Final Report

Existing Ecological Conditions: East of Aberline Growth Corridor, Warrnambool , Victoria

Prepared for

Victorian Planning Authority

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Ecology and Heritage Partners Pty Ltd

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Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

LIST OF ACRONYMS

Acronym	Definition
CaLP Act	Victorian Catchment and Land Protection Act 1994
CMA	Catchment Management Authority
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEECA	Victorian Department of Energy, Environment and Climate Action
DELWP	(Previous) Victorian Department of Environment, Land, Water and Planning
DoEE	(Previous) Commonwealth Department of the Environment and Energy
EE Act	*Environment Effects Act 1978*
EES	Environment Effects Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FZ	Farming Zone
GRZ	General Residential Zone
INZ1	Industrial Zone
NES	National Environmental Significance
NVPP	Native Vegetation Precinct Plan
NVR Report	Native Vegetation Removal Report

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EXECUTIVE SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was engaged by the Victorian Planning Authority (VPA) to prepare an Existing Ecological Conditions Report for the East of Aberline Growth Corridor in Warrnambool, Victoria (the Growth Corridor [study area]). The purpose of the assessment was to determine the current extent and type of native vegetation present and to determine the likely presence of significant flora and fauna species and/or ecological communities.

The findings presented in this report will be used by the VPA to prepare a Precinct Structure Plan (PSP) and related Native Vegetation Precinct Plan (NVPP), which together will guide appropriate development within the study area and streamline Victorian approvals for any required native vegetation removal resulting from future development. In addition, the findings outlined in this report can be used to inform any potential implications under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the State *Flora and Fauna Guarantee Act 1988* (FFG Act).

Methods

Relevant literature, online-resources and databases, policy and strategy documents, and previous ecological assessments were reviewed to determine the flora and fauna values across the study area. This included a review of the previous ecological assessment of the study area from 2018.

The field surveys were undertaken by qualified and experienced ecologists in May 2024, and sought primarily to assess the extent and condition of native vegetation and potential flora and fauna habitat, with particular consideration given to the potential presence of significant species and ecological communities.

All fieldwork was carried out under the appropriate licences, including a Research Permit (10010981) and Scientific Procedures Fieldwork Licence (SPFL20005) under the *Wildlife Act 1975,* and an Animal Research permit issued by the Wildlife and Small Institutions Animal Ethics Committee (13.20).

The ecological site assessment was restricted to parcels/properties where access was permitted or where an adequate visual assessment could be conducted from adjoining properties, roadsides and/or reserves for which access had been permitted. However, all except property 39 (140 Boiling Downs Road, Warrnambool) could be adequately assessed from adjoining properties and/or roadsides where necessary. As such, only approximately 2.821 hectares out of a total of approximately 407 hectares (i.e. approximately 0.69%) of the study area was not subject to assessment.

Ecological values of the study area, as determined through field assessments and targeted surveys undertaken within the accessible property parcels, are summarised below.

Results

Native Vegetation

The majority of the study area is highly modified due to past and current agricultural and farming practices and is dominated by non-native grasses and weeds (i.e. pasture grasses). Native vegetation within the study area is largely confined to a large area of Higher Rainfall Plains Grassy Woodland within Tozers Reserve, scattered small patches of Higher Rainfall Plains Grassy Woodland in private property and along roadsides, one small patch of Aquatic Herbland in a farm dam in property 3, and a small patch of Tall Marsh in property 18. Agricultural properties supporting planted indigenous and non-indigenous species (mostly in the form of windrows) and pasture, provide suitable habitat for common generalist fauna tolerant of modified open areas.

A total of 19.653 hectares of native vegetation was recorded within the study area (including 12.47 hectares of native revegetation within the southern portion of Tozer Reserve (Figure 2), across three different Ecological Vegetation Classes (EVCs) (Higher Rainfall Plains Grassy Woodland [EVC 55_63], Aquatic Herbland [EVC 653], and Tall Marsh [821]).

No DEECA modelled wetlands are present, though several farm dams are scattered across the study area. While no native vegetation was recorded along the Russells Creek corridor, this waterway is considered to have ecological value due to its potential to form a vegetated biolink within the study area.

The study area did not support any Large trees in patches or scattered trees.

Significant Flora

Three State-significant flora (Swamp Flax-lily *Dianella callicarpa*, Golden Cowslips *Diuris behrii* and Annual Fireweed *Senecio glomeratus* subsp. *longifructus*) have a moderate likelihood of occurrence within the study area. Swamp Flax-lily and Golden Cowslips, both listed as Endangered under the *Flora and Fauna Guarantee* (FFG) *Act 1988,* were recorded within Tozers Reserve by Landtech Consulting in 2014, and Swamp Flax-lily has been recorded in abundance by the Tozer Trust within Tozers Reserve (K. Sparrow, *pers. comm*). One record of Annual Fireweed *Senecio glomeratus* subsp. *longifructus* (listed as Vulnerable under the FFG Act), from 2010, exists southeast of the study area, and this species has been recorded by the Tozer Trust within Tozers Reserve (K. Sparrow, *pers. comm*).

However, because no development/impacts are planned for Tozers Reserve, and these species are not expected to occur outside of Tozers Reserve due to the highly modified nature of the study area which has been subject to development and/or intensive agricultural practices, no additional flora surveys are recommended at this stage to inform the PSP.

Black Wattle *Acacia mearnsii* was also recorded in Tozers Reserve. This species was recently recategorised as 'Protected under restricted use' under the FFG Act.

No other national or State significant flora were recorded during the site assessment or are expected to occur within the study area due to historical and existing land use and agricultural disturbance.

Significant Fauna

Four nationally-significant fauna (Growling Grass Frog *Litoria raniformis major,* Swamp Skink *Lissolepis coventryi*, Grey-headed Flying-fox *Pteropus poliocephalus* and Southern Bent-wing Bat *Miniopterus orianae bassanii*) and five State-significant fauna (Blue-billed Duck *Oxyura australis*, Freckled Duck *Stictonetta naevosa*, Musk Duck *Biziura lobata*, Southern Toadlet *Pseudophryne semimarmorata*, and Glossy Grass Skink *Pseudemoia rawlinsoni*) have the highest likelihood of occurrence within the study area.

There is a moderate likelihood that the study area supports Growling Grass Frog, Swamp Skink and Southern Toadlet, as they were recorded within Tozers Reserve in 2014 by Landtech Consulting. There is also a moderate likelihood that Glossy Grassy Skink utilises the study area, as it has been recorded west and northwest of Warrnambool, and suitable (albeit low-quality) habitat exists along Russells Creek and within Tozers Reserve, under suitable conditions.

Swamp Skink and Southern Toadlet will only be present if they have persisted within Tozers Reserve since the 2014 assessment as both species have a very small home range and limited dispersal capability. Growling Grass Frog are considered likely to only use the study area as a dispersal corridor when conditions are suitable. However, targeted surveys for these species should be undertaken at the appropriate time of year (November to March for Growling Grass Frog, October to March for Swamp Skink and April/May for Southern Toadlet) to confirm their presence, to facilitate an informed assessment of whether the proposed development of the study area would impact these species. Targeted Surveys for Glossy Grass Skink should also be undertaken from October to March.

The targeted survey methodology for Growling Grass Frog must be in accordance with best practice methods described in the following guidelines:

- Survey Guidelines for Australia's Threatened Frogs (DEWHA 2010); and,
- Biodiversity Precinct Structure Planning Kit (DSE 2010).

The targeted survey methodology employed for Swamp Skink and Glossy Grass Skink must be in accordance with the best practice methods described in the following guidelines:

- Survey Guidelines for Australia's Threatened Reptiles (DSEWPaC 2011); and,
- Biodiversity Precinct Structure Planning Kit (DSE 2010).

The targeted survey methodology employed for Southern Toadlet must be in accordance with the best practice methods described in the following guidelines:

- Interim Survey Guidelines for Toadlet *Pseudophryne* Species in Victoria (De Angelis and Cleeland 2023); and,
- Survey Guidelines for Australia's Threatened Frogs (DEWHA 2010);

While there is a low likelihood that Grey-headed Flying-fox *Pteropus poliocephalus* and Southern Bent-wing Bat *Miniopterus orianae bassanii* rely on the study area for foraging and breeding purposes, the species are likely to utilise Tozers Reserve, surrounding windrows and other planted vegetation as opportunistic foraging habitat enroute given there are known roosting sites nearby. As such, their presence should be assumed, and

it is strongly recommended that potential habitat corridors (i.e. Plains Grassy Woodland patches, planted native vegetation and potential roosting habitat) (Figure 2; Figure 5) should be protected and enhanced within the study area to support their movement through the landscape. The requirement to undertake pre-clearance fauna inspections, salvage and relocation (where appropriate) should also be included within the PSP for any tree removal for Grey-headed Flying-fox as a mitigation measure. (This requirement is not necessary for Southern Bent-wing Bat as the species will not roost at the site, so will not be present during the day when fauna inspections [and any future construction] is being undertaken.)

Blue-billed Duck, Freckled Duck and Musk Duck may opportunistically visit Russells Creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River, however these species are not expected to rely on the study area for foraging or breeding purposes, and as such, targeted surveys are not recommended to inform the PSP.

No other national or State significant fauna were recorded during the site assessment or are expected to occur within the study area based on poor habitat suitability and/or a lack of previous records.

Significant Ecological Communities

No significant ecological communities are present within the study area. The assessments are provided in sections 3.2.3 and 3.2.4 below.

Table S1. Summary of the ecological values that occur within the (assessed areas of) the study area.

Native vegetation	• 19.653 hectares of native vegetation represented by three EVCs: o Plains Grassy Woodland (EVC 55_63) 19.64 hectares; o Aquatic Herbland (EVC 653) 0.010 hectares; and, o Tall Marsh (EVC 821) 0.003 hectares.
Wetlands	• There are no wetlands within the study area (assessed on-ground or modelled). Lake Colongulac is the nearest Ramsar site (approximately 53 kilometres northeast of the study area) and is one of nine lakes that forms the Western District Lakes Ramsar site.
Significant ecological communities	• No significant ecological communities were recorded within the study area.
Significant flora species	• No nationally significant flora were recorded in the study area. • State significant flora species with the highest likelihood of occurrence are: o Swamp Flax-lily *Dianella callicarpa* (recorded within in the study area in 2014 and 2024) o Golden Cowslips *Diuris behrii* (recorded within the study area in 2014) o Annual Fireweed *Senecio glomeratus* subsp. *longifructus* (recorded by Tozer Trust in Tozers Reserve (K. Sparrow, person. comm). o Black Wattle *Acacia mearnsii* (recorded within the study area in 2014, 2018 and 2024)
Significant fauna species	• Nationally significant fauna species with the highest likelihood of occurrence are: o Growling Grass Frog *Litoria raniformis major* (recorded in the study area in 2014) o Swamp Skink *Lissolepis coventryi* (recorded in the study area in 2014) o Grey-headed Flying-fox *Pteropus poliocephalus*

- Southern Bent-wing Bat *Miniopterus orianae bassanii*

- State significant fauna species with the highest likelihood of occurrence are:
  - Blue-billed Duck *Oxyura australis*
  - Freckled Duck *Stictonetta naevosa*
  - Musk Duck *Biziura lobata*
  - Southern Toadlet *Pseudophryne semimarmorata*
  - Glossy Grass Skink *Pseudemoia rawlinsoni*

Legislative Implications and Key Recommendations

The findings of the assessment confirmed that the study area is highly modified, with key ecological values largely limited to the Tozers Reserve and Russells Creek corridor. Ecological values within the study area are subject to the natural and anthropogenic pressures commonly associated with developed and fringing landscapes.

Given the potential for future development within the study area to intensify existing pressures and threaten the overall viability of retained ecological values, a precinct-wide approach is required to ensure all known values are accounted for and that management responses are consistent and implemented on a landscape-scale. In particular, Tozers Reserve and the Russells Creek Corridor should be retained and enhanced for the benefits of conservation, landscape connectivity, and amenity for future residential areas.

Given that the native vegetation present is restricted to Tozers Reserve which will not be developed, and limited, scattered, low-quality patches of roadside vegetation, it is recommended that a NVPP is not necessary, and that instead applications for native vegetation removal could be managed through the usual approval process under the Warrnambool Planning Scheme (i.e. Clause 52.17 Native Vegetation). However, if the VPA decides to pursue the preparation of a NVPP, it is recommended that the VPA further investigate the possibility to gain access to property 39, to determine the quality and extent of any native vegetation present, and to determine the presence of suitable habitat for any significant species.

The legislative implications associated with developing the Precinct, and further requirements, additional studies or reporting that may be required, are provided in Table S2 below.

Table S2. Legislative implications and further requirements associated with development of the Precinct.

Relevant Legislation	Implications	Further Action Required
Environment Protection and Biodiversity Conservation Act 1999	There is a moderate likelihood that the study area supports two fauna species listed under the EPBC Act (Growling Grass Frog and Swamp Skink). Targeted surveys should be undertaken at the appropriate time of year (November to March for Growling Grass Frog, and October to March for Swamp Skink) to confirm presence. Two other fauna species listed under the EPBC Act (Grey-headed Flying-fox and Southern Bent-wing Bat) are likely to utilise Tozers Reserve, surrounding windrows and other planted vegetation as opportunistic foraging habitat enroute to areas of higher quality habitat. As such, it is strongly recommended that these habitat features are retained as part of the Precinct design. No flora listed under the EPBC Act are considered likely to be present within the study area. No ecological communities listed under the EPBC Act are present within the study area.	Undertake targeted surveys for Growling Grass Frog and Swamp Skink.
Environment Effects Act 1978	The *Environment Effects Act 1978* (EE Act) provides for an assessment of proposed activities that are capable of having a significant impact on the environment at a State level. Actions undertaken in accordance with a prescribed Precinct Structure Plan (PSP) are exempt from the requirements of the EE Act.	No further action required.

Relevant Legislation	Implications	Further Action Required
Flora and Fauna Guarantee Act 1988	DEECA and Warrnambool City Council are public authorities under the FFG Act. Public authorities have a duty under the FFG Act to consider potential biodiversity impacts when exercising their functions. A permit under the FFG Act would be required where impacts to listed FFG Act matters occur on public land. Two specimens of Swamp Flax-lily (listed as Endangered) were recorded within Tozers Reserve, and potential more specimens may be present; targeted surveys would be required when the species is flowering to confirm numbers. Golden Cowslips (Endangered under the FFG Act) was recorded within Tozers Reserve in 2014 (Landtech Consulting 2013a), and Annual Fireweed has previously been recorded by the Tozer Trust in Tozers Reserve (K. Sparrow, pers. comm). As Tozers Reserve is owned by the Education Department and is therefore public land, the removal of specimens within the reserve would require a permit under the FFG Act. Should any development be proposed within Tozers Reserve, targeted surveys for FFG Act species will be required to determine the presence and number of any listed species within the proposed impact area, to inform the FFG Act permit application. However, as no development is currently proposed within Tozers Reserve, no targeted surveys are recommended. Black Wattle was also recorded in Tozers Reserve, however this species was recently recategorised as 'Protected under restricted use', and as such, a permit would not be required for removal associated with development. Southern Toadlet was previously recorded within Tozers Reserve in 2014 (Landtech Consulting 2014). Suitable habitat exists there and along Russells Creek by way of damp areas with leaf litter (Figure 6). Targeted surveys are recommended within Tozers Reserve and along Russells Creek and should be undertaken in accordance with the best practice methodology referred to in section 3.2.2. While no previous records for Glossy Grass Skink exist within 10 kilometres of the study area, the species has been recorded just over 20 kilometres northwest and west of Warrnambool, and similar habitat requirements to Swamp Skink which has been previously recorded in Tozers Reserve. It is therefore considered there is potential for the species to use Tozers Reserve and the adjacent Russells Creek under suitable conditions. Targeted surveys are recommended for the species from October to March and should be undertaken in accordance with the best practice methodology referred to in section 3.2.2.	Undertake targeted surveys for Southern Toadlet and Glossy Grass Skink.
Planning and Environment Act 1987	The future removal of any native vegetation and habitat for significant species will trigger the requirement to source offsets at the State level in accordance with the Guidelines (DELWP 2017a).	Prepare a Precinct Structure Plan.

Relevant Legislation	Implications	Further Action Required
Catchment and Land Protection Act 1994	Nine weeds declared as noxious under the CaLP Act were noted during the assessment (Blackberry, Hawthorn, African Box-thorn, Spear Thistle, Wild Teasel, Fennel, Bridal Creeper, English Broom and Gorse). Similarly, there is evidence that the study area is currently occupied by three pest fauna species listed under the CaLP Act (European Rabbit, European Hare and Red Fox), and it is highly likely they occupy the broader region. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements, there should be a requirement that listed noxious weeds and pests be appropriately controlled during any development activity to minimise their spread and impact on ecological values within the study area.	Listed noxious weeds and/or pests should be appropriately controlled throughout the study area during and after development to enhance ecological values; a Weed and Pest Management Plan should be required for proposed Conservation Areas.
Wildlife Act 1975	With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, the Wildlife Act makes it an offence to hunt, take or destroy protected or threatened wildlife without authorisation. A Wildlife Act permit would be required to undertake any action that is likely to result in the death of wildlife, or require the translocation of wildlife. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975* or under any other Act issued by DEECA.	Ensure engaged wildlife specialists hold a current Management Authorisation.
Water Act 1989	Russells Creek flows through the study area in a westerly direction before terminating in Merri River approximately 3.5 kilometres west of the study area. A 'works on waterways' permit from the Glenelg Hopkins CMA is likely to be required where any action impacts on waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DEECA with the Glenelg Hopkins CMA included for comment.	Obtain a 'works on waterways' permit from the Glenelg Hopkins CMA for any works proposed to impact Russells Creek and refer any relevant proposed structures to DEECA as necessary.

The implementation of the following seven ecological principles is recommended for the future development of the PSP and associated NVPP (if pursued):

- Integrated and accessible biodiversity - Future development integrates biodiversity into the urban landscape and ensures all neighbourhoods have access to nature;
- Connected ecological values - Future development maintains, improves and creates biolinks, allowing the passive movement of fauna species across the landscape;
- Increase in extent of ecological values - Future development increases the extent of land managed for biodiversity within the study area;
- Quality improvement of biodiversity values - Future development ensures that the quality of biodiversity assets within the study area is enhanced;
- Remnant values retained and enhanced - Future development protects and promotes the enhancement of key remnant features, including vegetation, habitat and species;

- Representative landscape approach - Future development maintains and promotes biodiversity through the retention and re-establishment of features representative of the natural landscape; and,
- Resilient significant species - Future development retains and facilitates the long-term resilience of key significant species and ecological communities recorded or potentially present within the landscape.

Table 10 in Section 5 (below), provides detail about how the PSP should have regard to these principles, and how the recommendations link to and can assist the VPA to follow the principles and meet the targets within the PSP 2.0 Guidelines (VPA 2021).

Draft Place Based Plan

The draft Place Based Plan (version dated 16 January 2025) recognises the importance of Tozers Reserve and Russells Creek – the two most valuable ecological assets within the study area, and responds appropriately by retaining Tozers Reserve (which has more existing, intact ecological values than Russells Creek) as a Conservation Area, and retaining Russells Creek as 'other uncredited open space'. It is understood that a 20-metre landscaped road interface is proposed as a buffer for Tozers Reserve, and that a 41-metre buffer has been included on either side of Russells Creek (as required to meet bushfire management standards). It is understood that the riparian corridor is approximately 60 metres wide, though some areas extend beyond this. Adjacent to this riparian corridor, a 21-metre-wide bushfire safe vegetated corridor is proposed, in addition to a 20-metre-wide local road designed to interface with the adjoining residential and other uses. It is considered that these buffers/corridors are sufficient to provide protection to the ecological values present within these areas if they are managed appropriately (i.e. weed control, pest animal control, revegetation with appropriate indigenous species) and if Tozers Reserve is fenced off in such a way that prevents access aside from designated entrance points that are designed to minimise impacts to ecological values, but allows the passage of wildlife.

When finalising the draft Place Based Plan, the following should be considered: If designed and managed with strong conservation goals (in addition to functionality for nearby residents and meeting bushfire protection requirements), the Russells Creek open space provides an opportunity for the enhancement of Russells Creek's ecological values and its development as a biolink through to the Merri River downstream, whilst also offering scope for a direct connection to Tozers Reserve and the Crown land reserve south of Russells Creek (Figure 2) (that is also noted as a Conservation Area). It could serve the purpose of providing integrated and accessible biodiversity (as per the Precinct Design Principles detailed in section 5) by creating functional open space that can also support biodiversity locally and in the broader landscape. It is important the existing native vegetation present in these areas (i.e. Plains Grassy Woodland and Tall Marsh – PGW2 and TM1 on Figure 2) is retained and enhanced during the development of the open space so that flora and fauna occupying and/or utilising this area can persist, and the ecological values can be built upon.

The Crown land reserve that supports a dam (south of Russells Creek) offers no native vegetation at present, and the outcome of targeted fauna surveys at this location is currently unknown. Nevertheless, as a waterbody, it has the potential to provide important habitat for myriad species if revegetated and managed

appropriately, and retaining it within a Conservation Area as detailed in the draft Place Based Plan will provide the framework for this enhancement.

Important habitat features in the northwest of the study area have also been proposed for retention in credited and uncredited open space, which presents the opportunity to retain native plantings, flowering eucalypts and the Aquatic Herbland patch (AH1 on Figure 2), and importantly, it links to Tozers Reserve. Many of the small patches of Plains Grassy Woodland along roadsides have also been incorporated into other uncredited open space.

Overall, the draft Place Based Plan responds well to the existing ecological values present and incorporates almost all into forms of open space or conservation reserve.

Summary of Recommendations

Category	Recommendation
Flora	• Currently, no further investigations (e.g. targeted flora surveys) are required as no development is proposed within Tozers Reserve. • If any development is proposed within Tozers Reserve in the future, targeted surveys should be undertaken for Swamp Flax-lily, Golden Cowslips, Annual Fireweed, and any FFG-act Protected flora (Section 3.2.1). • If any EPBC-listed flora are found to be present within the proposed impact area during the targeted surveys, a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact'. • If any FFG Act-listed or protected species (excluding those listed as 'Protected under restricted use') are found to be present within any proposed impact area during any targeted surveys, an FFG Act permit application must be prepared and submitted to DEECA for assessment.

Category	Recommendation
Fauna	• Retain all of Tozers Reserve and link it to Russells Creek through revegetation to promote fauna movement. Revegetate and enhance Russells Creek including a minimum 20 metre buffer either side, to act as a biolink connecting through to the Merri River downstream. • Undertake targeted surveys for Growling Grass Frog, Swamp Skink, Southern Toadlet and Glossy Grass Skink according to the relevant best practice survey methodology. (Section 3.2.2) Revise the recommended 20-metre buffer widths for Tozers Reserve and Russells Creek if required, dependent on the outcome of the targeted surveys. • If any EPBC-listed fauna are found to be present within the proposed impact area during the targeted surveys, a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact'. • If Growling Grass Frog, Swamp Skink, Southern Toadlet or Glossy Grass Skink are recorded outside Tozers Reserve, formalise the management of the species by including in the PSP the requirement to prepare a Conservation Management Plan that addresses the management of these species. • Protect and enhance potential habitat corridors (i.e. Plains Grassy Woodland patches, planted native vegetation and potential roosting habitat) (Figure 5) within the study area to support the movement of Grey-headed Flying-fox and Southern Bent-wing Bat through the landscape. (Section 3.2.2) • Minimise impacts to flowering Eucalypts and potential roosting habitat (i.e. tall trees) (as detailed on Figure 2 and Figure 5), wherever possible. (Section 3.2.2) • Include within the PSP a requirement that pre-fauna inspections, salvage and relocation (where appropriate) must be undertaken for any tree removal (native or exotic). (Section 3.2.2; Section 4.6).

