map	0.0000
Baillon's Crake	*Porzana pusilla palustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0000
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0000
Slender Mint-bush	*Prostanthera saxicola var. bracteolata*	502750	Rare	Dispersed	Habitat importance map	0.0000
Barking Owl	*Ninox connivens connivens*	10246	Endangered	Dispersed	Habitat importance map	0.0000
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

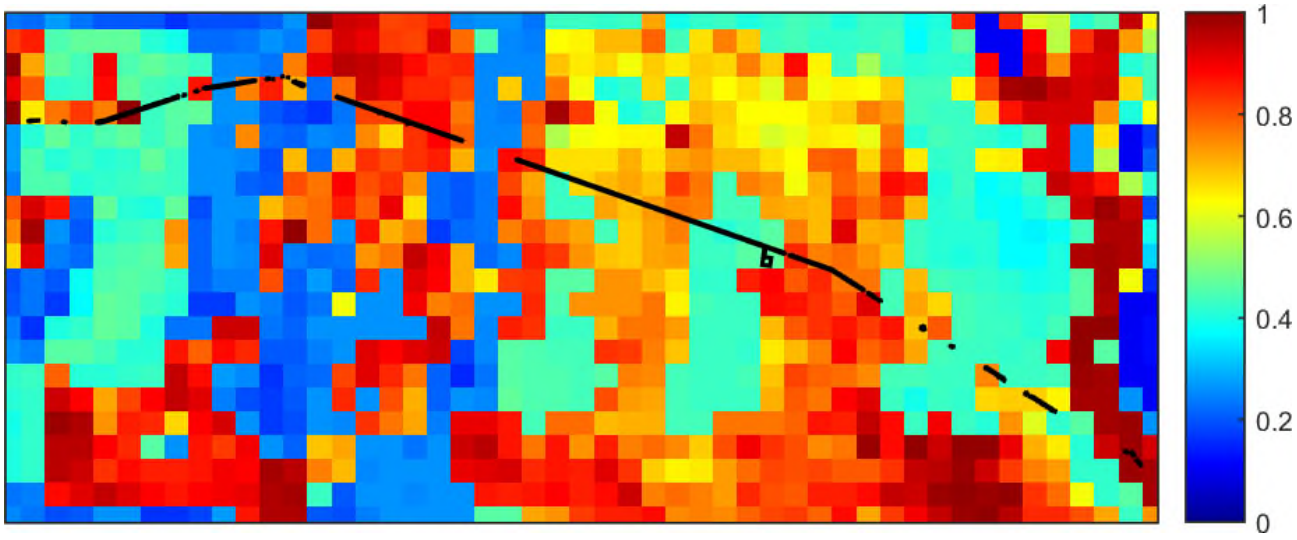
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

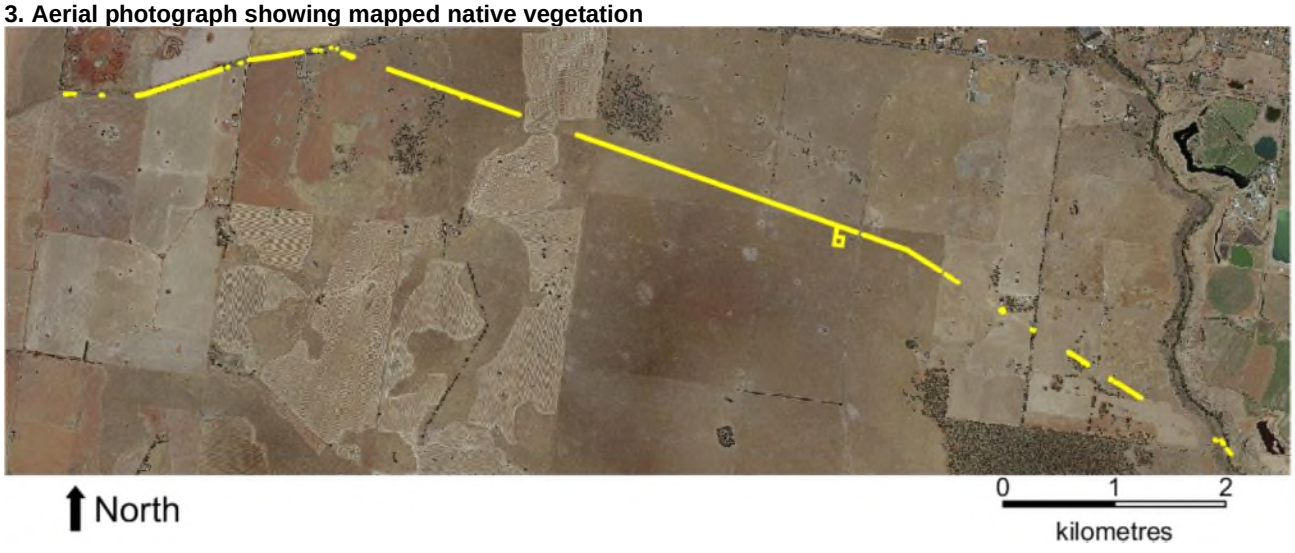
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance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