Category	Recommendation
	• Require pre-works fauna inspections, salvage and relocation (where appropriate) be undertaken for any tree removal (native or exotic). • Require pre-works fauna inspections, salvage and relocation (where appropriate) for any waterbodies to be decommissioned. • Prepare a Fauna Management Plan to address impacts to mobile fauna (including but not limited to Grey-headed Flying-fox, Southern Bent-wing Bat, Koala and macropods), both during and after development of the study area. (Section 6.2) • Ensure any engaged wildlife specialists hold a current Management Authorisation. (Section 4.6)
Native vegetation	• Retain all native vegetation within the study area, including native vegetation patches, scattered trees and native plantings. (Section 3.1; Figure 2; Figure 5) • Retain all vegetation within the Tozers Reserve as a Conservation Area (Section 6.1) and include a Conservation Area Concept Plan and Conservation Management Plan (either as a combined document or separate) for this area and the Russells Creek corridor within the PSP (Section 6.2). Incorporate a minimum 20-metre-wide non-disturbance habitat zone around these areas if possible, in addition to any other required open space. Incorporate a Weed and Pest Management Plan into the Conservation Management Plan (Section 4.5). • Aside from designated access points for management purposes or future pathways, Tozers Reserve should be fenced off to prevent unauthorised vehicle and trail bike access, and internal pathways should be formalised and fenced off in such a manner to deter off-track passive or active recreation. Any fencing should not prevent wildlife from accessing the reserve. • Follow the principles for conservation areas during the design phase (Section 5). • Retain and enhance native plantings (as detailed on Figure 2 and Figure 5) wherever possible (Section 6.1), using indigenous species of local provenance. • Undertake revegetation activities in accordance with the relevant EVC for the area, and with consideration given to the Merri River

Category	Recommendation
	Landscape Guidelines (WCC 2020) as appropriate (i.e. urban character zone guidelines and urban/rural living cross section guidelines), dependent on the surrounding (future) land use (Section 5). • Implement Tree Retention Zones (TRZs) for vegetation to be retained (Section 6.1) • Prepare a Construction Environmental Management Plan. (Section 6.2) • Retain existing roadside trees and facilitate protection through the use of 'No-go' zones and associated fencing, with tailored TPZs and on-ground requirements during construction detailed within a Construction Environment Management Plan (see Section 6.2 below). Design all nearby infrastructure (footpaths, crossovers, etc) to avoid the TPZs at minimum, though preferably enhance and increase the extent of these patches of vegetation through revegetation. • Based on the current draft Place Based Plan, it is recommended that the preparation of an NVPP is not necessary in this instance; no development is proposed within Tozers Reserve which supports the most ecological value, and other key ecological values (i.e. Russells Creek and native vegetation patches) are almost all contained within proposed open space. If these areas are managed appropriately, it is considered that reliance on Clause 52.17 Native Vegetation (rather than 52.16) is sufficient to protect the ecological values present and achieve the desired overarching ecological outcomes for the study area.
National Heritage Places	• The study area falls within the buffer zone of the *Great Ocean Road and Scenic Environs* National Heritage Place. Consultation with a Heritage Advisor will be required to determine whether there are any associated implications for the PSP. (Section 3.2.6)
Precinct Design Principles	• Follow the Precinct Design Principles (Section 5), the key recommendations from which are summarised below, amongst others. • Apply the five principles of Biodiversity Sensitive Urban Design. • Implement Water Sensitive Urban Design, an incorporate existing farm dams and natural depressions including the Aquatic Herbland

Category	Recommendation
	in property #3, in addition to Russells Creek (Section 3.1.1; Section 6.1). • Require new/additional interpretative signage in key areas (Tozers Reserve, Russells Creek) to highlight environmental features and promote increased community appreciation of the natural values in their neighbourhood. • Revegetate any wetlands/waterbodies/drainage lines with fringing, emergent and floating vegetation to support a diversity of fauna and encourage significant species such as Growling Grass Frog to occupy and disperse through the area; • Ensure that any Integrated Water Management planning prepared during the course of the PSP development has regard to these, and any Catchment Scale Public Realm and Water Plan produced as part of the PSP to meet targeted T17 of the PSP 2.0 Guidelines. • Apply appropriate buffer widths to biolinks and conservation reserves: provide a core 'non-disturbance' habitat zone of at least 20 metres to support ecological values, in addition to buffers either side for open space. These buffers should also balance the need to maintain key view lines and enhance the safety of park users as per the Merri River Landscape Guidelines (WCC 2020) and the PSP 2.0 Guidelines (VPA 2021). If significant species are recorded during any targeted surveys (e.g. Growling Grass Frog), these buffer widths will require revision. • When planning to meet the minimum 30% canopy tree cover target outlined in the PSP 2.0 Guidelines (i.e. T13) (VPA 2021), aim to simultaneously create fauna habitat to act as stepping stones by using indigenous species and incorporating structural diversity, and seek opportunities to link these areas to Tozers Reserve and Russells Creek. • Explore creative solutions for achieving T14 within the PSP 2.0 Guidelines (i.e. 'All streets containing canopy trees should use stormwater to service their watering needs') (VPA 2021) that simultaneously offer water supply for native fauna. • Incorporate existing artificial waterbodies (e.g. farm dams) and smaller tributaries/drainage lines into landscape scale drainage/stormwater treatment solutions that promote smaller

Category	Recommendation
	connected waterbodies/wetlands, especially in the vicinity of Tozers Reserve (Section 5). • Active revegetation within buffers and areas of open space should be undertaken using appropriate indigenous species of local provenance (Section 5). • Establish design and siting standards for future development within the study area that align with the Merri River Landscape Guidelines (WCC 2020); • Include recommended planting lists within the PSP that encourage the use of species of local provenance that would typically occur within the relevant EVC (Section 5). • Engage a bushfire consultant to inform the development of revegetated biolinks and conservation areas. • Undertake consultation with the Gleneg Hopkins CMA to ensure Integrated Water Management planning and any related designs (such as Water Sensitive Urban Design) aligns with the Glenelg Hopkins Regional Catchment Strategy. • Ensure that any offset requirements generated by future development activity within the study area are met through the securement of offsets within the Warrnambool City Council area wherever possible. • Apply appropriate planning controls, zones and overlays (PCRZ, ESOs, VPOs) to significant environmental values within the study area, including the Tozers Reserve and Russells Creek Corridor. • Prioritise the siting of infrastructure within areas which have already been disturbed or support existing infrastructure, thereby limiting the requirement for further environmental rehabilitation. • A Conservation Area Concept Plan should be prepared to ensure the ecological values present within each reserve/biolink are appropriately managed, monitored and enhanced, in alignment with Principle F12.1 of the PSP 2.0 Guidelines (VPA 2021). • Undertake pest plant and animal control (particularly of CaLP-listed weeds and pest animals) (see Section 4.4) followed by a long-term program of revegetation and maintenance to create structurally diverse habitats that will promote biodiversity, within conservation areas and open space.

Category	Recommendation
	• Utilise existing road networks to limit the crossing of Russells Creek.
Other	• Obtain a 'works on waterways' permit from the Glenelg Hopkins CMA for any works proposed to impact Russells Creek and refer any relevant proposed structures to DEECA as necessary. (Section 4.7). • Consult with the Glenelg Hopkins CMA to ensure the land use decisions made during the preparation of the PSP align appropriately with the objectives of the Glenelg Hopkins Regional Catchment Strategy (Glenelg Hopkins CMA 2021), which itself is a requirement of the CaLP Act to ensure integrated planning for land, water and biodiversity within the catchment. • Require within the PSP that declared noxious weeds must be managed as per the obligations under the CaLP Act. • Undertake the General Best Practice Mitigation Measures detailed in Section 6.2.

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by the Victorian Planning Authority (VPA) to undertake an Existing Ecological Conditions assessment to inform the development of the East of Aberline Growth Corridor (Growth Corridor) in Warrnambool, Victoria. The purpose of the assessment was to identify the extent and type of native vegetation present, and to determine the likely presence of significant flora and fauna species and/or ecological communities, to inform the preparation of a Precinct Structure Plan (PSP) to guide appropriate development within the Growth Corridor, and to determine whether a Native Vegetation Precinct Plan (NVPP) is required to streamline Victorian approvals for any required vegetation removal resulting from future development.

Ecology and Heritage Partners Pty Ltd previously prepared a Flora and Fauna Assessment Report (Ecology and Heritage Partners Pty Ltd 2018) for the Growth Corridor for Warrnambool City Council (Council) in 2018, however the assessment had become outdated (i.e. more than five years old) prior to a PSP being prepared. As such, it was deemed necessary to conduct an updated assessment to provide current knowledge of the ecological conditions within the study area.

1.2 Study Area

The study area comprises the East of Aberline Growth Corridor, which covers 407.96 hectares of land in Warrnambool bounded by Aberline Road to the west, Wangoom Road to the north and predominately farming properties to the east and south (Figures 1 and 2). According to the Victorian Department of Energy, Environment, and Climate Action (DEECA) NatureKit Map (DEECA 2025a), the study area occurs within the Victorian Volcanic Plain Bioregion, and the boundaries of the Glenelg Hopkins Catchment Management Authority (CMA) and Warrnambool City municipality.

Under the Warrnambool Planning Scheme, no planning overlays relating to ecological values occur within the study area, and the following zoning applies (DTP 2025):

- Farming Zone (FZ) (93.45% of the study area);
- Public Use Zone - Service and Utility (PUZ1) (5.84% of the study area);
- Transport Zone 3 – Significant Municipal Road (TRZ3) (0.71% of the study area)

The applied zoning is reflected by current land use, with the majority of the study area comprising cleared agricultural land with scattered rural dwellings. Surrounding land use is predominately agricultural; however, residential development associated with Martin Place Estate, Anchor Point Village and Russells Creek Estate abuts the south-west sections of the study area.

The study area does not contain any formal conservation reserves; however, the Tozers Reserve is located in the northern section of the study area. This 20-hectare property was donated to the Victorian School Plantation Endowment Scheme in 1926, is owned by the Department of Education and Training, and is currently managed by a trust committee (the 'Tozer Trust') represented by three local schools. The site retains large tracts of the Plains Grassy Woodland Ecological Vegetation Class (EVC) and is recognised as an important ecological resource within the context of the surrounding landscape by the Tozer Trust, associated schools and Warrnambool City Council.

The study area does not support any nationally significant wetlands or 'Current Wetlands' mapped by DEECA. Russells Creek runs east-west through the central portion of the study area, meeting the Merri River approximately 3.5 kilometres west of the study area. Scattered ephemeral farm dams are also present across the study area and the south-east section of the study area supports two large water storage ponds managed by Wannon Water.

Under current regulatory requirements, proposals involving the removal, destruction or lopping of native vegetation within the study area are subject to assessment under the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines) (DELWP 2017) as required under Clause 52.17 Native Vegetation from the Victorian Planning Provisions.

1.3 Objectives

The objectives of the project were to:

- Map and describe the quality and extent of the existing ecological conditions within the East of Aberline Growth Corridor;
- Determine the presence and extent of habitat for significant flora and fauna, including potential habitat present such as foraging, breeding and/or nesting sites, wetlands and ephemeral waterways;
- Determine the presence of any threatened ecological communities;
- Identify legislative implications and determine potential impacts on flora and fauna under relevant policy and legislation;
- Identify appropriate avoidance, mitigation and management measures to minimise the impacts of the project on biodiversity;
- Broadly describe opportunities to protect and enhance biodiversity values;
- Determine the requirement for further ecological studies during future stages of growth corridor planning; and,
- Provide a recommendation about the suitability of preparing a Native Vegetation Precinct Plan (NVPP) for the study area.

2 METHODS

This section details the desk-based and field methods used to assess the current ecological conditions, as well as the methods used to assess the likelihood of significant flora and fauna species occurring within the study area. It is noted that the methodology detailed below is in accordance with the standard ecological assessment requirements used to inform the precinct structure planning process.

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 DEECA NatureKit Map (DEECA 2025a) and Native Vegetation Regulation (NVR) Map (DEECA 2025b) for:
    - Modelled data for location risk, native vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DEECA 2025c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DEECA 2025d);
- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DCCEEW 2025);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DEECA 2024a) and Protected (DEECA 2024b) Lists;
- The online VicPlan Map (Department of Transport and Planning [DTP] 2025) to ascertain current zoning and environmental overlays in the study area;
- Aerial photography of the study area; and,
- Previous ecological assessments relevant to the study area; being;
    - *Warrnambool City-wide Housing Strategy 2013* (Warrnambool City Council 2013);
    - *Warrnambool Open Space Strategy 2014* (Warrnambool City Council 2014);
    - *Tozer Reserve Vegetation Survey 2014* (Landtech Consulting 2014a);
    - *Tozer Reserve Fauna Survey 2014/15* (Landtech Consulting 2014b); and,
    - *Flora and Fauna Assessment: Aberline to Horne Growth Corridor* (Ecology and Heritage Partners Pty Ltd 2018).

2.2 Nomenclature

Common and scientific names of vascular plants follow the Victorian Biodiversity Atlas (VBA) (DEECA 2025d). Vegetation community names follow DEECA's EVC benchmarks (DEECA 2025c). The names of aquatic and terrestrial vertebrate and invertebrate fauna follow the VBA (DEECA 2025d).

2.3 Field Assessments

2.3.1 Ecological Assessments (including Habitat Hectares)

Detailed ecological assessments were undertaken by a habitat hectare assessor accredited by DEECA in the habitat hectare assessment methodology between 20th – 22nd of May 2024, to quantify the quality and extent of native vegetation values within the study area, identify flora and fauna habitat values present, and to determine conditions with reference to findings of the desk-based assessment.

Consent was given to access approximately 285 hectares (70%) of the study area for the field surveys (Figure 2). The remainder of the properties were assessed from adjoining properties and/or roadsides where possible. Sufficient access/visuals could be obtained for all properties except property 39 (2.82 hectares).

The study area was walked and/or driven, with all commonly observed vascular flora and fauna species recorded, significant records mapped, and the overall condition of vegetation and habitats noted. The inspections focussed on identifying patches of native vegetation, scattered trees, protected ecological communities and potential habitat for significant flora and fauna species. Ecological Vegetation Classes (EVCs) were determined with reference to DEECA pre-1750 and extant EVC mapping (DEECA 2025a) and their published descriptions (DEECA 2025c).

The fieldwork did not include targeted surveys for significant species.

Binoculars were 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.

Where native vegetation was identified, a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment (DSE) 2004), and the vegetation was classified in accordance with the definitions provided in (Table 1) as defined in the '*Guidelines for the removal, destruction or lopping of native vegetation*' (the Guidelines) (DELWP 2017a).

In summary, the following tasks were undertaken as part of the field assessments within the study area:

- The identification of flora and fauna habitat values;
- An assessment of all watercourses, wetlands and springs;
- An assessment of all potential native fauna habitat, including habitat corridors, food and water sources, nesting and foraging sites;
- The identification of all native vegetation, including:
    - EVCs;

- Scattered trees, with Diameter and Breast Height (DBH) quantified, and trees identified as Large Trees or Small Trees;

- Identification of the potential presence of any Matters of National Environmental Significance (NES) listed under the EPBC Act;
- A habitat hectares assessment of the native vegetation within the study area, in accordance with the Vegetation Quality Assessment Manual (DSE 2004);
- The documentation of site and vegetation information, including the address of the property; and,
- Photographs of the native vegetation and other habitats within the study area.

Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

Under the *Planning and Environment Act 1987,* Clause 12.01 of the City of Warrnambool Planning Scheme aims to '*protect and enhance Victoria's biodiversity'* by ensuring land use and development decisions consider Victoria's Biodiversity, including: '*cumulative impacts, fragmentation of habitat and the spread of pest plants, animals and pathogens into natural ecosystems'*. No net loss to biodiversity is an objective of Clause 12.02-2s, requiring that decisions which involve, or will lead to, the removal, destruction or lopping of native vegetation, apply the three-step approach in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (Clause 52.17).

Under Clause 52.17, a permit is not required where native vegetation that is to be removed, destroyed or lopped was either planted or grown as a result of direct seeding. This applies to many native windrows that have been planted within the study area. However, this does not apply to native vegetation that was planted or managed with public funding for the purpose of land protection or biodiversity enhancement, unless permission from the agency (or its successor) is obtained in writing. This applies to vegetation within Tozer Reserve.

Vegetation Assessment

Native vegetation as defined in the Guidelines (DELWP 2017a), and summarised in Table 1 is assessed using two key parameters: extent (in hectares) and condition. For the purposes of this assessment, both condition and extent were determined as part of the field assessments.

In addition, the type and general condition of all vegetation was assessed, and a determination made as to whether it qualifies for further consideration under local, State or national legislation and policy.

Table 1. Determination of 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	Measured in hectares. Based on hectare area of the patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.

Category	Definition	Extent	Condition
	touches the drip line of at least one other tree, forming a continuous canopy; OR Any mapped wetland included in the *Current Wetlands map*, available in DEECA systems and tools.		
Scattered tree	A native canopy tree that does not form part of a remnant patch.	Measured in hectares. The extent of a Large scattered tree is the area of a circle with a 15 metre radius, with the trunk at the centre (assigned an extent of 0.070 hectares). The extent of a Small scattered tree is the area of a circle with a 10 metre radius, with the trunk at the centre (assigned an extent of 0.031 hectares).	Scattered trees are assigned a default condition score of 0.2 (outside a patch).

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

Assessment Pathway

The Guidelines manage the impacts on biodiversity from native vegetation removal using an assessment-based approach. Two factors – extent and location – are used to determine the assessment pathway associated with an application for a permit to remove native vegetation. The location category (1, 2 or 3) has been determined for all areas in Victoria and is available on DEECA's NatureKit Map (DEECA 2025a). Determination of the assessment pathway is summarised in Table 2.

Table 2. Assessment pathways for applications to remove native vegetation (DELWP 2017a)

Extent		Location		
		1	2	3
Native Vegetation	< 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

Notes: For the purpose of determining the assessment pathway of an application to remove native vegetation the extent includes 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.

Current Wetlands (DEECA)

Wetlands can be difficult to map and assess accurately as they respond quite quickly to changes in environmental condition, especially rainfall. After a period of no or low rainfall they can disappear or appear very degraded. However, wetlands are known to rapidly recover when inundated after rainfalls. As a result, all DEECA mapped wetlands (based on 'Current Wetlands' layer in the DEECA NatureKit Map [DEECA 2025a])

that are to be impacted must be included as native vegetation, with the modelled condition score assigned to them (DELWP 2017a). No wetlands are mapped to occur within the study area, as shown in Figure 2.

Large Tree and Habitat Assessment

Large tree and habitat assessments were undertaken concurrently with the habitat hectare assessments to quantify the number of scattered trees and Large Trees within native vegetation, as well as to collate data pertaining to the presence of hollows and/or nests and significant 'habitat trees' that may provide habitat for fauna. Where present, hollows, nests or other relevant features were noted during the assessments.

Large Tree benchmarks relating to the EVCs present within the study area are summarised below (Table 3).

Table 3. Benchmark sizes for large trees within the study area.

EVC	Species	Large Tree (DBH)	Small Tree (DBH)
Plains Grassy Woodland (EVC 55_63)	*Eucalyptus* spp.	≥ 80 cm	< 80 cm
	Acacia melanoxylon	≥ 40cm	<40cm
	Allocasuarina verticillata	≥ 40cm	<40cm
Aquatic Herbland (EVC 653)	N/A	N/A	N/A
Tall Marsh (EVC 821)	N/A	N/A	N/A

Note. DBH = Diameter at Breast Height (i.e. 1.3 metres above ground level).

2.4 Likelihood of Occurrence Assessment

Relevant biological databases, literature and expert advice were used to identify all species records of national and State significance within 10 kilometres of the study area. The proximity, number, dispersion and date of known locality records (assuming over-dispersed and random patterns of locality records being more likely to occur in the study area) were considered to determine a species' likelihood of occurrence within the study area.

Additional factors also taken into consideration include: the known biogeographical distribution of the species; underlying geology of existing locality records; and vegetation and habitat associations.

The decision guidelines for determining the likelihood of occurrence of flora and fauna species are presented in Table 4 and Table 5 respectively.

The results of the likelihood of occurrence assessment for listed flora and fauna species are provided in Appendix 1.3 and Appendix 2.1, respectively, along with the decision guidelines for determining the likelihood of occurrence.

All significant flora and fauna species considered to have the highest likelihood of occurrence within potential habitats within the study area are discussed in the body of this report.

Table 4. Decision guidelines for determining a flora species likelihood of occurrence within the study area.

Likelihood of occurrence	Ecology and Heritage Partners Decision Criteria
1 – Known occurrence	Recorded within the study area recently (i.e. within ten years).
2 - High	Previous records of the species in the local vicinity; and/or, the study area contains areas of high-quality habitat.
3 – Moderate	Limited previous records of the species in the local vicinity; and/or, the study area contains some characteristics of the species' preferred habitat.
4 – Low	Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a low likelihood of presence.
5 – Unlikely	No suitable habitat and/or outside the species range.

Table 5. Decision guidelines for determining fauna species likelihood of occurrence within the study area.

Likely presence or use of the study area	Ecology and Heritage Partners Decision Criteria
1 – Known occurrence	Recorded within the study area recently (i.e. within ten years).
2 - High	Likely resident in the study area based on database records, or expert advice; and/or, recent records (i.e. within ten years) of the species in the local area; and/or, the study area contains the species' preferred habitat.
3 - Moderate	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; and/or, the study area contains some characteristics of the species' preferred habitat.
4 - Low	The species may 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.
5 - 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.

2.5 Assessment Qualifications and Limitations

2.5.1 General Limitations

General ecological limitations associated with the ecological investigations are detailed below.

Data and information held within the ecological databases and mapping programs reviewed as part of the desktop assessment (e.g. VBA, PMST, NatureKit Maps 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. Furthermore, a documented record may indicate a species' presence in an area at a given point in time, but it generally does not offer information about how a species is making use of an area (e.g. foraging, nesting, dispersing). This can be important information when determining the potential impact of a proposed action on a threatened species.

The VBA data regarding significant flora species (Appendix 1.3) and significant fauna species (Appendix 2.1) used to inform the Significance Assessment (Section 3.2) was downloaded from the VBA (DEECA 2025d) on 28 January 2025.

This report has been written based on the quality and extent of the ecological values and habitat considered to be present or absent at the time of the desktop and/or field assessments being undertaken. The field assessment was undertaken during a sub-optimal season for the identification of flora and fauna species (i.e. late autumn). The 'snapshot' nature of the assessment means that migratory, transitory or uncommon fauna species may be absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

For cryptic and less abundant species that are known to, or that have the potential to use habitat resources within the study area as a resident or a visitor on a regular or infrequent basis, the precautionary principle has been applied when determining the likelihood of occurrence (i.e. the absence of a species during targeted surveys is not used as a reason for assuming the species is not present, or may utilise habitats within the study area, particularly where the species was/is known to occur within the locality, and the study area supports suitable habitats).

Non-vascular flora (i.e. mosses, liverworts) were not recorded, although their presence is noted as part of the cover of native species in the definition of a patch of native vegetation;

Targeted flora or fauna surveys were not undertaken, as this was beyond the scope of the project.

The assessment of likelihood of occurrence is based on survey effort and results, background information and previous records compiled;

Ecological values identified within the study area were recorded using a GPS-enabled device with an accuracy of +/-3 metres. This level of accuracy is considered 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. In some instances, it was not possible to map on-ground due to site access constraints (e.g. lack of landowner consent), in which cases mapping was done using the latest available aerial imagery, while on-site. Those properties that were assessed from adjoining properties and/or roadsides, or for which access and/or visibility was insufficient are indicated on Figure 2 and discussed further in Section 2.5.2, below.

Nevertheless, the terrestrial flora and fauna data collected during the field assessment and information obtained from relevant desktop sources is considered to inform an accurate assessment of the ecological values present within the study area.

2.5.2 Access Constraints

The ecological site assessment was restricted to parcels where access was permitted, or an adequate visual assessment could be conducted from areas of public access such as reserves and roadsides, or adjacent properties (for which access had been permitted). This resulted in approximately 285 hectares (70%) of the study area being subject to on-ground assessments, 119.78 hectares (29%) being adequately assessed from adjoining properties/roadsides/reserves (diagonally hatched on Figure 2), and 2.82 hectares (0.69%) not being assessed (i.e. only property 39: 110 Boiling Down Road, Warrnambool; crosshatched on Figure 2).

Where access was not permitted and an adequate visual assessment could not be undertaken, the extant (2005) DEECA modelled extent of native vegetation (DEECA 2025a) has been used to give an indication of the potential values present within unassessed land. This is only relevant to property 39, which is modelled to support two small patches of Plains Grassy Woodland (EVC 55). While it is unlikely that property 39 supports large areas of native vegetation as it comprises a rural residential dwelling that is likely subject to regular disturbance (i.e. mowing), further on-ground assessments should be undertaken to confirm the quality and extent of any native vegetation within this parcel, as well as the presence of habitats for significant flora or fauna (though the potential to support habitat for significant flora and fauna is considered highly unlikely given the isolated, fragmented distribution of modelled native vegetation and the highly modified condition of the study area).

Qualifications relating to ecological values within parcels not assessed

For the purposes of this report, the 'study area' refers to areas within the Precinct that were subject to an on-ground assessment or an adequate visual assessment from adjoining properties/roadsides/reserves. As such, the results of the field assessments, including data related to the presence or absence of significant flora, fauna and ecological communities and associated implications detailed in this report relate only to the study area.

The only property for which permission to access was not granted, and was not able to be visually assessed from adjacent land was 110 Boiling Downs Road, Warrnambool. Based on the quality and extent of known habitats within the study area, and the modelled extant (2005) native vegetation mapping (DEECA 2023c), it is considered unlikely that patches of native vegetation exist within this parcel. If it does support native vegetation, it is more likely to support occasional scattered trees, mostly likely surrounded by planted vegetation and/or ornamental garden. Given this, additional on-ground vegetation and habitat assessments are unlikely to contradict the results of the likelihood of occurrence assessments for significant species within the study area.

However, for the purposes of developing an NVPP and to reduce uncertainty in the significant species occurrence assessments, it is recommended that the VPA further investigate the possibility to gain access to 110 Boiling Downs Road, to enable the quality and extent of any native vegetation and/or habitat present to be determined.

In the absence of an NVPP, these knowledge gaps will be filled through a Biodiversity Assessment being undertaken on the subject land prior to any future development (which will be the standard requirement for all parcels). The assessment should include a native vegetation assessment in accordance with the Guidelines, a fauna habitat assessment to determine whether suitable habitat for any significant species exists, and will demonstrate whether any native vegetation is being impacted as part of a planning application.

3 EXISTING ENVIRONMENT

The following description of the existing environment is based on the landscape, vegetation, fauna habitats and species identified from the desktop assessment and within the study area during the ecological surveys.

3.1 Ecological Values

Several patches of native vegetation were recorded within the study area. The remainder of the study area comprised large expanses of introduced and planted vegetation (sometimes indigenous), present as indigenous revegetation, pasture grass, exotic or native windrows, and ornamental gardens.

A total of 103 flora species were observed within the study area, including 54 indigenous and 49 non-indigenous species. A list of all flora species recorded during the field assessment are provided in Appendix 1.1. Specific details relating to observed EVCs are provided below.

3.1.1 Patches of Native Vegetation

Native vegetation in the study area is representative of three EVCs: Higher Rainfall Plains Grassy Woodland (EVC 55_63), Aquatic Herbland (EVC 653) and Tall Marsh (EVC 821). The presence of these EVCs is generally consistent with the modelled extant (2005) native vegetation mapping (DEECA 2025c). Revegetation efforts (using a combination of public and corporate funding) within Tozer Reserve (as indicated on Figure 2) are also generally consistent with the modelled extant (2005) native vegetation mapping (Figure 2). One natural depression was observed to contain native vegetation that is best described as Aquatic Herbland, and the vegetation within a small portion of Russells Creek was characteristic of Tall Marsh.

The results of the habitat hectare assessment are provided in Appendix 1.2.

Plains Grassy Woodland

Within the Victorian Volcanic Plain bioregion, Higher Rainfall Plains Grassy Woodland (PGW) typically occurs at low elevations on poorly drained fertile soils of flat or undulating plains that receive greater than 700 millimetres annual rainfall. It is characterised as an open Eucalypt woodland to 15 metres tall or acacia/sheoak woodland to 10 metres tall, with a sparse shrub layer and a diverse ground layer of grasses and herbs (DEECA 2025c). This EVC has a Bioregional Conservation Status of Endangered.

Multiple patches of this EVC were recorded across the study area and were categorised into two habitat zones based on quality: PGW1 (low-quality) and PGW2 (high-quality). The high-quality occurrence of PGW within the study area was limited to Tozers Reserve (Figure 2; Plate 2). While PGW2 overall comprised a relatively diverse understorey of native flora, many understorey species were observed in low abundance in the remnant section (as opposed to the larger of the two revegetated sections [Figure 2]) as Wattles including Black Wattle *Acacia mearnsii* (which is 'Protected under restricted use' under the FFG Act) and Silver Wattle *Acacia dealbata* dominated much of the middle layer (Plate 3). Other middle layer species observed in low abundance included Blackwood *Acacia melanoxylon*, Hedge Wattle *Acacia paradoxa* and Tree Everlasting *Ozothamnus ferrugineous*. Native vegetation within the ground layer was relatively sparse as the ground layer contained a

high cover of predominately mosses and liverworts of the Bryophyte group. This noticeably high Bryophyte coverage is likely a result of the dense cover of Wattles in the middle layer, preventing light from penetrating to the ground floor (Plate 4). Spear Grass *Austrostipa* sp. and scattered pockets of Flax-lilies *Dianella* spp. including Small-flower Flax-lily *Dianella brevicaulis* and the State significant Swamp Flax-lily *Dianella callicarpa* were also observed at low to moderate density, though could not all be formerly recorded due to lack of flowering material to confirm species identification.

The larger of the two revegetated areas of PGW2 (Figure 2) contained improved species diversity within all layers of vegetation, including additional species within the canopy and middle layers such as Manna Gum *Eucalyptus viminalis* and Scrub Sheoak *Allocasuarina paludosa*. The ground layer also contained improved species diversity with the occasional tufted graminoid including Common Tussock Grass *Poa labillardierei* and Kangaroo Grass *Themeda triandra.* Herbaceous species were also present in low abundance and included Bidgee-widgee *Acaena novae-zelandiae* and Swamp Pennywort *Centella cordifolia*. Contrastingly, the smaller revegetated patch almost entirely comprised of Black Wattle (Plate 4).

Low quality occurrences of PGW (PGW1) formed the remainder of PGW patches within the study area, in the form of Blackwood and Silver Wattle observed sporadically, predominantly along roadsides along the study area's periphery (Figure 2). Native vegetation within these patches was limited to a single middle layer species surrounded by introduced grasses (e.g. Kikuyu *Cenchrus clandestinus*) (Plate 5).

Aquatic Herbland

Aquatic Herbland (EVC 653) typically occurs in semi-permanent or permanent wetlands on fertile paludal soils and is dominated by aquatic herbs and/or sedges (DEECA 2025c). This EVC has a Bioregional Conservation Status of Endangered.

One patch of native vegetation characteristic of Aquatic Herbland was present within the study area's north (Property 3 on Figure 2) and comprised a moderate cover of submerged and floating Hornwort *Ceratophyllum demersum* within the waterbody's middle (Plate 6). While the waterbody was degraded and showed clear evidence of agricultural disturbance, Common Spike-sedge *Eleocharis acuta* and Rush *Juncus* sp. were observed in fringing areas (Plate 7).

Tall Marsh

Tall Marsh (EVC 821) typically comprises a closed to open grassland/sedgeland dominated by Common Reed *Phragmites australis* and Cumbungi *Typha* sp. up to 3 metres tall, on estuarine sands, peaty soils, or silty clays in areas where average rainfall is approximately 600 millimetres. It requires shallow water (to one metre deep) and low-current scour, and can only tolerate low levels of salinity (DEECA 2025c). Associated species are varied and can include aquatic species such as *Potamogeton* spp. *Myriophyllum* spp., *Rumex bidens*, *Stellaria caespitosa*, *Amphibromus fluitans* and *Pseudoraphis spinescens*, *Calystegia sepium*, *Azolla* spp., *Landoltia* punctata and *Lemna* spp. (DSE 2012). This EVC does not have a listed Bioregional Conservation Status in the Warrnambool Plain bioregion, however in other bioregions it is listed as either Least Concern or Depleted.

A patch of Tall Marsh (TM1) was recorded in one location; within the Horne Road road reserve, where the road crosses Russells Creek in the study area's east (Figure 2). TM1 comprised Narrow-leaf Cumbungi *Typha*

domingensis and Rushes *Juncus* spp. within the ground layer (Plate 8). No other remnant native vegetation was identified, however planted native vegetation was observed in the adjacent upper banks and included Drooping Sheoak *Allocasuarina verticillata* and Silver Banksia *Banksia marginata* (Plate 9).

Plate 2. A patch of Plains Grassy Woodland within Tozer Reserve in the north of the study area (Ecology and Heritage Partners Pty Ltd 22/05/2024).

Plate 3. Poor quality ground layer species diversity in the background. High coverage of Spear Grass intermixed with Flax-lily within the foreground (Ecology and Heritage Partners Pty Ltd 22/05/2024).

Plate 4. A patch of Plains Grassy Woodland within Tozer Reserve comprising a high coverage of bare ground and Bryophytes in the ground layer (Ecology and Heritage Partners Pty Ltd 22/05/2024).

Plate 5. Patch of Plains Grassy Woodland within the study area northeast, solely comprising Silver Wattle (Ecology and Heritage Partners Pty Ltd 21/05/2024).

Plate 6. Hornwort within a patch of Aquatic Herbland within the north of the study area (Ecology and Heritage Partners Pty Ltd 20/05/2024).

Plate 7. A patch of Aquatic Herbland within the north of the study area (Ecology and Heritage Partners Pty Ltd 20/05/2024).

Plate 8. Tall Marsh within the drainage area of Russells Creek within the study area's east (Ecology and Heritage Partners Pty Ltd 22/05/2024).

Plate 9. Rushes in the foreground forming part of the patch of Tall Marsh within Russells Creek. Planted Silver Banksia in the background with stake. (Ecology and Heritage Partners Pty Ltd 22/05/2024).

3.1.2 Scattered trees and Large trees *in patches*

No scattered trees or Large Trees in patches were identified within the study area.

3.1.3 Introduced and Planted Vegetation

The vast majority of the study area did not support native vegetation, and instead mostly comprised pasture and ornamental gardens with a high cover (>95%) of exotic grassy and herbaceous species such as Toowoomba

Canary-grass, Rye-grass, Meadow Fox-tail *Alopecurus pratensis*, Wild Oat *Avena fatua*, Yorkshire Fog *Holcus lanatus,* Sweet Vernal-grass *Anthoxanthum odoratum* and Cat's-ear *Hypochaeris radicata* (Plate 10). Scattered native grasses and/or Rush were noted on rare occasion, however they did not have the required 25% relative cover to be considered a patch. This reflects the agricultural history of the area, which for decades has supported cropping and grazing practices that saw almost all trees cleared from farmland (as observed through historical aerial imagery [DEECA 2025d]). Other environmental weeds included planted ornamental species such as Algerian Oak *Quercus canariensis* and Radiata Pine *Pinus radiata* (Plate 11).

Noxious weeds, as defined under the CaLP Act, were present within the study area. Blackberry *Rubus fruticosus* spp. agg. and Hawthorn *Crataegus monogyna* were the most commonly observed, forming dense clusters within the east of the study area (Plate 12). African Box-thorn *Lycium ferocissimum,* Spear Thistle *Cirsium vulgare,* Wild Teasel *Dipsacus fullonum,* Fennel *Foeniculum vulgare,* Bridal Creeper *Asparagus asparagoides,* English Broom *Cytisus scoparius* and Gorse *Ulex europaeus* were present in limited numbers throughout the study area. Blackberry, Bridal Creeper, English Broom, Gorse and African Box-thorn are also Weeds of National Significance (WoNS).

Notably, most native trees within the study area were planted. Most farming properties supported a mixture of native and non-native windrows, utilising species such as Swamp Gum *Eucalyptus ovata*, River Red-gum *Eucalyptus camaldulensis*, Southern Blue Gum *Eucalyptus bicostata,* Blackwood, Lightwood *Acacia implexa,* Scented Paperbark *Melaleuca squarrosa,* Sheoak *Allocasuarina* sp., and other non-indigenous eucalypts such as Argyle Apple *Eucalyptus cinerea* (Plate 13).

As detailed in Section 3.1.1 above, the southern (approximate) half of Tozers Reserve has been revegetated with some native species that are indicative of the Plains Grassy Woodland EVC, in addition to other native species that would not typically occur in this vegetation type. Where the cover of planted native vegetation as part of revegetation efforts qualifies as a 'patch' of native vegetation, these areas have been mapped and assessed as Plains Grassy Woodland (PGW2 on Figure 2).

Plate 10. Pasture grasses and other environmental weeds within farmland (Ecology and Heritage Partners Pty Ltd 20/05/2024).

Plate 11. Ornamental garden comprising introduced species along a property boundary within the study area's south (Ecology and Heritage Partners Pty Ltd 21/05/2024).

Plate 12. High coverage of noxious weeds including Blackberry (WoNS) and Hawthorn (CaLP Act) within the study area's east (Ecology and Heritage Partners Pty Ltd 20/05/2024).

Plate 13. Planted mixture of native and non-native vegetation present as a property boundary windrow (Ecology and Heritage Partners Pty Ltd 21/05/2024).

3.1.4 Fauna Habitat

Exotic Grasslands and Ornamental Gardens

Most of the study area consisted of agricultural land comprising improved exotic pastures or ornamental garden within the smaller residential properties. These areas are likely to be used as a foraging resource by common generalist bird species which are tolerant of modified open areas, and common reptiles such as the Eastern Blue-tongue lizard *Tiliqua scincoides* and Eastern Brown Snake *Pseudonaja textilis*. Fauna observed using this habitat included Australian Magpie *Cracticus tibicen*, Little Raven *Corvus mellori*, Magpie-lark *Grallina cyanoleuca*, Willie Wagtail *Rhipidura leucophrys*, Superb Fairy-wren *Malurus cyaneus,* Red Wattlebird *Anthochaera carunculata,* Red Fox *Vulpes vulpes*, European Hare *Lepus europaeus* and European Rabbit *Oryctolagus cuniculus*. The Red Fox, European Rabbit and European Hare are listed as pest animals under the CaLP Act.

Scattered Trees (Planted)

Many mature windrows, both native and exotic, also exist within the study area. These tall treed areas are likely to be used by avifauna that require trees for nesting/roosting (e.g. Sulphur-crested Cockatoo *Cacatua galerita,* Wedge-tailed Eagle *Aquila audax*), and those reliant on a medium density of shrub cover (e.g. Superb Fairy-wren *Malurus cyaneus* and New Holland Honeyeater *Phylidonyris novaehollandiae*). Fauna recorded within this habitat included Eastern Grey Kangaroo *Macropus giganteus* and common birds including Australian Magpie, Red Wattlebird and Red Fox.

Aquatic Habitat

Multiple waterbodies in the form of artificial dams occurred within the study area (Figure 2). The Aquatic Herbland in the north of the study area (AH1 on Figure 2a) provides low quality suitable habitat for amphibians (e.g. Growling Grass Frog *Litoria raniformis major*), reptiles and waterbirds (e.g. Eurasian Coot *Fulica atra*), as well as providing a water source for mammals (e.g. Eastern Grey Kangaroo *Macropus giganteus*). Russells Creek, small drainage lines, and the farm dams and other natural depressions were notably degraded, with high levels of bank erosion observed during the field assessment. While these waterbodies are unlikely to provide foraging, nesting or breeding habitat for fauna, they may serve as a stopover point for common generalist fauna tolerant of highly modified open areas and waterbodies, or a dispersal corridor for species such as Growling Grass Frog. Importantly, Russells Creek flows into the Merri River, in which records for the following significant species exist nearby: Yarra Pygmy Perch *Nannoperca obscura* (Endangered under the EPBC Act, Vulnerable under the FFG Act), Platypus *Ornithorhynchus anatinus* (Vulnerable under the FFG Act) and Murray Spiny Crayfish *Euastacus armatus* (Threatened under the FFG Act).

Tozers Reserve

While highly modified, Tozers Reserve and its revegetated area (PGW2 on Figure 2) to the south provide suitable habitat for a variety of common fauna such as reptiles (e.g. Blotched Blue-tongue Lizard *Tiliqua nigrolutea*, Tiger Snake *Notechis scutatus*), possums (Common Ring-tailed Possum *Pseudocheirus peregrinus* and Common Brushtail Possum *Trichosurus vulpecula*), kangaroos and wallabies (e.g. Eastern Grey Kangaroo *Macropus giganteus*) and a range of common avifauna that require trees for nesting/roosting (e.g. Sulphur-crested Cockatoo *Cacatua galerita*), and those reliant on a medium density of shrub cover (e.g. Superb Fairy-wren *Malurus cyaneus*).

A previous report for Tozers Reserve by Landtech Consulting (Landtech Consulting 2014) documented that between September 2013 and September 2014, seven indigenous mammal species were recorded, mostly via remote camera technology (Bush Rat *Rattus fuscipes*, Koala *Phascolarctos cinereus*, Eastern Grey Kangaroo, Swamp Wallaby *Wallabia bicolor*, Common Brushtail Possum, Echidna *Tachyglossidae* sp., Gould's Wattled Bat *Chalinolobus gouldii*), in addition to the introduced Red Fox and Feral Cat *Felis catus*.

Tozers Reserve also offers potential opportunistic foraging and/or roosting habitat for some nationally significant fauna such as Southern Bent-wing Bat *Miniopterus orianae bassanii* and Grey-headed Flying-fox *Pteropus poliocephalus* as they move through the landscape to more suitable areas of habitat.

Two fauna species listed under the EPBC Act and one fauna species listed under the FFG Act have previously been recorded within Tozers Reserve, as detailed in section 3.2.2 below.

The Tozer Trust have observed kangaroos, wallabies, koalas, Brushtail Possum and Ring-tailed Possum inhabiting the reserve (pers.comm. J. O'Beirne).

3.2 Significance Assessment

3.2.1 Flora

The VBA contains records of one (1) nationally-significant and 15 State significant flora species previously recorded within 10 kilometres of the study area (DEECA 2025d) (Figure 3). The PMST nominated an additional 15 nationally significant species which have the potential to occur in the locality (DCCEEW 2025) (Figure 3; Appendix 1.3).

Those species with a moderate likelihood of occurrence are detailed in Table 6. FFG Act listed species with the highest likelihood of occurrence within the study area are further discussed below.

Table 6. FFG Act listed species with the highest likelihood of occurrence within the study area.

Common Name	Scientific Name	FFG Act Status	Closest Local Record (Approximate distance in kilometres)	Rationale for likelihood of occurrence
Swamp Flax-lily	*Dianella callicarpa*	Endangered	Recorded within Tozers Reserve during assessment.	Species recorded within Tozers Reserve during the site assessment, and also in 2014 (Landtech Consulting 2014a).
Golden Cowslips	*Diuris behrii*	Endangered	Previously recorded within Tozers Reserve (Landtech Consulting 2014a).	Species recorded within Tozers Reserve in 2014 (Landtech Consulting 2014a), which supports open woodland which the species prefers (along with grasslands).

Swamp flax-lily

Two specimens of Swamp Flax-lily were recorded within the northern portion of Tozer Reserve during the site assessment (Figure 2), the species was recorded during a previous assessment by Landtech Consulting in 2014, and the species has been recorded in abundance by the Tozer Trust (K. Sparrow, pers. comm). This species is listed as Endangered under the *Flora and Fauna Guarantee Act 1988.* The recent field assessment was undertaken outside of the species' flowering period (October – February) when accurate identification is possible, and as such, the mapped records do not indicate all specimens present. However, because no development/impacts are planned for Tozers Reserve, no additional surveys are recommended at this stage to confirm the numbers present and specific locations.

Golden Cowslips

According to information provided by Council and the NatureShare Database (NatureShare 2017) for the preparation of the 2018 Flora and Fauna Assessment (Ecology and Heritage Partners Pty Ltd 2018), Golden Cowslips *Diuris behrii* (listed as Endangered under the FFG Act) have also been recorded within Tozers Reserve.

This orchid was not detected during the assessment, however the species typically flowers from September to November, so its presence cannot be ruled out as the updated assessment was undertaken in May. (N.B. other flora species that were noted in the 2018 assessment but are no longer considered to be significant under the FFG Act have been omitted, specifically Arching Flax-lily *Dianella* sp. aff. *Longifolia (Benambra).*) However, because no development/impacts are planned for Tozers Reserve, no additional surveys are recommended at this stage.

Annual Fireweed

One record of Annual Fireweed *Senecio glomeratus* subsp. *longifructus* (listed as Vulnerable under the FFG Act), from 2010, exists approximately 850 metres southeast of the study area, and this species has been recorded by the Tozer Trust within Tozer Memorial Reesrve (K. Sparrow, pers. comm). The species was not detected during the assessment, however it typically flowers from late spring to autumn (Vicflora 2024) (i.e. outside the time the assessment was undertaken (i.e. May), and targeted surveys were not conducted for the species. As such, its presence cannot be ruled out. However, because no development/impacts are planned for Tozers Reserve, no additional surveys are recommended at this stage.

Protected flora

Black Wattle was also recorded in Tozers Reserve. This species was recently recategorised as 'Protected under restricted use'.

No other national or State significant flora were recorded during the site assessment, or are expected to occur due to the extensive and repeated disturbance throughout the study area. Previously present habitat for significant flora has likely been removed as a result of historical agricultural practices including land clearing and grazing. While the northern portion of Tozer Reserve does contain remnant native vegetation, this area has suffered a reduction in species diversity due to the introduction of invasive species, lack of native vegetation links and surrounding disturbance.

Recommendations

- If any development is proposed within Tozers Reserve, targeted surveys should be undertaken for Swamp Flax-lily, Golden Cowslips, Annual Fireweed, and any FFG-act Protected flora (i.e. orchids) to determine their presence, and confirm numbers of individuals if present;
- If any EPBC-listed species are found to be present within the proposed impact area during the targeted surveys, a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact';
- If any FFG Act-listed or protected species (excluding those listed as 'Protected under restricted use') are found to be present within the proposed impact area during the targeted surveys, an FFG Act permit application must be prepared and submitted to DEECA for assessment.

- If any EPBC-listed flora are found to be present within the proposed impact area during the targeted surveys, a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact'.

3.2.2 Fauna

The VBA contains records of 38 nationally significant and 36 State significant fauna species previously recorded within 10 kilometres of the study area (DEECA 2025d) (Figure 4). The PMST nominated an additional 38 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2025) (Figure 4; Appendix 2.1).

While no national or State significant fauna were recorded during the site assessment, two nationally significant, and one State significant fauna species were recorded in Tozers Reserve during targeted fauna surveys undertaken by Landtech Consulting in 2013/2014 (Landtech Consulting 2014), and another five species listed under the FFG Act are considered to have a moderate or higher likelihood of occurrence within the study area.

The targeted surveys in 2013/14 were undertaken for Golden Sun Moth *Synemon plana*, Striped Legless Lizard *Delma impar*, Grassland Earless Dragon *Tympanocryptis pinguicolla,* Growling Grass Frog *Litoria raniformis major* and Fat-tailed Dunnart *Sminthopsis crassicaudata*. The surveys recorded the following species (N.B. species that are no longer listed under the FFG Act have been omitted, including Common Long-necked Turtle *Chelodina longicollis*):

- Growling Grass Frog (Vulnerable under the EPBC Act and FFG Act);
- Swamp Skink *Lissolepis coventryi* (Endangered under the EPBC Act and FFG Act)*;* and,
- Southern Toadlet *Pseudophryne semimarmorata* (Endangered under the FFG Act).

Those species considered to have a moderate to high likelihood of occurrence are detailed in below. EPBC Act listed species are detailed in Table 7, and FFG Act listed species are detailed in Table 8. Further detail on these species is provided thereafter, and the significance assessment is detailed in Appendix 2.1.

Table 7. EPBC Act listed species with the highest likelihood of occurrence within the study area.

Common Name	Scientific Name	EPBC Act Status	FFG Act Status	Closest Local Record (Approximate distance in kilometres)	Rationale for likelihood of occurrence
Growling Grass Frog	*Litoria raniformis major*	Vulnerable	Vulnerable	Within the study area; reported to have been recorded in Tozers Reserve in 2014	Species recorded within Tozers Reserve in 2014 (Landtech Consulting 2014b). Study area may offer potential dispersal

Common Name	Scientific Name	EPBC Act Status	FFG Act Status	Closest Local Record (Approximate distance in kilometres)	Rationale for likelihood of occurrence
				(Landtech Consulting 2014b)	habitat under suitable conditions.
Swamp Skink	*Lissolepis coventryi*	Endangered	Endangered	Within the study area; reported to have been recorded in Tozers Reserve in 2013/14 (Landtech Consulting 2014b).	Species recorded within Tozers Reserve in 2013/14 (Landtech Consulting 2014b).
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable	Vulnerable	280 metres (1963)	The study area provides low quality foraging habitat for this species, which is capable of nightly flights of up to 50 kilometres from roost sites, feeding from multiple sites in complex feeding patterns. Foraging resources include nectar and pollen from Eucalypts and other native/ introduced plants. As a camp exists within the Warrnambool Botanic Gardens (approximately four kilometres southwest of the study area), the species may opportunistically utilise Tozers Reserve and surrounding windrows.
Southern Bent-wing Bat	*Miniopterus orianae bassanii*	Critically Endangered	Critically Endangered	5 kilometres southwest (1967)	Low quality foraging habitat exists within Tozers Reserve and surrounding agricultural land. As a known Southern Bent-wing Bat maternity cave is located near Warrnambool and the species can travel over 70 kilometres at a time, the species may opportunistically utilise the study area as part of its (aerial) feeding patterns.

Table 8. FFG Act listed species with the highest likelihood of occurrence within the study area.

Common Name	Scientific Name	FFG Act Status	Closest Local Record (Approximate distance in kilometres)	Rationale for likelihood of occurrence
Southern Toadlet	*Pseudophryne semimarmorata*	Endangered	Within Tozers Reserve (2013/14)	Reported to have been recorded in Tozers Reserve (2013/2014) (Landtech Consulting 2014b). Tozers Reserve may support the species when conditions are suitable.
Glossy Grass Skink	*Pseudemoia rawlinsoni*	Endangered	Closest record is approximately 21 kilometres northwest, from 2003.	Potential low-quality habitat exists by way of low, dense grassy (albeit exotic) vegetation along Russells Creek. Recorded west and northwest of Warrnambool.
Blue-billed Duck	*Oxyura australis*	Vulnerable	3.5 kilometres southeast (1999)	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River. The species is not expected to rely on the study area for foraging or breeding purposes.
Freckled Duck	*Stictonetta naevosa*	Endangered	3 kilometres northwest (1960)	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River. The species is not expected to rely on the study area for foraging or breeding purposes.
Musk Duck	*Biziura lobata*	Vulnerable	2 kilometres south (2019)	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River. The species is not expected to rely on the study area for foraging or breeding purposes.

Growling Grass Frog

The study area currently supports low quality habitat for Growling Grass Frog. Tozers Reserve was lacking the damp depressions and wetlands described in the report by Landtech Consulting (Landtech Consulting 2014b), and Russells Creek and the farm dams had little to no fringing, emergent, or floating vegetation, which are habitat attributes favoured by the species. Based on the absence of good quality habitat, the study area is unlikely to be used as a breeding area. However, given the previous record within Tozers Reserve, there is potential for the species to use the reserve, nearby waterbodies and adjacent habitat for dispersal under suitable conditions. Targeted surveys are therefore recommended within Tozers Reserve, along Russells Creek,

within the Crown Water Reserve to the south of Russells Creek, and within a farm dam in property 3 (220 Wangoom Road, Warrnambool) that supported aquatic vegetation (Habitat Zone AH1 on Figure 2a).

The targeted survey methodology employed for Growling Grass Frog must be in accordance with best practice methods described in the following guidelines:

- Survey Guidelines for Australia's Threatened Frogs (DEWHA 2010); and,
- Biodiversity Precinct Structure Planning Kit (DSE 2010).

Analysis of detection probability thresholds specified by the Department of Energy, Environment and Climate Action (DEECA) determines specific cumulative probabilities of detection. For a detection probability threshold of 0.99, three nights' surveys must be undertaken each site. A detailed Habitat Assessment should be undertaken at all survey sites as per the above guidelines.

Swamp Skink

Swamp Skink occurs in densely vegetated swamps and associated watercourses where it inhabits adjacent low lying, cool wet heaths (Melaleuca sp. or Leptospermum sp. thickets), sedges and saltmarshes that are subject to natural hydrological regimes. It is a secretive species that generally retreats into shelter when disturbed. Shelters usually consist of dense vegetation or burrows of its own construction, although it uses the burrows of Freshwater Crayfish, as well as rocks, logs, tussocks and sedges. It has a home range of about 10 metres from its burrow, and juveniles disperse up to 200 metres (SWIFFT 2023), although individual Swamp Skinks may be largely sedentary, rarely moving more than five metres from initial capture sites (Robertson 1998).

Swamp Skinks live in areas that are regularly flooded, although it appears unlikely the species remains in burrows that have been inundated with water (DCCEEW 2023). The species prefers dense vegetation cover up to two meters such as grasses, sedges and small shrubs. Vegetation canopy cover that exceeds two meters becomes unsuitable for Swamp Skink as the site becomes too shady for the species to use (Robertson and Clemann 2015). The species is also highly dependent on water availability (Humphrey *et al*. 2017).