Appendix 3 – Images of mapped native vegetation

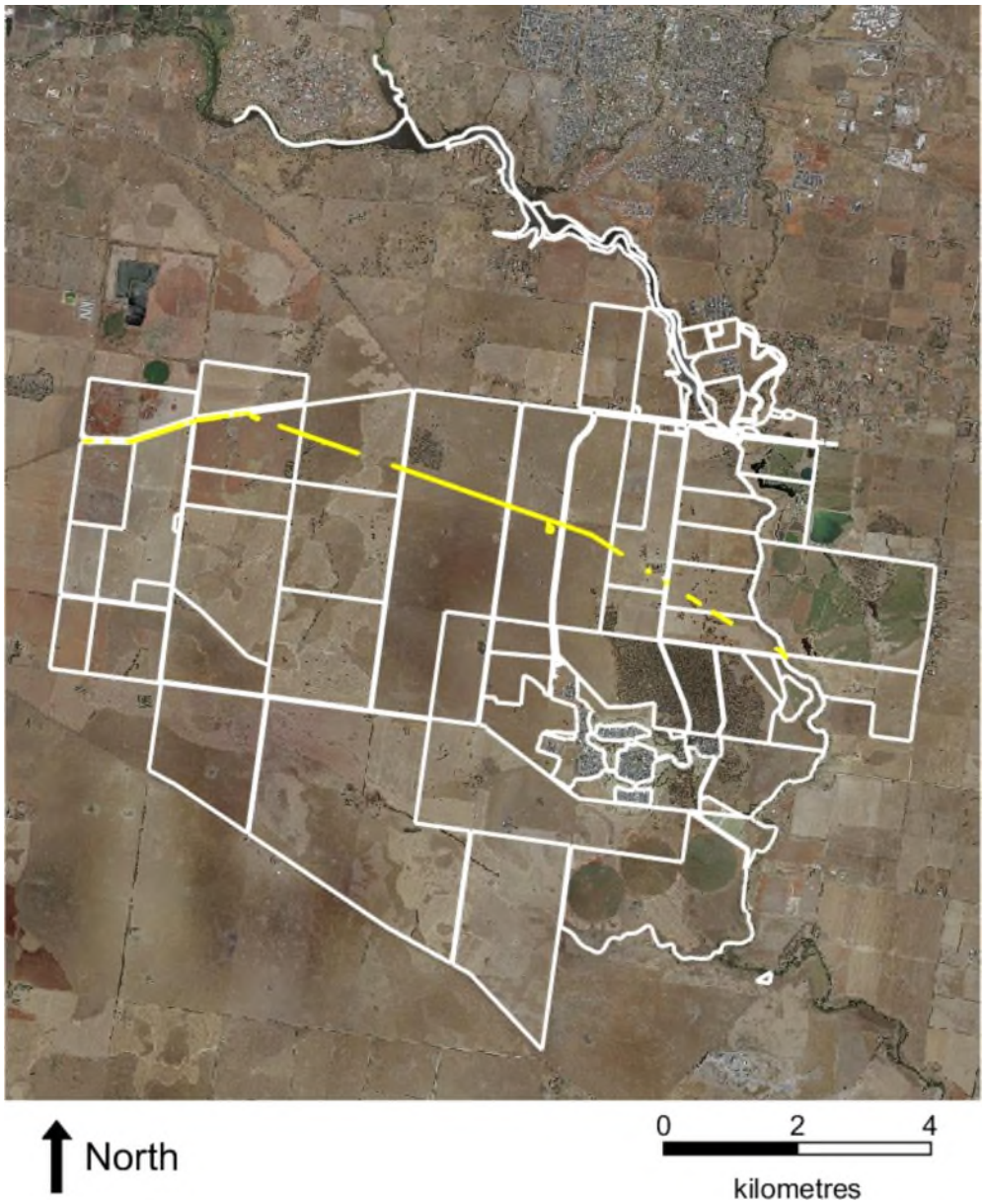
2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation



4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.