Given the previous record within Tozers Reserve, there is potential for the species to use the reserve and adjacent Russells Creek under suitable conditions. Targeted surveys for the species are recommended within Tozers Reserve and along Russells Creek, between October and March. The survey methodology should be in accordance with the best practice methods described in the following guidelines:

- Survey Guidelines for Australia's Threatened Reptiles (DSEWPaC 2011); and,
- Biodiversity Precinct Structure Planning Kit (DSE 2010).

Grey-headed Flying Fox

The Grey-headed Flying-fox *Pteropus poliocephalusis* is listed as Vulnerable under the EPBC Act and Vulnerable under the FFG Act. There are two requirements to sustain viable populations of Grey-headed Flying-fox; foraging resources and roosting sites (i.e. 'camps'). The species is a canopy-feeding frugivore and nectarivore, which utilises a variety of vegetation communities but also feeds on commercial fruit crops and introduced tree species in urbanised areas, including fruit trees. Their primary food source is eucalypt blossom, but in some areas they also utilise a wide range of rainforest fruits (Eby 1998). None of the vegetation communities

used by the Grey-headed Flying-fox produce continuous foraging resources all year round, so this species adopts complex migratory behaviour in response to resource availability (Duncan *et al*. 1999; Eby 1996, 1998; Nelson 1965; Parry-Jones & Augee 1992; Spencer *et al*. 1991).

Given the presence of a camp at the Warrnambool Botanic Gardens, the species would be expected to be present within the locality on a regular basis. While some low-quality habitat exists by way of indigenous and non-indigenous Eucalyptus plantings within the southern portion of Tozers Reserve, private property windrows and boundary lines, the species is not expected to rely on habitat within the study area for foraging purposes.

As such, targeted surveys are not recommended for this species, but potential habitat corridors (i.e. Plains Grassy Woodland patches, planted vegetation and potential roosting habitat) (Figure 2; Figure 5) should be protected and enhanced within the study area to support its movement through the landscape, and pre-clearance fauna inspections, salvage and relocation (where appropriate) should be undertaken for any tree removal as a mitigation measure.

Southern Bent-wing Bat

Southern Bent-wing Bat *Miniopterus orianae bassanii* (SBWB) is listed as Critically Endangered under the EPBC Act. Southern Bent-wing Bat are known insectivores which are aerial feeders and rely heavily on caves for breeding and roosting (maternity and non-maternity). The species is also known to roost in trees, including native and exotic paddock species typical of modified landscapes (Kuhne 2022; Kuhne 2020; TSSC 2021).

Little is known of the species foraging behaviour, with recent research suggesting the species feeds primarily on moths common in agriculture landscapes (Kuhne *et al*. 2022). While the species may forage opportunistically within the study area when transitionally moving through the landscape in search of food from the nearby Starlight cave in Warrnambool, or two other known caves in Pomborneit and Panmure, the species is not expected to rely on the study area for foraging due to the extensive abundance of agricultural land and windrows within the broader locality.

As such, targeted surveys are not recommended for this species, but existing and potential habitat corridors (i.e. Plains Grassy Woodland patches, planted native vegetation and potential roosting habitat) (Figure 2; Figure 5) should be protected and enhanced within the study area to support its movement through the landscape. (Pre-clearance fauna inspections and salvage is not necessary for Southern Bent-wing Bat as the species will not roost at the site, so will not be present during the day when fauna inspections [and any future construction] is being undertaken.)

Southern Toadlet

Southern Toadlet *Pseudophryne semimarmorata* is a small frog listed as Endangered under the FFG Act, that can be found in forest, woodland, shrubland, grassland and heathland. Adults shelter under leaf litter, rocks, logs and other debris in damp areas (Hero *et al.* 1991; Robinson 2000). They are a ground dwelling frog with a preference for walking (Hero *et al.* 1991). Males of this species call from shallow burrows in low lying areas, usually near water or boggy ground from under leaf litter, logs or rocks (Hero *et al.* 1991; Robinson 2000). Males usually call in autumn, before periods of heavy rain (Robinson 2000).

Southern Toadlet was previously recorded within Tozers Reserve in 2014 (Landtech Consulting 2014). Suitable habitat exists there by way of damp areas with leaf litter. Targeted surveys are recommended within Tozers Reserve and along Russells Creek (given it is contiguous with Tozers Reserve) and the survey methodology should be in accordance with the best practice methods described in the following guidelines:

- Interim Survey Guidelines for Toadlet *Pseudophryne* Species in Victoria (De Angelis and Cleeland 2023); and,
- Survey Guidelines for Australia's Threatened Frogs (DEWHA 2010).

Glossy Grass Skink

Glossy Grass Skink *Pseudemoia rawlinsoni* is a poorly known species listed as Endangered under the FFG Act. Its habitat comprises low, dense grassy vegetation within drainage lines, swamps, dry sclerophyll forest, tussock-grasslands, salt marshes, heathlands and marshlands where it basks in or on grass tussocks (McNab 2024).

While no previous records for Glossy Grass Skink exist within 10 kilometres of the study area, the species has been recorded just over 20 kilometres northwest and west of Warrnambool, and similar habitat requirements to Swamp Skink which has been previously recorded in Tozers Reserve. It is therefore considered there is potential for the species to use Tozers Reserve and the adjacent Russells Creek under suitable conditions. Targeted surveys are recommended for the species from October to March.

The targeted survey methodology employed for Glossy Grass Skink must be in accordance with the best practice methodology described in the following guidelines:

- Survey Guidelines for Australia's Threatened Reptiles (DSEWPaC 2011); and,
- Biodiversity Precinct Structure Planning Kit (DSE 2010).

Blue-billed Duck, Freckled Duck and Musk Duck

Blue-billed Duck, Freckled Duck and Musk Duck may opportunistically visit Russells Creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River, however these species are not expected to rely on the study area for foraging or breeding purposes given the degraded nature of Russells Creek, and as such, targeted surveys are not recommended. Fauna inspections, salvage and relocation should be undertaken pre-works for any waterbodies to be decommissioned.

Listed Migratory Species

Migratory species listed under the EPBC Act are those protected under international agreements to which Australia is a signatory. These include the Japan Australia Migratory Bird Agreement (JAMBA), the China Australia Migratory Bird Agreement (CAMBA), the Republic of Korea Migratory Bird Agreement (ROKAMBA), and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Migratory species are considered matters of NES under the EPBC Act.

No species of bird recognised under the migratory provisions of the EPBC Act were recorded during ecological surveys and while species may fly near the study area, no EPBC Act listed migratory species are expected to rely on the study area for breeding or foraging purposes due to the absence of suitable habitat.

Summary of Fauna Recommendations

- Undertake targeted surveys for Growling Grass Frog, Swamp Skink, Southern Toadlet and Glossy Grass Skink according to the relevant best practice survey methodology, as detailed above;
- Potential habitat corridors (i.e. Plains Grassy Woodland patches, planted vegetation and potential roosting habitat) (Figure 2) should be protected and enhanced within the study area to support the movement of Grey-headed Flying-fox and Southern Bent-wing Bat through the landscape; and,
- Require pre-works fauna inspections, salvage and relocation for any waterbodies to be decommissioned.

3.2.3 Nationally-significant Ecological Communities (listed under the EPBC Act)

Six nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DCCEEW 2025):

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain;
- Natural Temperate Grassland of the Victorian Volcanic Plain;
- Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community;
- Subtropical and Temperate Coastal Saltmarsh
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; and,
- Giant Kelp Marine Forests of South East Australia.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

While it was deemed to be present in the vegetation assessment undertaken by Landtech Consulting (Landtech Consulting 2014b), vegetation within the study area did not meet the condition thresholds that define Grassy Eucalypt Woodland of the Victorian Volcanic Plain at the time of this assessment due to the low diversity of native flora, absence of remnant Eucalyptus species, low coverage of characteristic native grasses (e.g. Spear Grass) and high cover of exotic vegetation. Additionally, the majority of the vegetation present is revegetation within Tozers Reserve.

The Listing Advice for the community (DEWHA 2009) recognises management induced states of the community may occur due to prior activities (e.g. vegetation removal, burn regimes) and can constitute a derived or secondary representation of the Nationally-listed ecological community. While the remnant patch of Plains Grassy Woodland vegetation within the northern portion of Tozers Reserve (PGW2 on Figure 2) may have historically contained a canopy layer dominated by characteristic Eucalypts (i.e. River Red-gum), field assessments undertaken in September 2017 (Ecology and Heritage Partners 2017) and in May 2024 as part of

this updated assessment, did not identify any clear evidence of remnant Eucalyptus species presence (past or present) within the Plains Grassy Woodland patch (e.g. stumps, logs). Further, the Listing Advice considers that derived representations of the community are only included as the Nationally-listed ecological community where they meet the condition thresholds outlined in Section 5 of the Listing Advice (DEWHA 2009). The conditions thresholds also state that the description of the community (Section 4) must be met. In this instance the Plains Grassy Woodland is not considered to meet the description of the community as the vegetation did not meet a number of the key diagnostic characteristics as described in the Listing Advice (DEWHA 2009), including;

- *The tree canopy is typically dominated by Eucalyptus camaldulensis (River Red Gum) but may be dominated by other species, as outlined above, in response to variations in rainfall and/or localised landscape features; and,*
- *The understorey is dominated by a native ground layer with these features:*
    - *One or more of the following native grass genera typically dominates the perennial ground layer: Themeda, Austrodanthonia, Austrostipa, Poa and/or Microlaena; and,*
    - *One or more of the following native herb genera are typically present: Acaena, Arthropodium, Calocephalus, Chrysocephalum, Dianella, Dichondra, Geranium, Leptorhynchos or Solenogyne. (A list of typical ground layer species is at Appendix A.)*

While the tree canopy layer may be absent in derived representations of the community, the absence of clear evidence of prior presence in combination with an understorey which is not dominated by any of the characteristic native grass genera indicates the patch of Plains Grassy Woodland does not qualify as the Nationally-listed Grassy Eucalypt Woodland of the Victorian Volcanic Plain.

It should also be noted that although the community's distribution map is only indicative, the Tozers Reserve and contained Plains Grassy Woodland is located within the outer extremity of the Distribution area (DEWHA 2009).

Natural Temperate Grassland of the Victorian Volcanic Plain

In Victoria, this ecological community is linked to EVC 132 Plains Grassland (including EVC 132_61 Heavier - Soils Plains Grassland, EVC 132_62 Lighter-soils Plains Grassland and 132_63 Low-rainfall Plains Grassland) and Creekline Tussock Grassland (EVC 654) within the Victorian Volcanic Plain bioregion*.

No vegetation was assessed as Natural Temperate Grassland of the Victorian Volcanic Plain due to the paucity of native grass throughout the study area; no Plains Grassland or Creekline Tussock Grassland vegetation was present anywhere in the study area, and there were no patches of native grasses between the treed areas in Tozers Reserve that could have constituted the ecological community (i.e. there were no gaps between trees that were greater than 0.5 hectares that also supported a patch of native grassland 0.05 hectares (or greater) in size). The vegetation therefore did not meet the key diagnostic characteristics for this ecological community.

*Nearby bioregions can be applicable in some situations, where the key diagnostic characteristics and conditions thresholds are met.

Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community

No coastal salt-wedge estuaries occur within the study area. As such, this ecological community was assessed as not present.

Subtropical and Temperate Coastal Saltmarsh

The Subtropical and Temperate Coastal Saltmarsh ecological community consists mainly of salt-tolerant vegetation (halophytes) including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate and vegetation is generally of less than 0.5 m height.

No halophytic flora species were identified within the study area. As such, this ecological community was assessed as not present.

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

The Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains ecological community represents temporary freshwater wetlands that are inundated on a seasonal basis. It comprises an herbaceous ground layer with forbs present, often with a considerable graminoid component. Trees and shrubs are sparse to absent. The ecological community is linked to the following EVCs: Plains Grassy Wetland (EVC 125) and complexes (EVCs 755, 767, 959 and 960), Aquatic Grassy Wetland (EVC 306), Plains Sedgy Wetland (EVC 647), Ephemeral Drainage-line Grassy Wetland (EVC 678), Gilgai Wetland (EVC 778), Sweet Grass Wetland (EVC 920), Herb-rich Gilgai Wetland (EVC 956).

Vegetation within the study area did not meet the key diagnostic characteristics for Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (TSSC 2012) at the time of assessment due to the absence of native wetland graminoids and/or native wetland forbs (i.e. the Biota component could not be satisfied). Also, if the assumption was made that conditions were not suitable to observe the necessary flora, the condition thresholds could also not be met; the size of any natural depressions that could support the ecological community under suitable conditions were too small to qualify as the ecological community. Within Tozers Reserve, these depressions were significantly less than 0.1 hectares (i.e. the required size for a wetland within a native vegetation remnant), and there was not sufficient formation of depressions to consider a fine-scale cluster of wetlands (i.e. gilgai) that would amount to 0.5 hectares within a five hectare area. There was also no isolated wetland that was a minimum of 0.5 hectares in size. As such, the options within Figure 1 of the Listing Advice for the ecological community could not be met, in addition to the Biota component. Accordingly, the ecological community was assessed to not be present.

Giant Kelp Marine Forests of South East Australia

No marine areas are present within the study area.

3.2.4 State-significant Ecological communities (listed under the FFG Act)

No FFG Act-listed ecological communities were present within the study area, as determined by an assessment against the descriptions and characteristics described for these communities (DELWP 2019).

Western Basalt Plains (River Red Gum) Grassy Woodland

The vegetation present within Tozers Reserve and elsewhere in the study area did not meet the description for Western Basalt Plains (River Red Gum) Grassy Woodland (DELWP 2019) as it lacked an open canopy of River Red Gum, which is a defining characteristic of this ecological community.

Western (Basalt) Plains Grasslands Community

The vegetation present within Tozers Reserve and elsewhere in the study area did not meet the description for Western (Basalt) Plains Grasslands Community (DELWP 2019) as there were no areas where perennial native plants characteristic of grassland vegetation predominated, in addition to where very few eucalypts and shrubs were present and generally confined to drainage lines and the margins of ephemeral wetlands.

3.2.5 Ramsar Sites

The Western District Lakes Ramsar site comprises nine separate lakes within the Lake Corangamite catchment; Lakes Corangamite, Milangil, Bookar, Colangulac, Terangpom, Gnarput, Cundare, Beeac and Murdeduke. Lake Colangulac is the closest to the study area, being approximately 53 kilometres away.

3.2.6 Other Matters of NES

The study area does not support any other features corresponding with matters of NES protected under the EPBC Act (i.e. World or National Heritage Areas) (DCCEEW 2025), though it does fall within the buffer zone of the *Great Ocean Road and Scenic Environs* National Heritage Place. Consultation with a Heritage Advisor will be required to determine whether there are any associated implications for the PSP.

4 LEGISLATIVE CONSIDERATIONS

This section provides a summary of potential legislative considerations and implications associated with the potential future development of the East of Aberline Grown Corridor.

4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and provides a national framework for the protection of heritage and the environment, and the conservation of biodiversity. The EPBC Act establishes a Commonwealth process for the assessment of proposed actions that are likely to have a significant impact on matters of National Environmental Significance (MNES), or on Commonwealth land. An action (i.e. - project, development, undertaking, activity, or series of activities), requires approval from the Commonwealth Environment Minister if it is likely to have a significant impact on any MNES. An assessment of potential impacts to MNES from future development in the study area is described in Table 9 below.

Table 9. Potential impacts to matters of National Environmental Significance (NES)

Matter of NES	Potential Impacts
World Heritage properties	The proposed action will not impact any properties listed for World Heritage.
National heritage places	The proposed action is within the buffer zone for the *Great Ocean Road and Scenic Environs,* but will not directly impact any places listed for national heritage. Consultation with a Heritage Advisor will be required to determine whether there are any associated implications for the PSP.
Ramsar wetlands of international significance	The proposed action will not impact any Ramsar wetlands of international significance. Lake Colongulac is the nearest Ramsar site (approximately 53 kilometres northeast of the study area) and is one of nine lakes that forms the Western District Lakes Ramsar site.
Threatened species and ecological communities	Nationally significant fauna species with the highest likelihood of occurrence include four fauna species listed under the EPBC Act (Growling Grass Frog, Swamp Skink, Grey-headed Flying-fox and Southern Bent-wing Bat). Growling Grass Frog and Swamp Skink were recorded within Tozers Reserve in 2014 (Landtech Consulting 2014b). If still present, these species are considered likely to only use the study area when conditions are suitable, and potentially only as a dispersal corridor (in the case of Growling Grass Frog). However targeted surveys should be undertaken at the appropriate time of year (November to March for Growling Grass Frog, and October to March for Swamp Skink) to confirm presence. While there is a low likelihood that Grey-headed Flying-fox and Southern Bent-wing Bat rely on the study area, the species are likely to utilise the low quality foraging habitat within Tozers Reserve, surrounding windrows and other planted vegetation as opportunistic foraging habitat given there are known roosting sites nearby. As such, it is strongly recommended that these habitat features are retained as part of the Precinct design. No flora listed under the EPBC Act are considered likely to be present within the study area.

	No ecological communities listed under the EPBC Act are present within the study area.
Migratory and marine species	While a number of species may occasionally forage or fly over habitat within the study area, it would not be classed as 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013).
Commonwealth marine area	The proposed action will not impact any Commonwealth marine areas.
Nuclear actions (including uranium mining)	The proposed action is not a nuclear action.
Great Barrier Reef Marine Park	The proposed action will not impact the Great Barrier Reef Marine Park.
Water resources impacted by coal seam gas or mining development	The proposed action is not a coal seam gas or mining development.

4.1.1 Implications

Due to the presence of previous records, two fauna species listed under the EPBC Act (Growling Grass Frog and Swamp Skink) are considered to have a moderate likelihood of occurrence within the study area. Swamp Skink will only be present if it has persisted within Tozers Reserve since the 2014 assessment (Landtech Consulting 2014b), as the species has a very small home range. Growling Grass Frog are considered likely to only use the study area as a dispersal corridor when conditions are suitable. However, targeted surveys should be undertaken for both species at the appropriate time of year (November to March for Growling Grass Frog, and October to March for Swamp Skink) to confirm their presence, to facilitate an informed assessment of whether the proposed development of the study area would impact these species.

If any EPBC-listed fauna are found to be present within the proposed impact area during the targeted surveys, or during any flora surveys recommended in the future (based on development proposals), a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact'.

Targeted surveys are not considered necessary for Grey-headed Flying-fox and Southern Bent-wing Bat as these species are only likely to opportunistically utilise the study area enroute to areas of higher quality/more suitable habitat. Rather, their presence should be assumed, potential habitat corridors (i.e. Plains Grassy Woodland patches, planted vegetation and potential roosting habitat) (Figure 2; Figure 5) should be protected and enhanced within the study area to support their movement through the landscape, and pre-clearance fauna inspections, salvage and relocation (where appropriate) should be undertaken for any tree removal for Grey-headed Flying-fox as a mitigation measure.

4.2 Environment Effects Act 1978

The Environment Effects Act 1978 (EE Act) provides for an assessment of proposed activities that are capable of having a significant impact on the environment at a State level. The Act allows the Victorian Minister for planning to decide whether an Environment Effects Statement (EES) is required to be completed. Any action

that is likely to have a significant impact on State matters, as defined under the relevant guidelines, would need to be referred under the EE Act.

4.2.1 Implications

Actions undertaken in accordance with a prescribed Precinct Structure Plan (PSP) are exempt from the requirements of the EE Act.

4.3 *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. The *Flora and Fauna Guarantee Amendment Act 2019* (the Amendment Act) came into effect on June 1, 2020. The Amendment Act strengthens the framework for the protection of Victoria's biodiversity, with one of the main amendments now obligating all public authorities to have consideration of biodiversity to ensure decisions and policies are made with proper consideration of the potential impacts on biodiversity.

DEECA and Warrnambool City Council are public authorities under the FFG Act. Public authorities have a duty under the FFG Act to consider potential biodiversity impacts when exercising their functions. A permit under the FFG Act would be required where impacts to listed FFG Act matters occur on public land.

Two specimens of Swamp Flax-lily (listed as Endangered) were recorded within Tozers Reserve, and more specimens are likely be present, especially as the species was also detected in 2014 (Landtech Consulting 2014); targeted surveys would be required when the species is flowering to confirm numbers. Further, Golden Cowslips (listed as Endangered) were recorded during targeted surveys in 2014 (Landtech Consulting 2014a), and Annual Fireweed (listed as Vulnerable) was recorded by the Tozer Trust in Tozers Reserve (K. Sparrow, pers. comm.). As Tozers Reserve is owned by the Victorian Department of Education and is therefore public land, the removal of specimens within the reserve would require a permit under the FFG Act. Should any development be proposed within Tozers Reserve, targeted surveys for FFG Act species will be required to determine the presence and number of any listed species within the proposed impact area, to inform the FFG Act permit application.

Black Wattle was also recorded in Tozers Reserve, however this species was recently recategorised as 'Protected under restricted use', and as such, a permit would not be required for removal associated with development.

Southern Toadlet was previously recorded within Tozers Reserve in 2014 (Landtech Consulting 2014). Suitable habitat exists there by way of damp areas with leaf litter (Figure 6). Targeted surveys are recommended within Tozers Reserve, and should be undertaken in accordance with the best practice methodology referred to in section 3.2.2.

While no previous records for Glossy Grass Skink exist within 10 kilometres of the study area, the species has been recorded just over 20 kilometres northwest and west of Warrnambool, and similar habitat requirements to Swamp Skink which has been previously recorded in Tozers Reserve. It is therefore considered there is potential for the species to use Tozers Reserve and the adjacent Russells Creek under suitable conditions. Targeted surveys are recommended for the species from October to March and should be undertaken in accordance with the best practice methodology referred to in section 3.2.2.

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, unless an exemption applies.

Clause 12 of the State Policy Planning Framework details the overarching objectives and strategies for protecting and enhancing environmental and landscape values including biodiversity, waterbodies and wetlands, and significant environments and landscapes, which should be considered when deciding which ecological values to retain within the Precinct. Clause 12.01 requires planning authorities to consider Protecting Victoria's Environment – Biodiversity 2037 (DELWP 2017b) and the Flora and Fauna Guarantee Strategy under section 17 of the FFG Act when preparing a PSP and associated Native Vegetation Precinct Plan (NVPP).

4.4.1 Native Vegetation Precinct Plan

An NVPP provides for the strategic management of native vegetation for a defined area or precinct. It is established via a planning scheme amendment to incorporate the NVPP and list it in the schedule to Clause 52.16.

An NVPP identifies the native vegetation that can be removed and the vegetation to be protected, based on the conservation significance and land protection role of the vegetation, the identified values of vegetation within the planning scheme such as amenity and landscape, and the broader strategic planning objectives for the precinct (DELWP 2017c). An NVPP must consider the values of native vegetation described in the Guidelines (DELWP 2017a):

- Biodiversity value of native vegetation:
    - Extent of native vegetation;
    - Large trees;
    - Native vegetation condition;
    - Ecological Vegetation Class;
    - Sensitive wetlands and coastal areas;
    - Strategic biodiversity value; and,

  - Habitat for rare or threatened species.

- Other values of native vegetation:
  - Land and water protection;
  - Identified landscape values; and,
  - Native vegetation protected under the *Aboriginal Heritage Act 2006*.

Considerations for determining the appropriateness of preparing an NVPP

The preparation of an NVPP can allow for the implementation of several strategic biodiversity objectives to be incorporated. Firstly, an NVPP can allow for the VPA to consider the approved removal and retention of native vegetation and important habitat values at a precinct scale. This mitigates the risk of assessing and needing to approve multiple individual permit applications (with most likely at the Basic or Intermediate Assessment Pathway) that meet all of the relevant application requirements and decision guidelines – eroding opportunities for Council to retain the most important vegetation and habitats.

Any future permit applicant seeking a permit to remove native vegetation identified as being retained within the NVPP would be required to address the requirements of Clause 52.16 of the Planning Scheme, and respond to application requirement 8, which requires consideration of:

- The purpose and objectives of the Native Vegetation Precinct Plan.
- The effect on any native vegetation identified for retention in the Native Vegetation Precinct Plan;
- The potential for the effectiveness of the Native Vegetation Precinct Plan to be undermined;
- The potential for the proposed development to lead to the loss or fragmentation of native vegetation identified for retention in the Native Vegetation Precinct Plan; and,
- Offset requirements in the Native Vegetation Precinct Plan.

This mechanism is most beneficial when many ecological values are present within the focus area. In the case of the study area, which does not support substantial areas of native vegetation (outside of Tozers Reserve), especially within private property, it is considered that an NVPP may not be necessary to achieve the overarching biodiversity objectives of the PSP. Instead, the PSP itself could be used to ensure those ecological values present are built into the precinct in a way to support their enhancement and longevity. Including the most important ecological values (i.e. Tozers Reserve) in conservation area/s and connecting them through biolinks (i.e. Russells Creek), with appropriate buffers to mitigate against edge effects, is considered to present an effective alternative mechanism in this instance. Enhancing (through revegetation and weed control) and fencing off smaller patches of vegetation within open space, and/or including them in wider road verges can also be planned during the preparation of the PSP, given their limited number in this instance. If these areas are managed appropriately, it is considered that reliance on Clause 52.17 Native Vegetation (rather than 52.16) is sufficient to achieve the desired overarching ecological outcomes for the study area.

4.4.2 *The Guidelines*

The State Planning Policy Framework and the decision guidelines at Clause 12.01 Biodiversity and Clause 52.17 Native Vegetation require Planning and Responsible Authorities to have regard for the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a).

Because native vegetation (as defined by the Guidelines) within the study area is largely confined to Tozers Reserve, if this area is retained for conservation, future development is unlikely to result in the removal of a significant amount of native vegetation.

In the event no NVPP is prepared, the removal of vegetation will trigger a permit under Clause 52.17 (Native Vegetation), and the requirement to source offsets in accordance with the Guidelines (DELWP 2017a). In the event an NVPP is prepared, and native vegetation removal is in accordance with the NVPP, no permit will be triggered, however offsets as per the NVPP will be required. If native vegetation removal contrary to the NVPP is proposed, a permit under 52.16 (Native Vegetation Precinct Plan) will be triggered, and offsets in accordance with the Guidelines (DELWP 2017a) will be required.

4.5 *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. The Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- Protect water resources;
- Conserve soil;
- Eradicate regionally prohibited weeds;
- Prevent the growth and spread of regionally controlled weeds; and,
- Prevent the spread of, and as far as possible eradicate, established pest animals.

Nine weeds declared as noxious under the CaLP Act were noted during the assessment (Blackberry, Hawthorn, African Box-thorn, Spear Thistle, Wild Teasel, Fennel, Bridal Creeper, English Broom and Gorse). Similarly, there is evidence that the study area is currently occupied by three pest fauna species listed under the CaLP Act (European Rabbit, European Hare and Red Fox), and it is highly likely they occupy the broader region. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements, listed noxious weeds and pests should be appropriately controlled during and after any development activity to minimise their spread and impact on ecological values within the study area, and a Weed and Pest Management Plan should be required for proposed Conservation Areas.

Consultation with the Glenelg Hopkins CMA should take place to ensure the land use decisions made during the preparation of the PSP align appropriately with the objectives of the Glenelg Hopkins Regional Catchment

Strategy (Glenelg Hopkins CMA 2021), which itself is a requirement of the CaLP Act to ensure integrated planning for land, water and biodiversity within the catchment. Also, the PSP can state as a requirement that declared noxious weeds must be managed as per the obligations under the CaLP Act.

4.6 *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 *Planning and Environment Act 1987*.

The purposes of the Wildlife Act are to establish procedures in order to promote:

- The protection and conservation of wildlife;
- The prevention of taxa of wildlife from becoming extinct; and,
- The sustainable use of and access to wildlife.

With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, the Wildlife Act makes it an offence to hunt, take or destroy protected or threatened wildlife without authorisation. A Wildlife Act permit would be required to undertake any action that is likely to result in the death of wildlife, or require the translocation of wildlife.

Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975* or under any other Act issued by DEECA.

It is recommended the PSP include as a requirement that pre-works fauna inspections, salvage and relocation (where appropriate) must be undertaken for any tree removal (native or exotic).

4.7 *Water Act 1989* (Victoria)

Russells Creek flows through the study area in a westerly direction before terminating in Merri Creek approximately 3.5 kilometres west of the study area.

A 'works on waterways' permit from the Glenelg Hopkins CMA is likely to be required where any action impacts on waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DEECA with the Glenelg Hopkins CMA included for comment. This should be noted during the preparation of the PSP.

5 PRECINCT DESIGN PRINCIPLES

The study area contributes to the biodiversity value of the Warrnambool region and as such, the planning of future development to address population growth must be implemented on a precinct-wide scale to facilitate a consistent and informed approach to ensuring the protection and enhancement of ecological values present. Detailed desk-based assessments and field surveys have been undertaken to establish a set of recommended principles aimed at balancing the protection and enhancement of biodiversity with the need for future development. The following table (Table 10) outlines the key principles developed for the study area, and provides a set of recommended planning and design principles to inform the development of the proposed PSP. The principles and associated recommendations within Table 10 can assist the VPA to achieve the related principles and targets within the PSP 2.0 Guidelines (VPA 2021). Where relevant, specific recommendations for the study area within Table 10 refer to the relevant principles and/or targets within the PSP 2.0 Guidelines (VPA 2021).

Biodiversity Sensitive Urban Design and Water Sensitive Urban Design should form key guidance in the design process, to enable creation of healthier ecosystems that will benefit biodiversity within the immediate and wider environment, provide creative, functional solutions for drainage within the Precinct, and provide public open space that drives mental and health benefits for the community while supporting local biodiversity. Landscaping should be undertaken with consideration given to the Merri River Landscaping Guidelines (WCC 2020) to ensure outcomes balance ecological and social objectives.

Any Integrated Water Management (IWM) planning (including Water Sensitive Urban Design) undertaken as part of the PSP development should also have regard to the provided principles, and consultation should take place with the Glenelg Hopkins CMA to ensure alignment with the Glenelg Hopkins Regional Catchment Strategy (Glenelg Hopkins CMA 2021).

Table 10. Principles for future development

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
Integrated and accessible biodiversity	Future development integrates biodiversity into the urban landscape and ensures all neighbourhoods have access to nature.	In its current form, the study area supports large tracts of undeveloped land under private ownership. Limited areas of publicly accessible open space are present.	• Apply the five principles of Biodiversity Sensitive Urban Design: *Maintain and introduce habitat, Facilitate dispersal, Minimise threats and disturbances, Facilitate natural ecological processes, Improve potential human-nature interactions* (Garrard *et al*. 2018). Suggestions include: o Design areas of open space (informal parks, recreation reserves, landscape and amenity areas, and land encumbered by service infrastructure) to promote the integration of biodiversity features. The establishment of 'pocket parks', which provide limited connectivity and opportunities for fauna movement, should be avoided. o Create a variety of more complete flora and fauna habitats to promote and retain biodiversity through the revegetation and enhancement of linear habitat corridors and including creeks, tributaries, drainage lines, existing native windrows and proposed walking/cycling tracks, to provide landscape connectivity and buffers from development, and link them to larger areas of naturally-occurring and constructed habitat (e.g. Tozers Reserve, public open space) to offer dispersal opportunities.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			○ Interpretative signage should be used in key areas to highlight environmental features and promote increased community appreciation of the natural values in their neighbourhood. Developing an appreciation of local environmental values can improve human-nature interactions, and thereby minimise human-induced threats and disturbances. ○ Consider significant view lines between urbanised and natural areas to promote connections with nature and the use of these assets, in accordance with the urban zone design principles within the Merri River Landscape Guidelines (WCC 2020). ○ Provide connected public open space that simultaneously supports biodiversity and drives mental and health benefits for the community.
Connected ecological values	Future development maintains, improves and creates Biolinks, allowing the passive movement of fauna species across the landscape.	Bio-links within the study area are currently limited. Tozers Reserve, Russells Creek, scattered vegetation and farm dams provide connectivity within the highly fragmented, largely agricultural landscape.	• The creation of biolinks provides the opportunity to support biodiversity through: ○ Increasing connectivity between areas of ecological value that have previously been isolated/fragmented; ○ Providing habitat for wildlife that can utilise habitat in corridors for dispersal, foraging, breeding or sheltering; and, ○ Enabling species to disperse to or recolonise areas where the species was not formerly present. • Additional biolinks should be incorporated into the Precinct design. Broad habitat components of biolinks should include:

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			○ Ground cover species; ○ Shrubs; ○ Canopy trees and hollows; ○ Logs and litter; ○ Waterbodies (ephemeral or permanent) such as wetlands, ponds and lakes; ○ Wet depressions; and, ○ In-stream aquatic environments (e.g. rivers and creeks) (Practical Ecology 2012). Any creation and/or enhancement of biolinks and conservation reserves in the PSP must balance the requirement for bushfire protection and factor in suitable buffers between vegetation and future development. • Appropriate buffer width should be incorporated into biolinks and conservation areas to enable the provision of a core 'non-disturbance' habitat zone of at least 20 metres to support ecological values, in addition to buffers either side for open space, to increase habitat resilience (to edge effects) and ease maintenance requirements and costs. These buffers should also balance the need to maintain key view lines and enhance the safety of park users as per the Merri River Landscape Guidelines (WCC 2020) and the PSP 2.0 Guidelines (VPA 2021). Buffer widths should be appropriate to the values that are present and/or have the potential to utilise the habitat, and seek to incorporate a diversity of food resources and fauna microhabitats.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			For the study area, a minimum non-disturbance habitat zone of 20 metres either side of Tozers Reserve and Russells Creek, in addition to a buffer required to accommodate open space, is recommended. This non-disturbance habitat zone would also be sufficient to support common generalist fauna such as those identified in Section 3.1.4. These recommendations may require review dependent on the outcomes of any targeted surveys undertaken within the study area; while there are no defined buffer requirements for Southern Bent-wing Bat and Grey-headed Flying-fox, if Growling Grass Frog is present a 50-metre buffer would be required in accordance with the Growling Grass Frog Habitat Design Standards (DELWP 2017d). Similarly, if the species is not present, a 20 metre buffer could be adopted to encourage dispersal into and future use of Russells Creek. This buffer would also allow for the use of the corridor by other mobile significant fauna, and common fauna such as kangaroos, wallabies and echidnas. Specific suggestions to improve connectivity through the study area are provided below. • Promote passive fauna movement by establishing a native vegetation corridor between Tozers Reserve and Russells Creek;

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• Rehabilitate the Russells Creek corridor (both within and outside the study area) to form a biolink to the Merri River downstream, with reference to the design guidelines for urban zones within the Merri River Landscape Guidelines (WCC 2020). Replace the fringing stands of Hawthorn and Blackberry with species representative of the Swamp Scrub EVC (EVC 53) and Plains Grassy Woodland EVC (EVC 55_61), ensuring that consideration is given to important view lines and the guidelines relating to cross sections for urban/rural living within the Merri River Landscape Guidelines (WCC 2020). Fauna friendly culverts should be installed at any new crossing points. • To provide amenity and enhance biodiversity values while implementing necessary drainage infrastructure to manage the volume and treatment of runoff that will be a consequence of the increase in impervious surfaces resulting from future development, incorporate existing artificial waterbodies (e.g. farm dams) and smaller tributaries/drainage lines into landscape scale drainage/stormwater treatment solutions that promote smaller connected waterbodies/wetlands rather than large, isolated waterbodies/wetlands. An opportunity to achieve this outcome is the establishment of appropriately designed wetlands within the vicinity of Tozers Reserve. • Revegetate any wetlands/waterbodies/drainage lines with fringing, emergent and floating vegetation to support a diversity of fauna and encourage significant species such as Growling Grass Frog to occupy and disperse through the area;

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• Prioritise the retention and enhancement of any naturally-occurring or planted native vegetation within road reserves during any future road upgrade proposals. Infill planting around this vegetation should aim to increase structural and species diversity to support a greater variety of fauna. • When planning to meet the minimum 30% canopy tree cover target outlined in the PSP 2.0 Guidelines (i.e. T13) (VPA 2021), aim to simultaneously create fauna habitat to act as stepping stones by using indigenous species and incorporating structural diversity (i.e. plant mid-storey and understorey species as well as canopy trees, and introduce rocks and logs to provide foraging habitat, shelter and basking sites for native fauna), and seek opportunities to link these areas to Tozers Reserve and Russells Creek. Creative solutions for achieving T14 within the PSP 2.0 Guidelines (i.e. 'All streets containing canopy trees should use stormwater to service their watering needs') (VPA 2021) that simultaneously offer water supply for native fauna could be explored.
Increase in extent of ecological values	Future development increases the extent of land managed for biodiversity within the study area.	With the exception of Tozers Reserve, there are no areas within the study area managed for conservation.	• Ensure that any offset requirements generated by future development activity within the study area are met through the securement of offsets within the Warrnambool City Council area wherever possible. Offsetting arrangements may lead to the establishment of dedicated conservation areas through active management and subsequent land transfers. Clearing proposals should result in a no net loss outcome for biodiversity.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• As part of future planning processes, a Public Realm and Water Plan should be prepared to identify the extent of passive public open space areas on a precinct-wide scale and how water management has been integrated. The Public Realm and Water Plan should respond to principle F10.4 of the PSP 2.0 Guidelines (VPA 2021) (i.e. 'The location and scale of open space should respond to and optimise integration with the existing topography, waterway features, landscape features, biodiversity conservation areas and cultural heritage values') by identifying Tozers Reserve and Russells Creek as key conservation areas/biolinks, and looking for opportunities to create logical stepping stones of structurally diverse habitat to these areas. A precinct wide approach will ensure that sufficient land has been set aside for the purposes of conservation, demonstrate the integration of different open space types, and how encumbered land has been appropriately used in alignment with principle F10.5 of the PSP 2.0 Guidelines. • When designing conservation reserves, the following general principles should be followed: o Large reserves are generally preferred over small reserves: Large reserves typically capture and preserve a greater diversity and quality of habitats. In a fragmented landscape, a large reserve can act as core habitat for species and ecosystems. However, the retention of smaller, high quality remnants should not be discounted;

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			○ Connected reserves are better than separated reserves: Connected reserves (via biolinks/habitat corridors) provide flora and fauna populations access to a larger, total area of habitat, maintain genetic diversity and reduce barriers to movement; ○ Several reserves are better than one reserve: Populations generally rely on more than one reserve for breeding and/or foraging. The risk of decline of a population due to habitat degradation, improper management or natural causes is greater when there are fewer reserves present within the landscape. The presence of multiple reserve mitigates this risk; ○ Domestic pets or stock should be excluded within conservation reserves; ○ A cat-curfew for should be implemented for residential dwellings adjacent to conservation reserves; and, ○ Non-disturbance habitat zone 20 metres wide should be implemented wherever possible, to mitigate against edge effects and factor in bushfire hazard requirements. Non-disturbance habitat zones are those that mitigate the impacts of noise, light, sound and human activity on the ecological values present, so the provision of open space, footpaths, amenities, lighting, etc in these areas should be avoided where possible.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			Principle F12.1 of the PSP 2.0 Guidelines (VPA 2021) speaks to the need for adequate buffers between waterways and urban uses, recognising that 'preserving and promoting access to waterways where possible 'should be an aim. Where community access to a waterway is desired, the non-disturbance habitat zone should be expanded in another area to balance the loss. • A Conservation Area Concept Plan should be prepared to ensure the ecological values present within each reserve/biolink are appropriately managed, monitored and enhanced, in alignment with Principle F12.1 of the PSP 2.0 Guidelines (VPA 2021). The management of conservation reserves and biolinks must consider the inclusion of active management activities that result in the desired ecological outcome (e.g. ecological burning), even if this conflicts with the potential use of adjacent land for residential/commercial development. In these instances, the requirement to achieve the conservation management objectives should be prioritised, and not be superseded by adjacent land use preferences.
Quality improvement of biodiversity assets	Future development ensures that the quality of biodiversity assets within the study area is enhanced.	Native vegetation and habitat within the study area ranges in quality. Key values include native vegetation and significant flora/ fauna species within Tozers Reserve.	• Investigate the potential for Tozers Reserve to be formally secured for conservation in perpetuity (potentially as an offset site). • Apply appropriate planning controls, zones and overlays (PCRZ, ESOs, VPOs) to significant environmental values within the study area, including the Tozers Reserve and Russells Creek Corridor.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• Apply appropriate development setbacks from Tozers Reserve and Russells Creek. The applied setbacks will be dependent on a range of factors (e.g. flood modelling); however based on the ecological values present, it is considered that a non-disturbance habitat zone of 20 metres should be applied to these features (i.e. 20 metres from the reserve boundary and 20 metres either side of Russells Creek), alongside an additional buffer that accommodates the width required for passive/active open space. • Appropriate setback distances may require review dependent on the findings of targeted fauna surveys (e.g. Growling Grass Frog surveys). • Any future development within the study area should adopt the principles of Water Sensitive Urban Design. This should include an integrated approach to stormwater and flood management that meets the objectives for hydraulic capacity, flood management and water cycle management. • Prioritise the siting of infrastructure within areas which have already been disturbed or support existing infrastructure, thereby limiting the requirement for further environmental rehabilitation. • Design of the open space network should consider potential issues associated with climate change, including the requirement to build resilience by increasing connectivity, changes to the abundance and distribution of invasive species and the potential for increased fire events.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• Undertake pest plant and animal control (particularly of CaLP-listed weeds and pest animals) (see Section 4.4) followed by a long-term program of revegetation and maintenance to create structurally diverse habitats that will promote biodiversity.

Remnant ecological values retained and enhanced	Future development protects and promotes the enhancement of key remnant features, including vegetation, habitat and species.	Vegetation mapping completed across the approximate 408 hectares (99%) of the study area assessed, recorded 19.64 hectares of Plains Grassy Woodland (EVC 55_63), 12.47 hectares of which comprised revegetation within the southern half of Tozers Reserve.	• The hierarchy of environmental management should be applied to all future development within the study area. In order of priority, environmental impacts should be avoided, minimised and offset.
			• Utilise existing road networks to limit the crossing of Russells Creek.
			• As the study area exhibits a low diversity of native flora and is largely homogenous in terms of habitat features and species dominance, strategic revegetation and enhancement activities should be undertaken to increase the floristic diversity and structural complexity of the vegetation, and increase the carrying capacity of the existing ecological values so that over time, they may encourage and support more fauna (including significant species) to reoccupy the Precinct; in particular avian, arboreal and aquatic species. Where relevant (based on surrounding future land use), consideration should be given to the Merri River Landscape Guidelines (WCC 2020) to ensure appropriate balance between ecological and social outcomes.
			• Active revegetation within buffers and areas of open space should be undertaken using appropriate indigenous species of local provenance. Revegetation targets should include:
			  ○ Species selection that represents at least 30% of the original community's EVC diversity; and,
			  ○ Canopy tree plantings that reflect EVC benchmark tree densities (where applicable).

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• Establish design and siting standards for future development within the study area that align with the Merri River Landscape Guidelines (WCC 2020), and include recommended planting lists that encourage the use of species of local provenance that would typically occur within the relevant EVC. Any revegetation should consider the proposed use of the relevant area (e.g. open active space; passive space etc), and factor in the requirement for bushfire hazard protection; a bushfire consultant should be engaged to inform the development of revegetated biolinks and conservation areas.
Representative landscape approach	Future development maintains and promotes biodiversity through the retention and re-establishment of features representative of the natural landscape.	The study area supports a diversity of flora and fauna species.	• Ensure that the siting and design of open space areas considers the diversity of vegetation and habitat types that would naturally occur in the landscape. • Adopt appropriate planting standards for all revegetation activities within areas of open space to ensure that all created habitats are representative of the natural environment and that vegetation and habitat diversity, and structural complexity, is increased.
Resilient significant species	Future development retains and facilitates the long-term resilience of key significant species and ecological communities recorded or potentially present within the landscape.	A number of significant flora and fauna species are known or predicted to occur within the study area.	• As part of the future planning process, undertake targeted surveys to determine the presence and distribution of Growling Grass Frog, Swamp Skink, Southern Toadlet and Glossy Grass Skink within the study area. An appropriate management response should consider the following: o Ecological requirements; o Legislative requirements; o Threats (existing and those predicted to arise through future development of the study area); o Demonstrated approaches to conservation and enhancement; and, o Appropriate management responses to direct the avoidance, minimisation and offsetting of future impacts.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• If Growling Grass Frog, Swamp Skink, Southern Toadlet or Glossy Grass Skink are recorded outside Tozers Reserve, formalise the management of the species by including in the PSP the requirement to prepare a Conservation Management Plan. • Retain suitable foraging habitat for other significant fauna that are likely to opportunistically use the study area such as Grey-headed Flying-fox *Pteropus poliocephalus* and Southern Bent-wing Bat *Miniopterus orianae bassanii.* By providing stepping stones through the landscape, these species may be encouraged to utilise the study area more frequently.

6 MITIGATION MEASURES

As outlined in both State and Commonwealth policy, a project should be designed to take into consideration the three-step approach, which is:

- Avoid environmental impacts;
- Minimise environmental impacts; and,
- Where impacts cannot be avoided or minimised, compensate for the residual impacts using other mitigation measures such as offsets.

This three-step approach should be reverted to in all decision-making during the development of the East of Aberline PSP and related precinct design documents.

The following best practice and specific mitigation measures to should be implemented to avoid and minimise ecological impacts during and post-development.

6.1 Specific Mitigation Measures

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

- Retain all vegetation within the Tozers Reserve as a conservation area, as this offers both the highest quality and largest area of native vegetation within the study area, and has clear potential to form part of a biolink connecting to Russells Creek and downstream to the Merri River, as discussed below;
- Russells Creek is an important east-west corridor through the study area and should be identified and developed as a key biolink to provide suitable habitat for more mobile fauna to move through the landscape to/from Tozers Reserve and to existing landscape corridors outside the study area; specifically, the Merri River. It is recognised that it will be preferable to enhance and manage this biolink in a manner that also supports the concurrent objectives of functional, aesthetically pleasing open space for users. An appropriate balance should be sought between meeting these dual objectives. There should be a focus on supporting mobile common fauna such as kangaroos, wallabies, echidnas, possums and the myriad avifauna that utilise the area, in addition to mobile significant fauna identified in section 3.2.2 above, including Grey-headed Flying-fox, Southern Bent-wing Bat, and Growling Grass Frog (if recorded during the recommended targeted surveys).

  The biolink width should be as wide as possible, with a minimum 20 metre-wide non-disturbance habitat zone either side of Russells Creek, and additional buffer sufficient to accommodate any required open space. The non-disturbance habitat zone should cater for any significant species' requirements that may be assessed as present during the recommended targeted surveys (e.g. if Growling Grass Frog is present, adhere to the Growling Grass Frog Habitat Design Standards prepared as part of the Melbourne Strategic Assessment (DELWP 2017d), and apply a 20-metre buffer. If the species is not present, a buffer and rehabilitation regime in accordance with the Growling Grass Frog Habitat Design Standards (DELWP 2017d) would be appropriate to encourage dispersal into and future use of the area by Growling Grass Frog.) Any revegetation activities should be undertaken using

indigenous species associated with the Swamp Scrub and Plains Grassy Woodland EVCs, and in alignment with the Merri River Landscape Guidelines (WCC 2020). Plains Grassy Woodland vegetation provides scope to accommodate the needs of open space more readily than Swamp Scrub, given its more open structure and the presence of tree canopy.

- Retain native plantings (as detailed on Figure 2 and Figure 5) wherever possible and enhance them with structurally diverse infill planting, to maintain connectivity within the study area and broader landscape for fauna, particularly avifauna;
- Implement Water Sensitive Urban Design such as stormwater treatment wetlands, bio-retention systems, porous paving or swales, utilising existing farm dams and natural depressions where possible (in particular the natural depression supporting Aquatic Herbland in property three [Figure 2a]);
- Undertake revegetation activities in accordance with the relevant EVC for the area, and with consideration given to the Merri River Landscape Guidelines (WCC 2020) as appropriate (i.e. urban character zone guidelines and urban/rural living cross section guidelines), dependent on the surrounding (future) land use;
- It is considered that Grey-headed Flying-fox are moderately likely to utilise habitat within the study area for opportunistic foraging and roosting habitat (Section 3.2.2; Appendix 2.1). As such, impacts to flowering Eucalypts and potential roosting habitat (i.e. tall trees) (as detailed on Figure 2 and Figure 5), should be minimised wherever possible;
- Scattered trees and native plantings also provide important stepping-stones and landscape connectivity, in particular for avian and arboreal fauna. These ecological values should also be retained, with Precinct design capitalising on their aesthetic. Where possible, these values should be connected to the proposed Russells Creek biolink and nearby (ideally contiguous) reserves through revegetation with indigenous species of local provenance. Any impacts to native vegetation, including windrows, other revegetation and scattered trees, must consider any potential adverse impacts to the EPBC-Act listed species detailed in section 3.2.2;
- Weed management activities should be incorporated into the future management of the study area, in addition to a program of revegetation and enhancement works to expand the current extent of the native vegetation into adjacent areas currently occupied by exotic flora (mostly pasture-grasses), and increase the availability of high-quality habitat for significant species that may utilise the study area opportunistically, to encourage them to frequent the area.
- Tozers Reserve should be buffered from surrounding development via substantial vegetated corridors, at least 20 metres in width. Any public access areas or facilities should consider potential impacts on significant flora and fauna in the area and be sensitively designed to mitigate any adverse effects to the ecology, hydrology and aesthetic of the area. Aside from designated access points for management purposes or future pathways, the reserve should be fenced off to prevent unauthorised vehicle and trail bike access, and internal pathways should be formalised and fenced off in such a manner to deter off-track passive or active recreation. Any fencing should not prevent wildlife from accessing the reserve;

- It is recommended that a fauna management plan be developed to address impacts to mobile fauna (including but not limited to Grey-headed Flying-fox, Southern Bent-wing Bat, Koala and macropods), both during and after development of the study area.
- Require pre-works fauna inspections, salvage and relocation for any waterbodies to be decommissioned.
- Trees to be retained along roadsides should be protected through the use of 'No-go' zones and associated fencing, with tailored Tree Protection Zones and on-ground requirements during construction detailed within a Construction Environment Management Plan (see Section 6.2 below). All nearby infrastructure (footpaths, crossovers, etc) should be designed to avoid the TPZs at minimum, though preferably these existing patches of native vegetation should be enhanced and increased in extent through revegetation to create more resilient stepping stones through the landscape.

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, as relevant;
- Conservation Management Plan (CMP). It is recommended that a CMP be prepared for inclusion in the PSP, for Tozers Reserve and the Russells Creek corridor, to detail how these areas that currently support and/or have the potential to support high value biodiversity in the future and provide linkages through the landscape are protected, managed and enhanced as part of the PSP process. The CMP should specify clear management actions and timeframes associated with the protection and enhancement of the retained values, including native vegetation and suitable habitat characteristics for myriad species as discussed in sections 3.1.4 Fauna Habitat and 3.2 Significance Assessment above. This may be part of or support a Conservation Area Concept Plan, which should also be prepared for the PSP, in alignment with principle F12.1 of the PSP 2.0 Guidelines (VPA 2021).

6.2 General Best Practice Mitigation Measures

- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation where adjacent development is proposed. If indeed necessary, trees should be lopped or trimmed rather than removed.
- Soil disturbance and sedimentation within Russells Creek should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats, especially the Merri River downstream (into which Russells Creek flows) in which EPBC Act-listed and FFG Act-listed species have previously been recorded (see Section 3.1.4). Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Agency guidelines (EPA 2020a; EPA 2020b; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands;

- Tree Retention Zones (TRZs) should be implemented to prevent indirect losses of native vegetation during construction activities in accordance with the Australian standard for the Protection of trees on development sites (AS 4970-2009). 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.
- Control noxious weeds within the study area and surrounds to reduce further detrimental impacts to the ecosystems present, and to allow for future revegetation. No topsoil should be removed near current infestations of Gorse to prevent the spread of this weed; and,
- As indigenous flora provides valuable habitat for indigenous fauna, any landscape plantings that are undertaken within the study area should be conducted using indigenous species of local provenance, rather than exotic deciduous trees and shrubs.

7 SUMMARY OF RECOMMENDATIONS

A summary of the key recommendations made within this report is provided below.

Category	Recommendation
Flora	• Currently, no further investigations (e.g. targeted flora surveys) are required as no development is proposed within Tozers Reserve. • If any development is proposed within Tozers Reserve in the future, targeted surveys should be undertaken for Swamp Flax-lily, Golden Cowslips, Annual Fireweed, and any FFG-act Protected flora (Section 3.2.1). • If any EPBC-listed flora are found to be present within the proposed impact area during the targeted surveys, a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact'. • If any FFG Act-listed or protected species (excluding those listed as 'Protected under restricted use') are found to be present within any proposed impact area during any targeted surveys, an FFG Act permit application must be prepared and submitted to DEECA for assessment.
Fauna	• Retain all of Tozers Reserve and link it to Russells Creek through revegetation to promote fauna movement. Revegetate and enhance Russells Creek including a minimum 20 metre buffer either side, to act as a biolink connecting through to the Merri River downstream. • Undertake targeted surveys for Growling Grass Frog, Swamp Skink, Southern Toadlet and Glossy Grass Skink according to the relevant best practice survey methodology. (Section 3.2.2) Revise the recommended 20-metre buffer widths for Tozers Reserve and Russells Creek if required, dependent on the outcome of the targeted surveys. • If any EPBC-listed fauna are found to be present within the proposed impact area during the targeted surveys, a self-assessment against the *Significant Impact Guidelines for Matters of National Environmental Significance* (DoE 2013) will need to be undertaken by a qualified ecological consultant, and a referral to the Commonwealth may be required to confirm whether the proposed action constitutes a 'significant impact'. • If Growling Grass Frog, Swamp Skink, Southern Toadlet or Glossy Grass Skink are recorded outside Tozers Reserve, formalise the management of the species by including in the PSP the requirement to prepare a Conservation Management Plan that addresses the management of these species. • Protect and enhance potential habitat corridors (i.e. Plains Grassy Woodland patches, planted native vegetation and potential roosting habitat) (Figure 5) within the study area to support the movement of Grey-headed Flying-fox and Southern Bent-wing Bat through the landscape. (Section 3.2.2)

Category	Recommendation
	• Minimise impacts to flowering Eucalypts and potential roosting habitat (i.e. tall trees) (as detailed on Figure 2 and Figure 5), wherever possible. (Section 3.2.2) • Include within the PSP a requirement that pre-fauna inspections, salvage and relocation (where appropriate) must be undertaken for any tree removal (native or exotic). (Section 3.2.2; Section 4.6). • Require pre-works fauna inspections, salvage and relocation (where appropriate) be undertaken for any tree removal (native or exotic). • Require pre-works fauna inspections, salvage and relocation (where appropriate) for any waterbodies to be decommissioned. • Prepare a Fauna Management Plan to address impacts to mobile fauna (including but not limited to Grey-headed Flying-fox, Southern Bent-wing Bat, Koala and macropods), both during and after development of the study area. (Section 6.2) • Ensure any engaged wildlife specialists hold a current Management Authorisation. (Section 4.6)
Native vegetation	• Retain all native vegetation within the study area, including native vegetation patches, scattered trees and native plantings. (Section 3.1; Figure 2; Figure 5) • Retain all vegetation within the Tozers Reserve as a Conservation Area (Section 6.1) and include a Conservation Area Concept Plan and Conservation Management Plan (either as a combined document or separate) for this area and the Russells Creek corridor within the PSP (Section 6.2). Incorporate a minimum 20-metre-wide non-disturbance habitat zone around these areas if possible, in addition to any other required open space. Incorporate a Weed and Pest Management Plan into the Conservation Management Plan (Section 4.5). • Aside from designated access points for management purposes or future pathways, Tozers Reserve should be fenced off to prevent unauthorised vehicle and trail bike access, and internal pathways should be formalised and fenced off in such a manner to deter off-track passive or active recreation. Any fencing should not prevent wildlife from accessing the reserve; • Follow the principles for conservation areas during the design phase (Section 5). • Retain and enhance native plantings (as detailed on Figure 2 and Figure 5) wherever possible (Section 6.1), using indigenous species of local provenance. • Undertake revegetation activities in accordance with the relevant EVC for the area, and with consideration given to the Merri River Landscape Guidelines (WCC 2020) as appropriate (i.e. urban character zone guidelines and urban/rural living cross section guidelines), dependent on the surrounding (future) land use (Section 5). • Implement Tree Retention Zones (TRZs) for vegetation to be retained (Section 6.1) • Prepare a Construction Environmental Management Plan. (Section 6.2)

Category	Recommendation
	• Retain existing roadside trees and facilitate protection through the use of 'No-go' zones and associated fencing, with tailored TPZs and on-ground requirements during construction detailed within a Construction Environment Management Plan (see Section 6.2 below). Design all nearby infrastructure (footpaths, crossovers, etc) to avoid the TPZs at minimum, though preferably enhance and increase the extent of these patches of vegetation through revegetation. • Based on the current draft Place Based Plan, it is recommended that the preparation of an NVPP is not necessary in this instance; no development is proposed within Tozers Reserve which supports the most ecological value, and other key ecological values (i.e. Russells Creek and native vegetation patches) are almost all contained within proposed open space. If these areas are managed appropriately, it is considered that reliance on Clause 52.17 Native Vegetation (rather than 52.16) is sufficient to protect the ecological values present and achieve the desired overarching ecological outcomes for the study area.
National Heritage Places	• The study area falls within the buffer zone of the *Great Ocean Road and Scenic Environs* National Heritage Place. Consultation with a Heritage Advisor will be required to determine whether there are any associated implications for the PSP. (Section 3.2.6)
Precinct Design Principles	• Follow the Precinct Design Principles (Section 5), the key recommendations from which are summarised below, amongst others. • Apply the five principles of Biodiversity Sensitive Urban Design. • Implement Water Sensitive Urban Design, an incorporate existing farm dams and natural depressions including the Aquatic Herbland in property #3, in addition to RUssells Creek (Section 3.1.1; Section 6.1). • Require new/additional interpretative signage in key areas (Tozers Reserve, Russells Creek) to highlight environmental features and promote increased community appreciation of the natural values in their neighbourhood. • Revegetate any wetlands/waterbodies/drainage lines with fringing, emergent and floating vegetation to support a diversity of fauna and encourage significant species such as Growling Grass Frog to occupy and disperse through the area; • Ensure that any Integrated Water Management planning prepared during the course of the PSP development has regard to these, and any Catchment Scale Public Realm and Water Plan produced as part of the PSP to meet targeted T17 of the PSP 2.0 Guidelines. • Apply appropriate buffer widths to biolinks and conservation reserves: provide a core 'non-disturbance' habitat zone of at least 20 metres to support ecological values, in addition to buffers either side for open space. These buffers should also balance the need to maintain key view lines and enhance the safety of park users as per the Merri River Landscape Guidelines (WCC 2020) and the PSP 2.0 Guidelines (VPA 2021). If significant species are recorded during any targeted surveys (e.g. Growling Grass Frog), these buffer widths will require revision.

Category	Recommendation
	• When planning to meet the minimum 30% canopy tree cover target outlined in the PSP 2.0 Guidelines (i.e. T13) (VPA 2021), aim to simultaneously create fauna habitat to act as stepping stones by using indigenous species and incorporating structural diversity, and seek opportunities to link these areas to Tozers Reserve and Russells Creek. • Explore creative solutions for achieving T14 within the PSP 2.0 Guidelines (i.e. 'All streets containing canopy trees should use stormwater to service their watering needs') (VPA 2021) that simultaneously offer water supply for native fauna. • Incorporate existing artificial waterbodies (e.g. farm dams) and smaller tributaries/drainage lines into landscape scale drainage/stormwater treatment solutions that promote smaller connected waterbodies/wetlands, especially in the vicinity of Tozers Reserve (Section 5). • Active revegetation within buffers and areas of open space should be undertaken using appropriate indigenous species of local provenance (Section 5). • Establish design and siting standards for future development within the study area that align with the Merri River Landscape Guidelines (WCC 2020); • Include recommended planting lists within the PSP that encourage the use of species of local provenance that would typically occur within the relevant EVC (Section 5). • Engage a bushfire consultant to inform the development of revegetated biolinks and conservation areas. • Undertake consultation with the Gleneg Hopkins CMA to ensure Integrated Water Management planning and any related designs (such as Water Sensitive Urban Design) aligns with the Glenelg Hopkins Regional Catchment Strategy. • Ensure that any offset requirements generated by future development activity within the study area are met through the securement of offsets within the Warrnambool City Council area wherever possible. • Apply appropriate planning controls, zones and overlays (PCRZ, ESOs, VPOs) to significant environmental values within the study area, including the Tozers Reserve and Russells Creek Corridor. • Prioritise the siting of infrastructure within areas which have already been disturbed or support existing infrastructure, thereby limiting the requirement for further environmental rehabilitation. • A Conservation Area Concept Plan should be prepared to ensure the ecological values present within each reserve/biolink are appropriately managed, monitored and enhanced, in alignment with Principle F12.1 of the PSP 2.0 Guidelines (VPA 2021). • Undertake pest plant and animal control (particularly of CaLP-listed weeds and pest animals) (see Section 4.4) followed by a long-term program of revegetation and maintenance to create structurally diverse habitats that will promote biodiversity, within conservation areas and open space. • Utilise existing road networks to limit the crossing of Russells Creek.

Category	Recommendation
Other	• Obtain a 'works on waterways' permit from the Glenelg Hopkins CMA for any works proposed to impact Russells Creek and refer any relevant proposed structures to DEECA as necessary. (Section 4.7). • Consult with the Glenelg Hopkins CMA to ensure the land use decisions made during the preparation of the PSP align appropriately with the objectives of the Glenelg Hopkins Regional Catchment Strategy (Glenelg Hopkins CMA 2021), which itself is a requirement of the CaLP Act to ensure integrated planning for land, water and biodiversity within the catchment. • Require within the PSP that declared noxious weeds must be managed as per the obligations under the CaLP Act. • Undertake the General Best Practice Mitigation Measures detailed in Section 6.2.

8 CONCLUSION

The East of Aberline Growth Corridor has been identified as being suitable for development accommodating the medium and longer term growth of Warrnambool. The findings of this Existing Ecological Conditions report are intended to help guide the Precinct design and subsequent preparation of a NVPP if the VPA should choose to pursue this option.

Detailed desk-based assessments and field surveys were undertaken to assess the biodiversity value of the study area and inform the future planning processes. The findings of the assessment confirmed that the study area is highly modified, with key ecological values largely limited to the Tozers Reserve and Russells Creek corridor. Ecological values within the study area are subject to the natural and anthropogenic pressures commonly associated with developed and fringing landscapes.

Given the potential for future development within the study area to intensify existing pressures and threaten the overall viability of retained ecological values, a precinct-wide approach is required to ensure all known values are accounted for and that management responses are consistent and implemented on a landscape-scale.

Knowledge gathered from this assessment has been used to develop a set of principles aimed at balancing the needs of population growth and biodiversity:

- Integrated and accessible - Future development integrates biodiversity into the urban landscape and ensures all neighbourhoods have access to nature.
- Connected - Future development maintains, improves and creates biolinks, allowing the passive movement of fauna species across the landscape.
- Increase in extent - Future development increases the extent of land managed for biodiversity within the study area.
- Quality Improvement - Future development ensures that the quality of biodiversity assets within the study area is enhanced.
- Remnant values retained and enhanced- Future development protects and promotes the enhancement of key remnant features, including vegetation, habitat and species.
- Representative approach - Future development maintains and promotes biodiversity through the retention and re-establishment of features representative of the natural landscape.
- Significance - Future development retains and facilitates the long-term resilience of key significant species and ecological communities recorded or potentially present within the landscape.

For each key principle, recommended design and planning principles have been developed to inform preparation of the Structure Plan, that also speak to, build upon, and can assist the VPA to achieve the related principles and targets within the PSP 2.0 Guidelines (VPA 2021) (Section 5). It is recommended that these principles are reassessed and built upon as future planning of the Growth Corridor progresses. In particular, the Precinct design could seek to accommodate and enhance the potential for the study area to support significant fauna, particularly Growling Grass Frog and Swamp Skink which have been previously recorded in Tozers Reserve (Landtech Consulting 2014), and both Grey-headed Flying-fox and Southern Bent-wing Bat which are likely to opportunistically forage within Tozers Reserve, windrows and other plantings within the

study area. Tozers Reserve, windrows and other planted vegetation should be retained as foraging habitat (in addition to retaining Tozers Reserve and Russells Creek as a biolink) and depending on the findings of the recommended targeted surveys (for Growling Grass Frog and Swamp Skink), specific fauna conservation management plans may be required.

Based on the findings of this Existing Ecological Conditions Report, it is considered that the Growth Corridor can accommodate the medium- and longer-term growth of Warrnambool whilst maintaining and enhancing the key ecological values present.

Given that the native vegetation present is restricted to Tozers Reserve which will not be developed, and limited, scattered, low-quality patches of roadside vegetation, it is recommended that a NVPP is not necessary to retain the ecological values present and achieve the overarching ecological objectives of the PSP, and that instead applications for native vegetation removal could be managed through the usual approval process under the Warrnambool Planning Scheme (i.e. Clause 52.17 Native Vegetation), (which would require a Biodiversity Assessment be undertaken for property 39 should development be proposed there, in addition to all other properties. However, if the VPA decides to pursue the preparation of a NVPP, it is recommended that the VPA further investigate the possibility to gain access to property 39, to determine the quality and extent of any native vegetation present, and to determine the presence of suitable habitat for any significant species.

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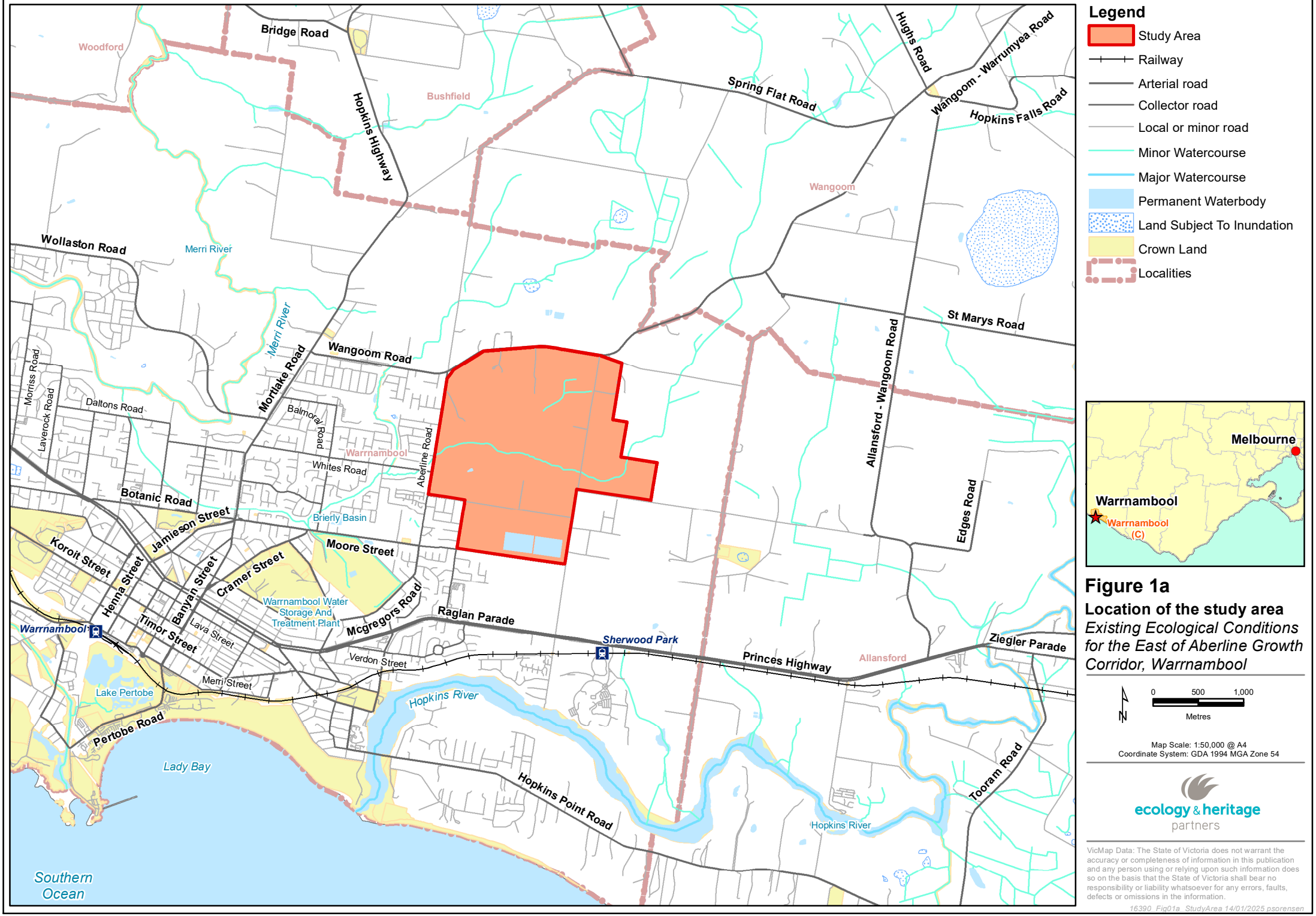

Figure 1a

Location of the study area

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Map Scale: 1:50,000 @ A4
Coordinate System: GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig01a_StudyArea 14/01/2025 psorensen

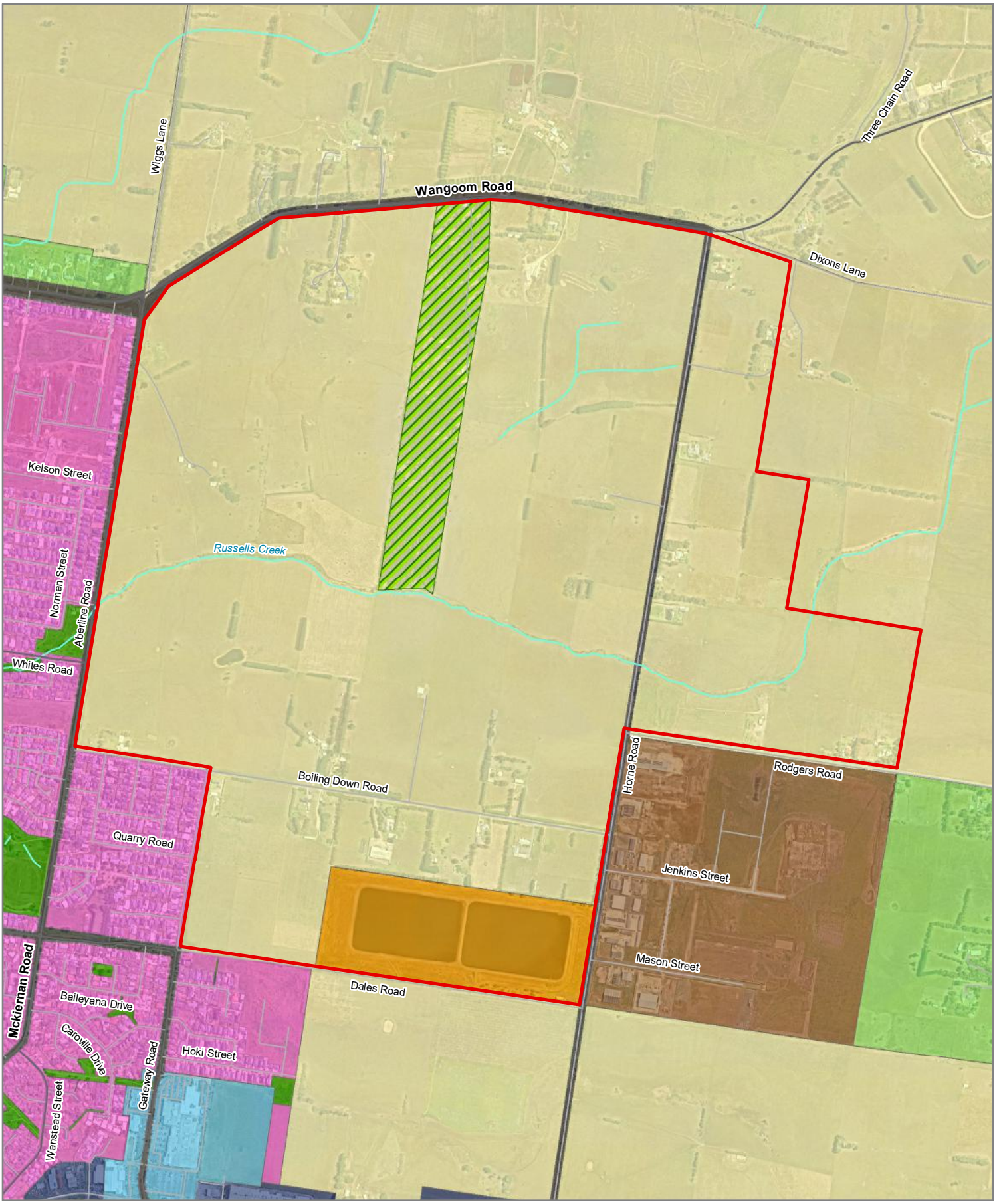

Figure 1b

Planning Zones

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

ecology & heritage partners

Legend

- Study Area
- Tozer Memorial Reserve

Planning Zone

- Commercial 1 Zone
- Commercial 2 Zone
- Farming Zone
- General Residential Zone - Schedule 1
- Industrial 3 Zone
- Public Park And Recreation Zone
- Public Use Zone - Service And Utility
- Rural Living Zone
- Transport Zone 3 - Significant Municipal Road

N

0 150 300

Metres

Map Scale: 1:15,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

Aerial source: Nearmap 2024

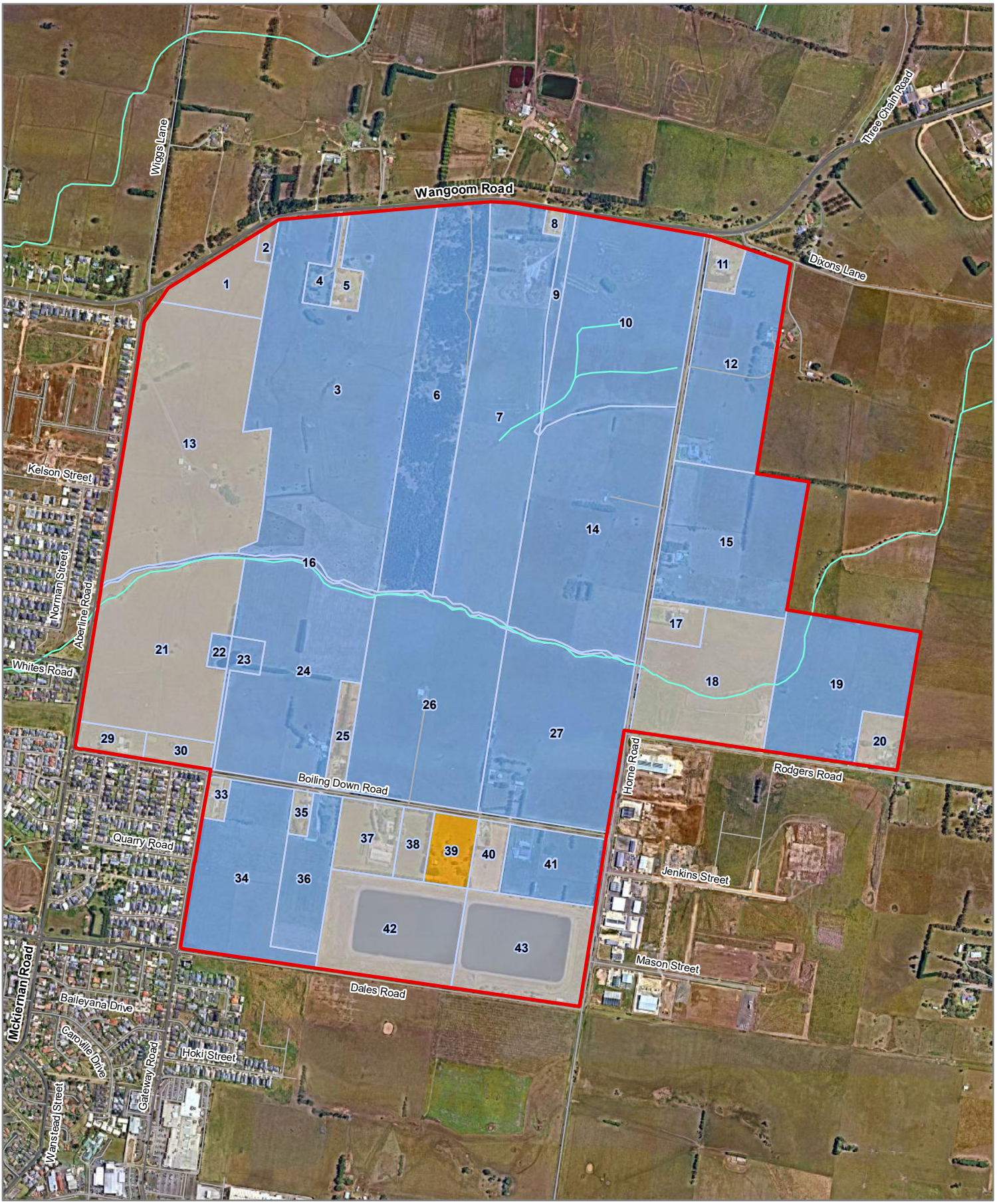

Figure 1c

Property assessment status

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

ecology & heritage partners

Legend

- Study Area
- Property with ID

Land access consent

- Consent given
- No consent given, assessed from adjoining property
- No consent given, could not be surveyed from adjoining property

N

0 150 300

Metres

Map Scale: 1:15,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

Aerial source: Nearmap 2024

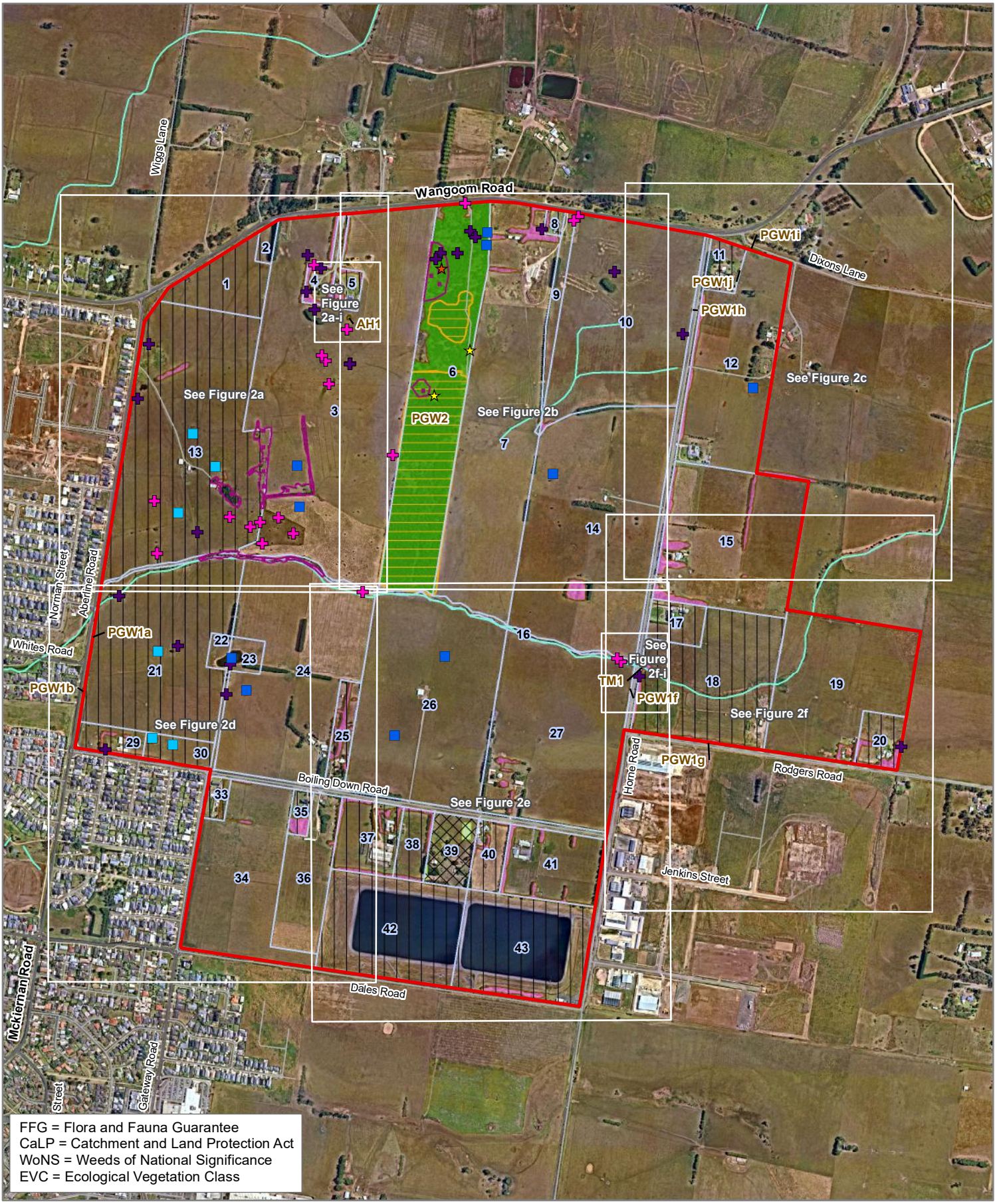

Figure 2 Overview

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- Not assessed
- CaLP listed weed
- WoNS
- FFG Act Listed Flora
- FFG Act Protected Flora
- Waterbody
- Unconfirmed Waterbody
- CaLP/WoNS weed patch
- Planted habitat (native and/or exotic)
- Tozer Reserve revegetation

Ecological Vegetation Classes

- Aquatic Herbland (AH) (EVC 653)
- Plains Grassy Woodland (PGW) (EVC 55)
- Tall Marsh (TM) (EVC 821)

Modelled Ecological Vegetation Class (DEECA 2005)

- Plains Grassy Woodland (PGW) (EVC 55)

N

0 150 300

Metres

Map Scale: 1:15,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_P_OV 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 2a

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- CaLP listed weed
- WoNS
- Waterbody
- Unconfirmed Waterbody
- CaLP/WoNS weed patch
- Potential roosting habitat
- Tozer Reserve revegetation

Planted habitat

- Mature exotic windrows
- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Plains Grassy Woodland (EVC 55)

N

0 50 100

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

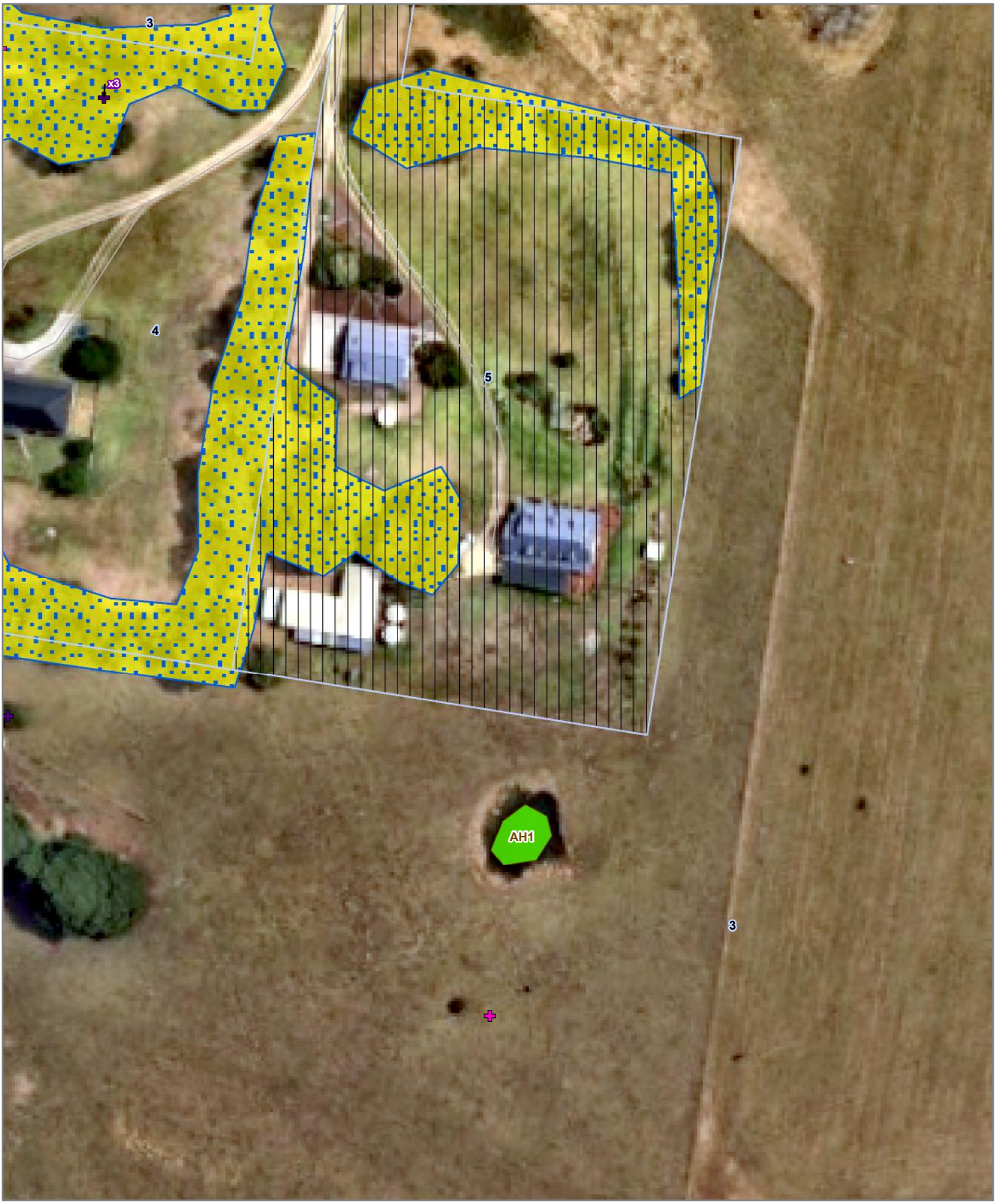

Figure 2a-i

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- CaLP listed weed
- WoNS

Planted habitat

- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)

N

0 10 20

Metres

Map Scale: 1:1,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

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Aerial source: Nearmap 2024

Figure 2b

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- CaLP listed weed
- WoNS
- FFG Act Listed Flora
- FFG Act Protected Flora
- Waterbody
- CaLP/WoNS weed patch
- Potential roosting habitat
- Tozer Reserve revegetation

Planted habitat

- Mature exotic windrows
- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Plains Grassy Woodland (EVC 55)

N

0 50 100

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

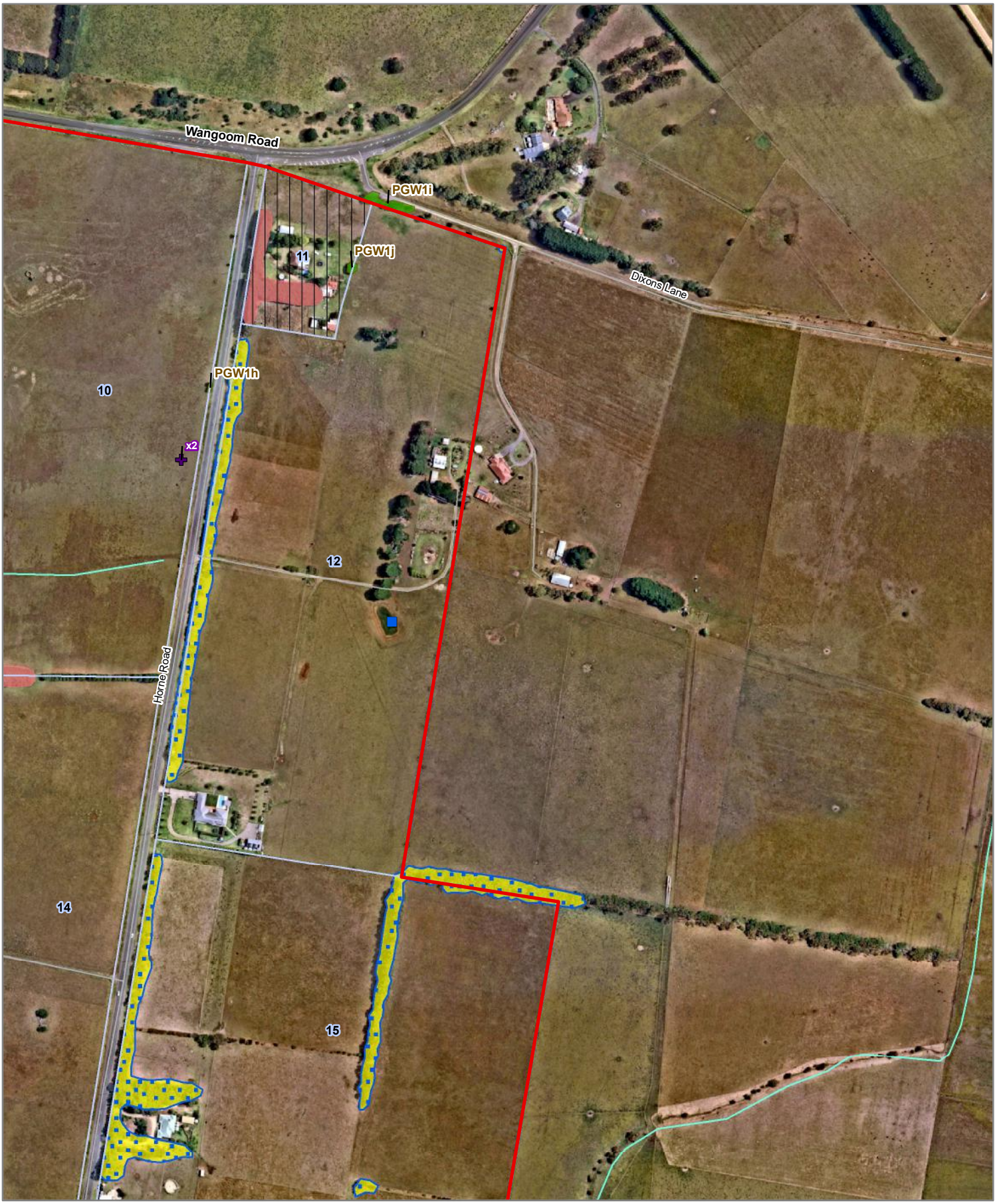


Figure 2c

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- WoNS
- Waterbody

Planted habitat

- Mature exotic windrows
- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Plains Grassy Woodland (EVC 55)

N

0 50 100

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 2d

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- CaLP listed weed
- WoNS
- Waterbody
- Unconfirmed Waterbody
- Potential roosting habitat

Planted habitat

- Mature exotic windrows
- Mixture of exotic and native
- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Plains Grassy Woodland (EVC 55)

N

0 50 100

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 2e

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

ecology & heritage partners

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- Not assessed
- CaLP listed weed
- WoNS
- Waterbody
- Potential roosting habitat
- Tozer Reserve revegetation

Planted habitat

- Mature exotic windrows
- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Plains Grassy Woodland (EVC 55)
- Tall Marsh (EVC 821)

Modelled Ecological Vegetation Class (DEECA 2005)

- Plains Grassy Woodland (EVC 55)

N

0 55 110

Metres

Map Scale: 1:5,500 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

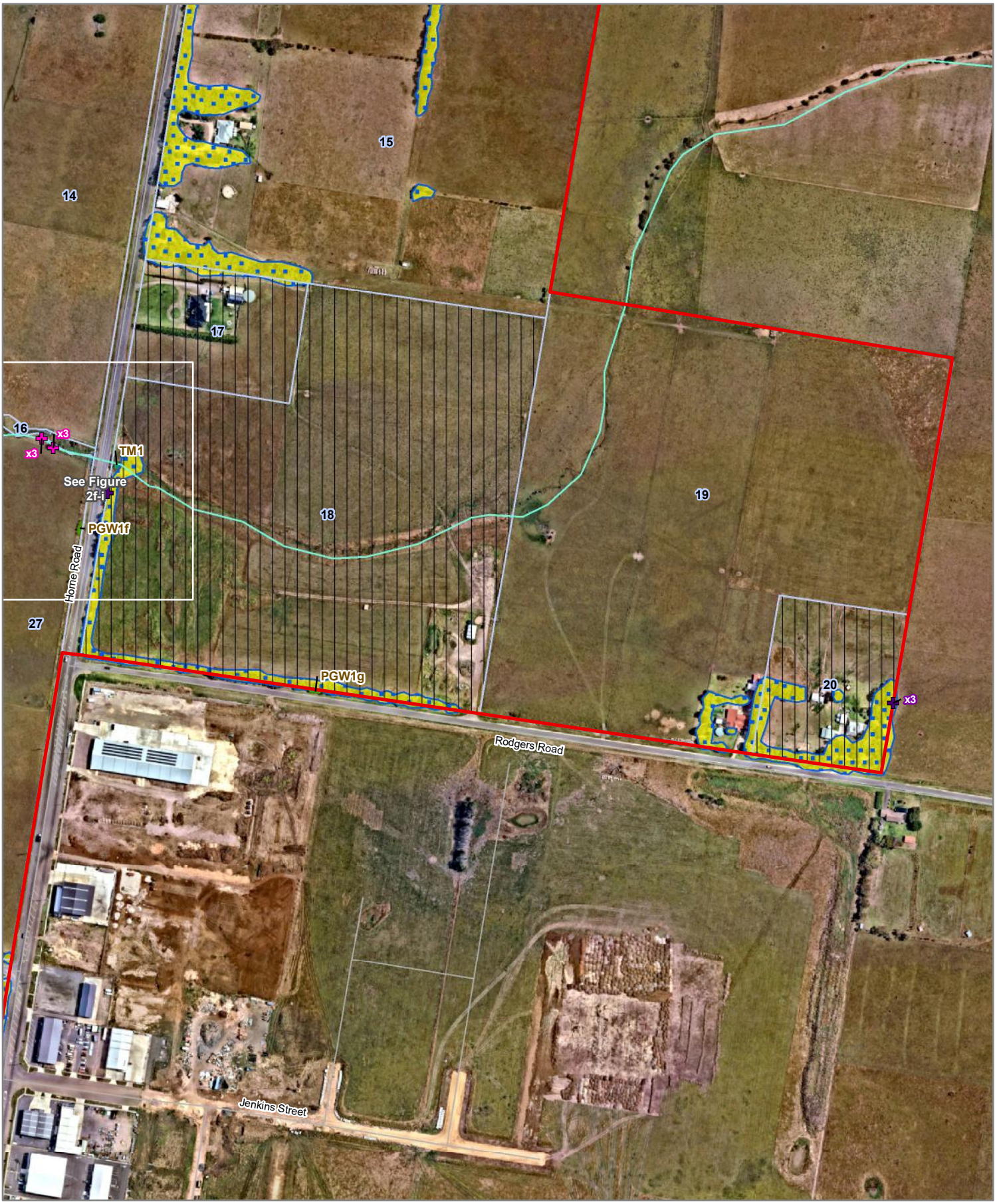


Figure 2f

Ecological features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- CaLP listed weed
- WoNS

Planted habitat

- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Plains Grassy Woodland (EVC 55)
- Tall Marsh (EVC 821)

N

0 50 100

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 2f-i
Ecological features
Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Property with ID
- Assessed from adjoining property/roadsides
- CaLP listed weed
- WoNS

Planted habitat

- Native
- Contains flowering Eucalypts

Ecological Vegetation Classes

- Plains Grassy Woodland (EVC 55)
- Tall Marsh (EVC 821)

N

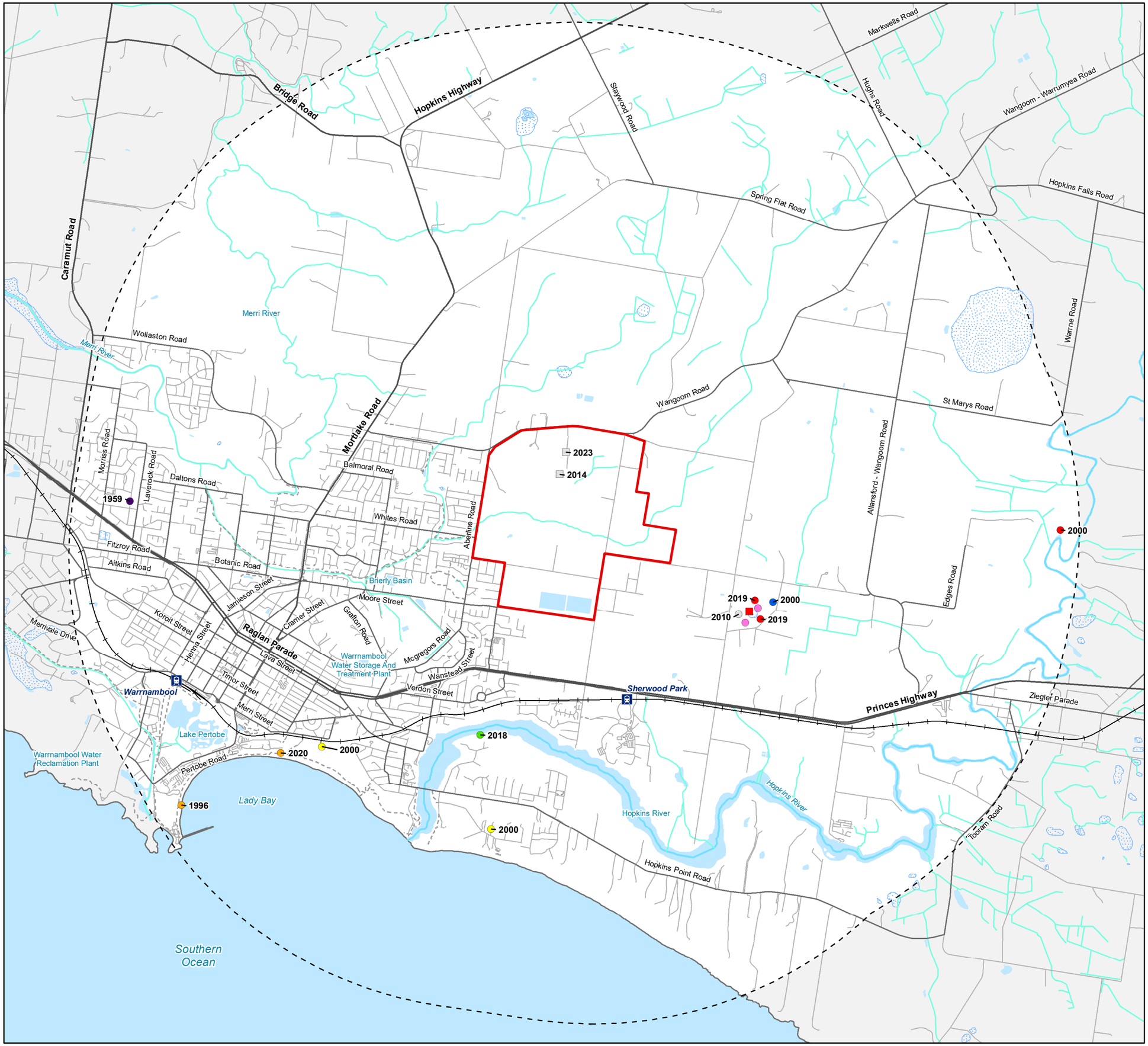
0 10 20
Metres

Map Scale: 1:1,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

16390_Fig02_EcoFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024



Legend

Study Area

Significant flora

- Annual Fireweed
- Basalt Leek-orchid
- Coast Fescue
- Coast Twin-leaf
- Giant Honey-myrtle
- Glaucous Flax-lily
- Pale Swamp Everlasting
- Short Spider-orchid
- Swamp Flax-lily
- Wavy Swamp Wallaby-grass

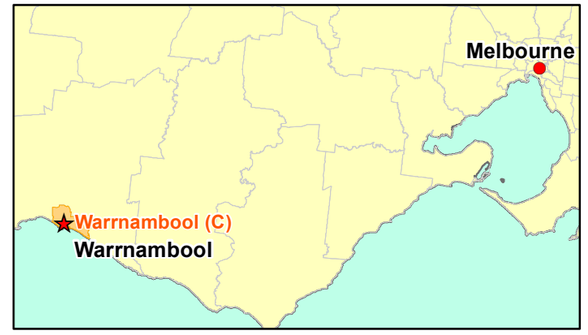


Figure 3

Previously documented significant flora within 5km of the study area

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

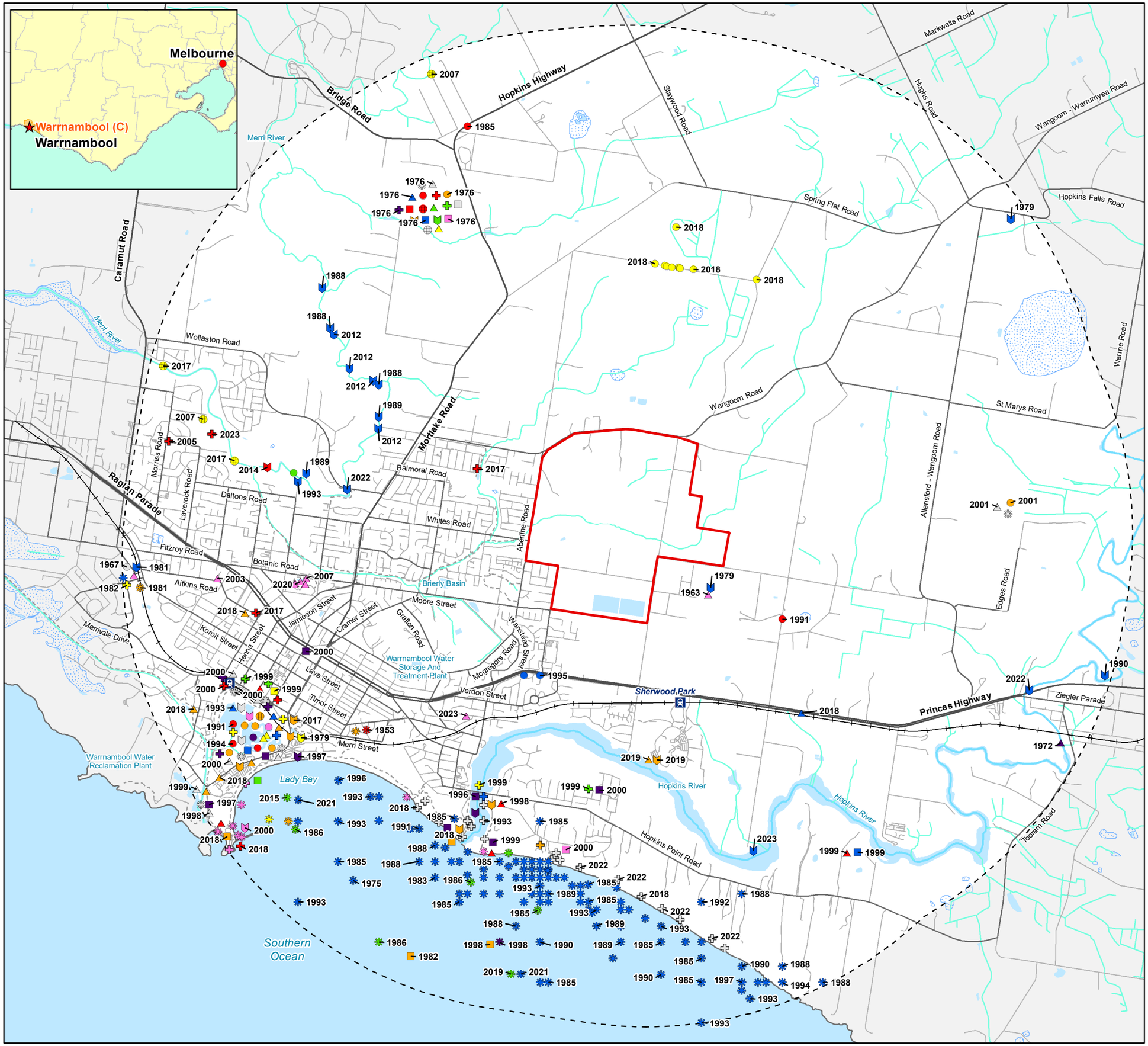
N

0 1 2

Kilometres

Map Scale: 1:45,000 @ A3
Coordinate System: GDA 1994 MGA Zone 54

ecology & heritage partners



Legend

Study Area

Significant fauna

- Southern Bent-winged Bat
- Australasian Bittern
- Australasian Shoveler
- Australian Bustard
- Australian Grayling
- Australian Little Bittern
- Australian Painted-snipe
- Bar-tailed Godwit
- Barking Owl
- Black Falcon
- Black-browed Albatross
- Black-tailed Godwit
- Blue Petrel
- Blue-billed Duck
- Blue-winged Parrot
- Caspian Tern
- Common Greenshank
- Common Sandpiper
- Eastern Great Egret
- Freckled Duck
- Gang-gang Cockatoo
- Grey Goshawk
- Grey-headed Flying-fox
- Growling Grass Frog
- Hooded Plover
- Latham's Snipe
- Leathery Turtle
- Lewin's Rail
- Little Eagle
- Little Egret
- Long-nosed Fur Seal
- Magpie Goose
- Marsh Sandpiper
- Murray Spiny Crayfish
- Musk Duck
- Orange-bellied Parrot
- Pacific Golden Plover
- Platypus
- Ruddy Turnstone
- Sea-lion
- Sharp-tailed Sandpiper
- Shy Albatross
- Southern Elephant Seal
- Southern Giant-Petrel
- Southern Humpback Whale
- Southern Right Whale
- Subantarctic Fur Seal
- Wandering Albatross
- Whimbrel
- White-throated Needletail
- Wood Sandpiper
- Yarra Pygmy Perch

Figure 4

Previously documented significant fauna within 5km of the study area

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

N

0 1 2

Kilometres

Map Scale: 1:45,000 @ A3
Coordinate System: GDA 1994 MGA Zone 54

ecology & heritage partners

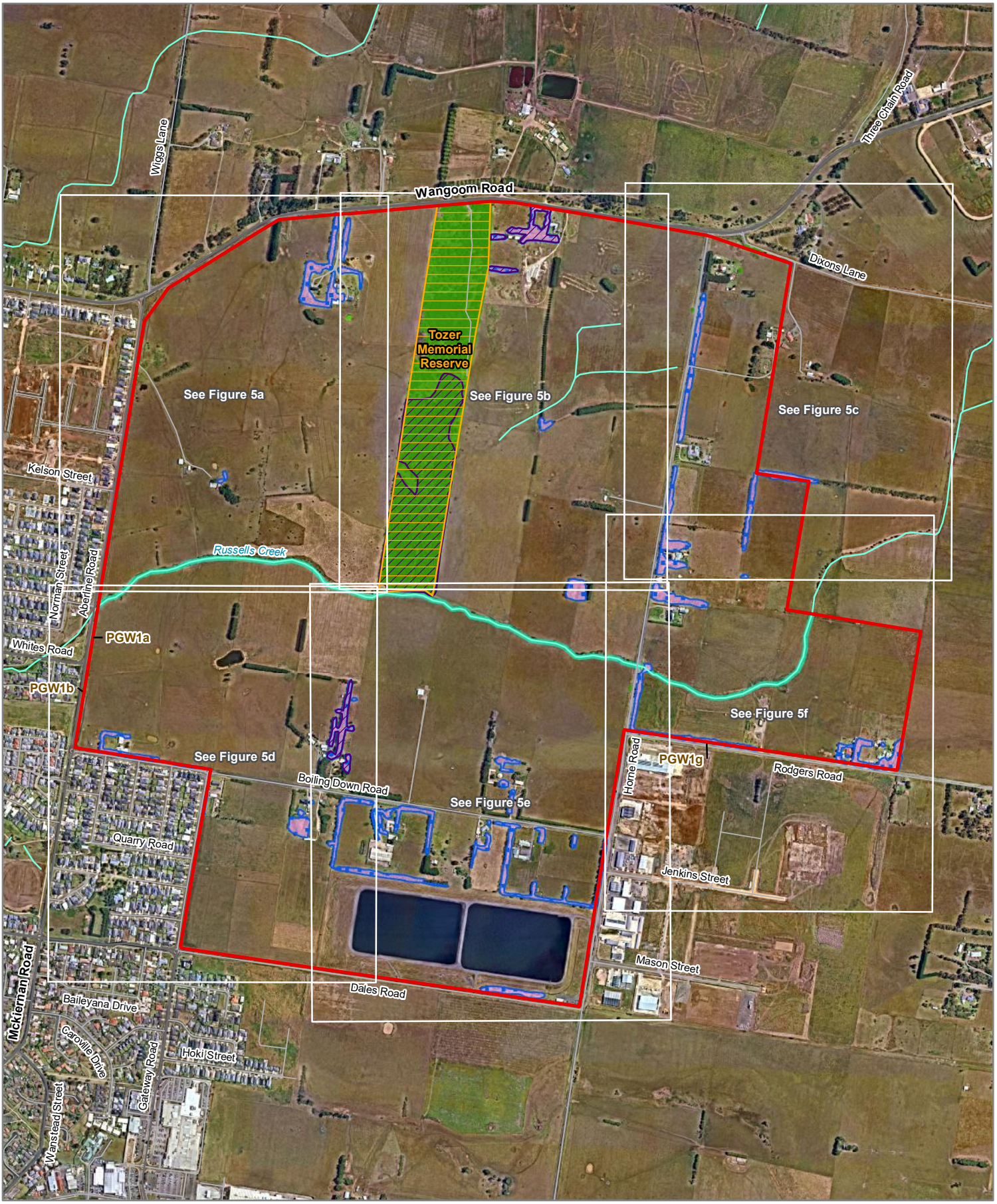


Figure 5 Overview

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

ecology & heritage partners

Legend

- Study Area
- Russells Creek (5m buffer)
- Tozer Memorial Reserve
- Planted native vegetation (PNV)
- Potential roosting habitat (PRH)
- Contains flowering Eucalypts (CFE)

Ecological Vegetation Classes

- Aquatic Herbland (AH) (EVC 653)
- Plains Grassy Woodland (PGW) (EVC 55)
- Tall Marsh (TM) (EVC 821)

N

0 130 260

Metres

Map Scale: 1:15,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 5a

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

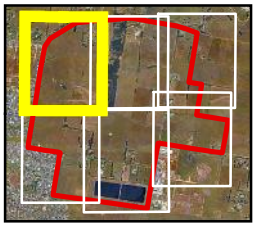
ecology & heritage partners

Legend

- Study Area
- Russells Creek (5m buffer)
- Tozer Memorial Reserve
- Planted native vegetation (PNV)
- Potential roosting habitat (PRH)
- Contains flowering Eucalypts (CFE)

Ecological Vegetation Classes

- Aquatic Herbland (AH) (EVC 653)
- Plains Grassy Woodland (PGW) (EVC 55)



N

0 45 90

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 5b

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

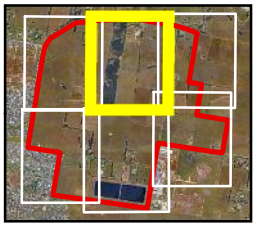
ecology & heritage partners

Legend

- Study Area
- Russells Creek (5m buffer)
- Tozer Memorial Reserve
- Planted native vegetation (PNV)
- Potential roosting habitat (PRH)
- Contains flowering Eucalypts (CFE)

Ecological Vegetation Classes

- Aquatic Herbland (AH) (EVC 653)
- Plains Grassy Woodland (PGW) (EVC 55)



N

0 45 90

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

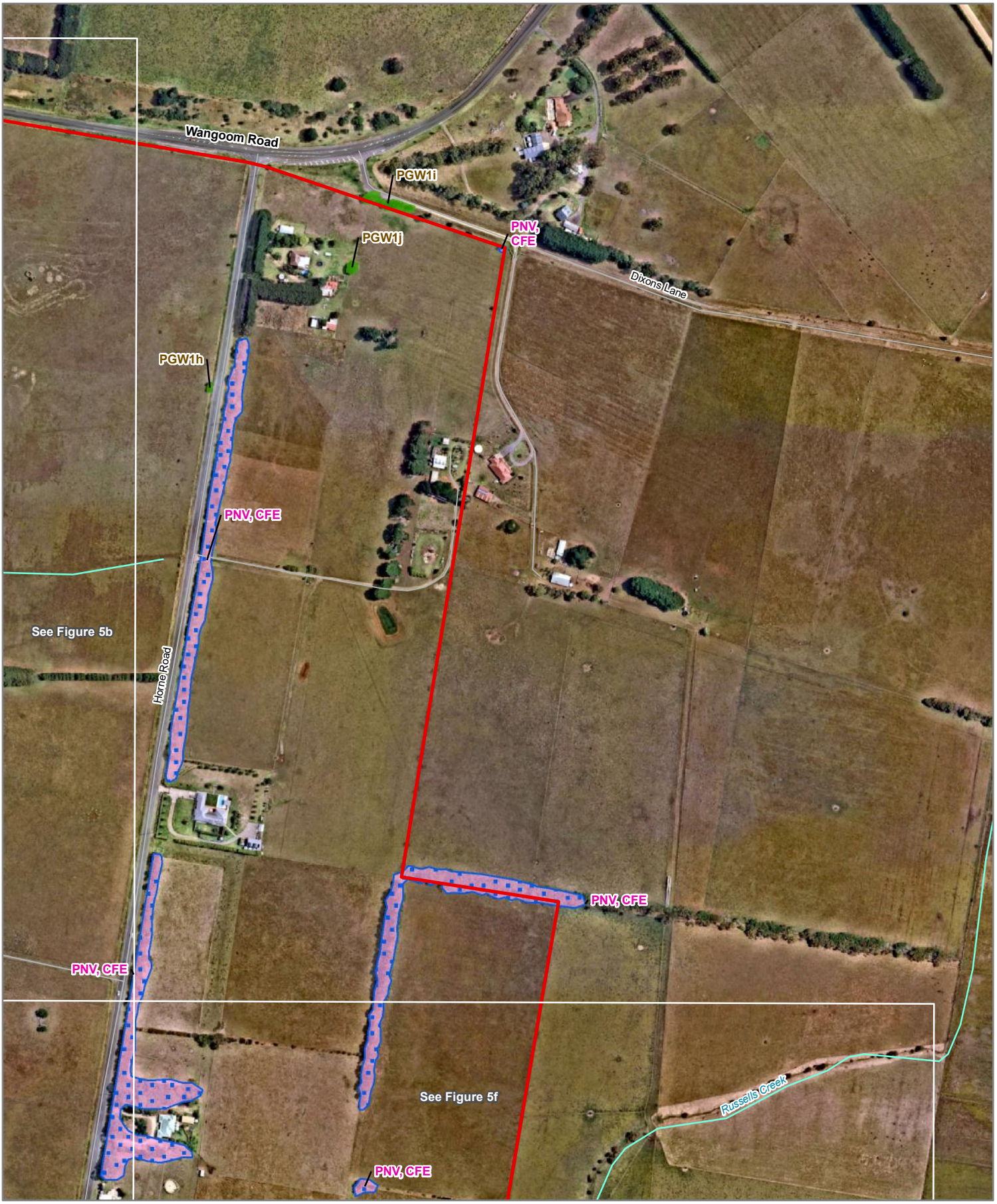


Figure 5c

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

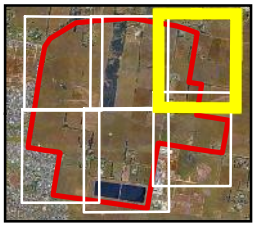
ecology & heritage partners

Legend

- Study Area
- Planted native vegetation (PNV)
- Contains flowering Eucalypts (CFE)

Ecological Vegetation Classes

- Plains Grassy Woodland (PGW) (EVC 55)



N

0 45 90

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

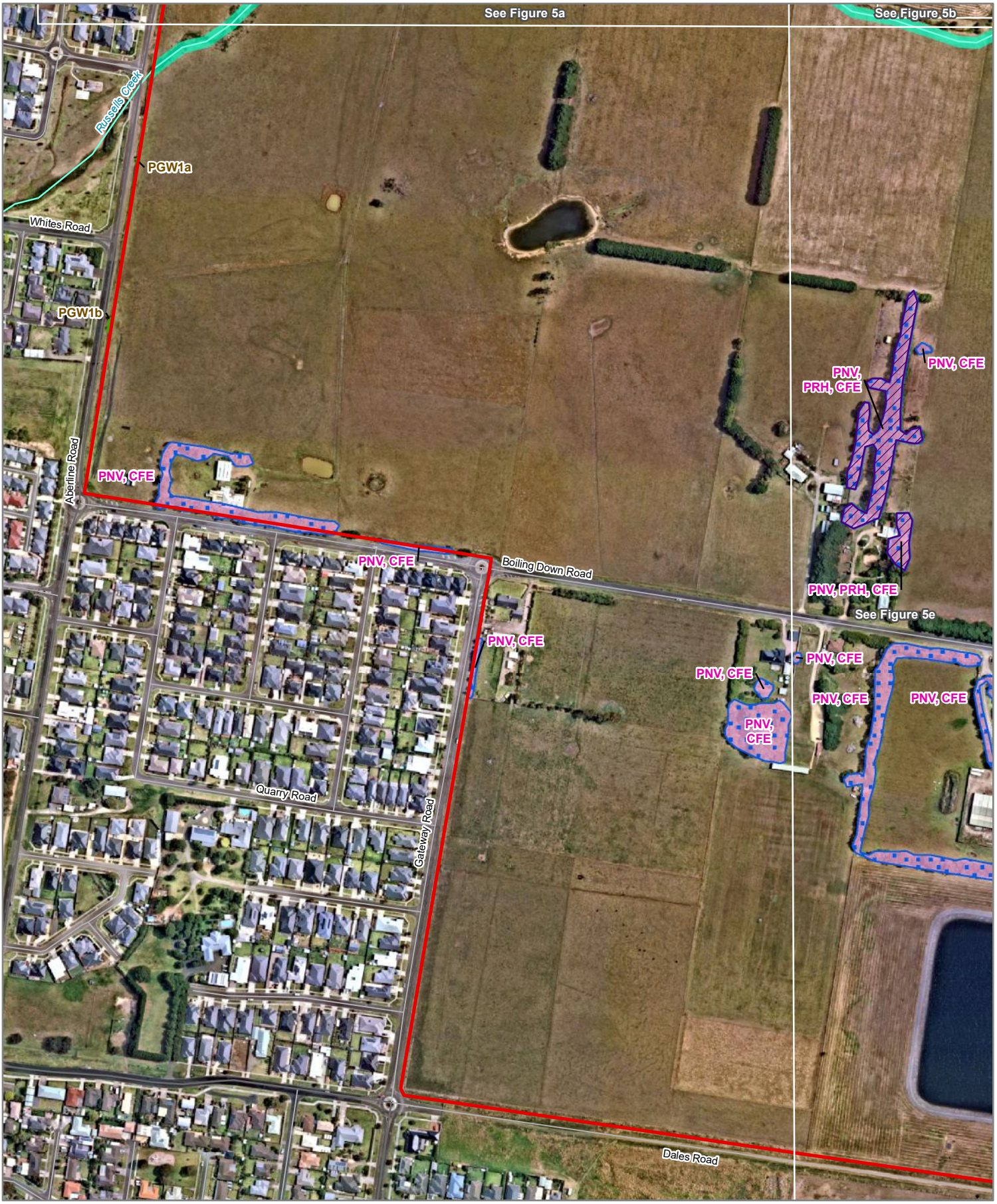


Figure 5d

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

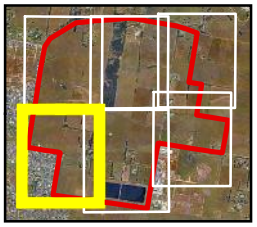
ecology & heritage partners

Legend

- Study Area
- Russells Creek (5m buffer)
- Tozer Memorial Reserve
- Planted native vegetation (PNV)
- Potential roosting habitat (PRH)
- Contains flowering Eucalypts (CFE)

Ecological Vegetation Classes

- Plains Grassy Woodland (PGW) (EVC 55)



N

0 45 90

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

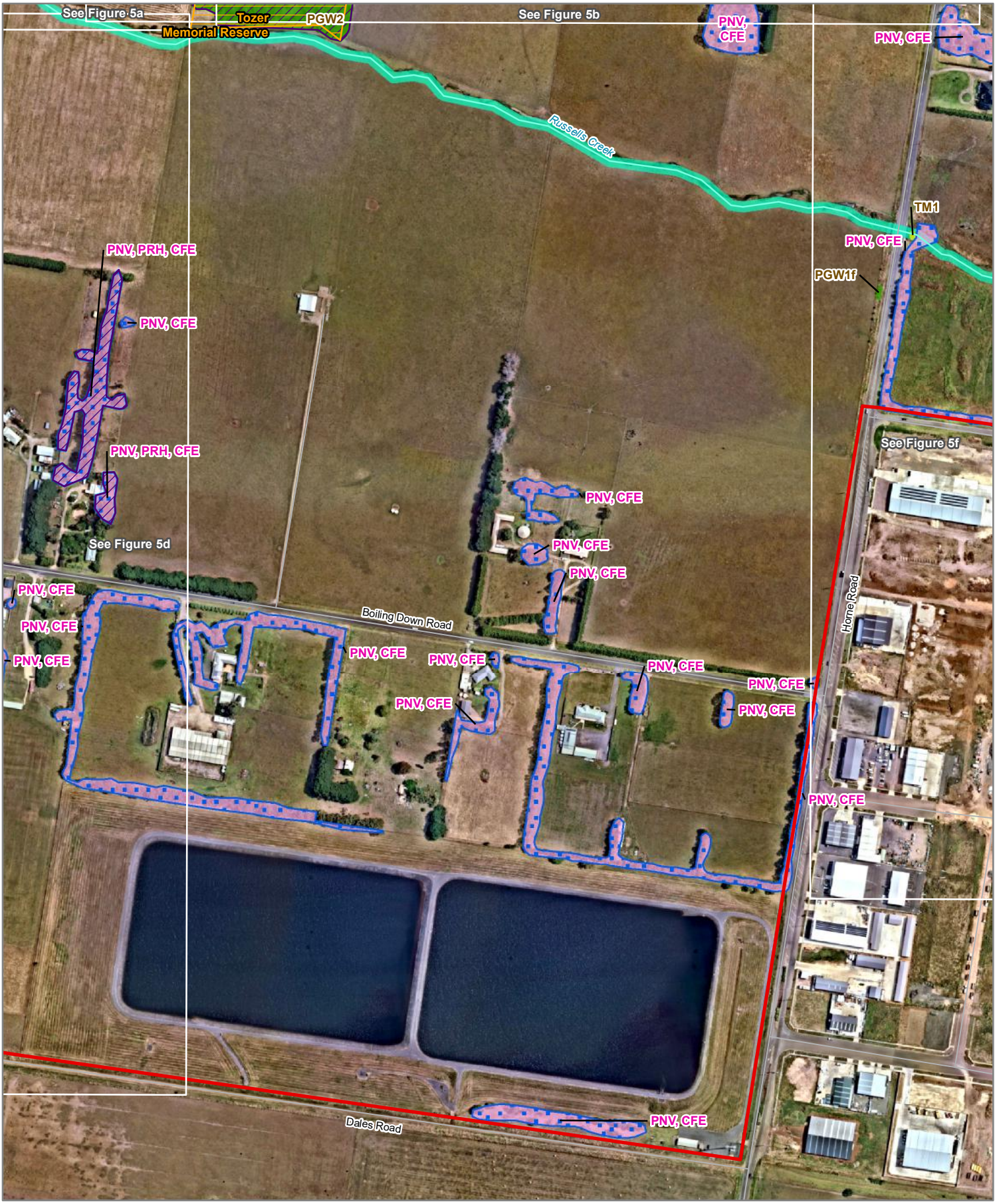


Figure 5e

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

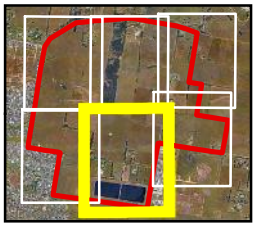
ecology & heritage partners

Legend

- Study Area
- Russells Creek (5m buffer)
- Tozer Memorial Reserve
- Planted native vegetation (PNV)
- Potential roosting habitat (PRH)
- Contains flowering Eucalypts (CFE)

Ecological Vegetation Classes

- Plains Grassy Woodland (PGW) (EVC 55)
- Tall Marsh (TM) (EVC 821)



N

0 50 100

Metres

Map Scale: 1:5,500 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

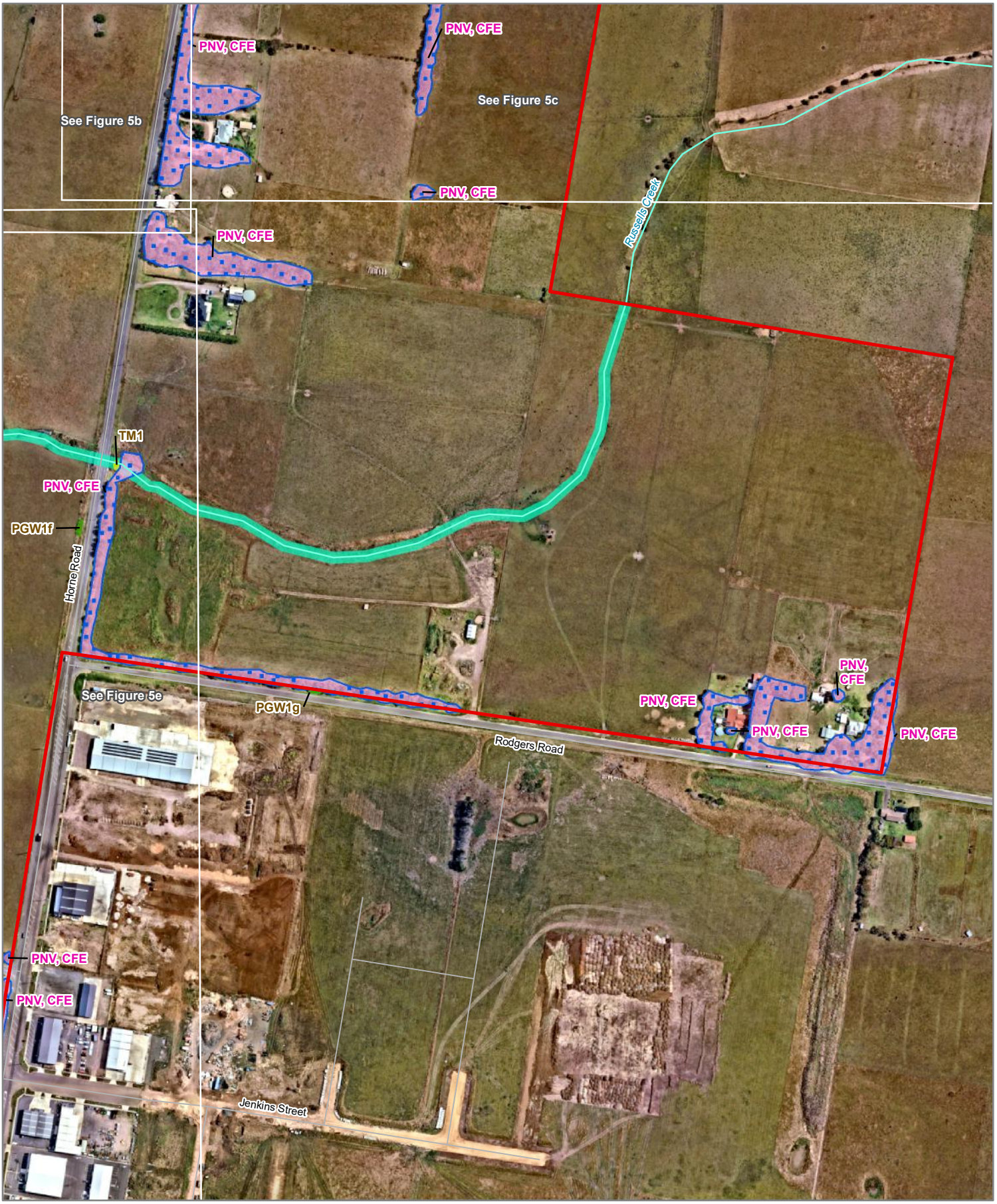


Figure 5f

Important habitat features

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

ecology & heritage partners

Legend

- Study Area
- Russells Creek (5m buffer)
- Planted native vegetation (PNV)
- Contains flowering Eucalypts (CFE)
- Tall Marsh (TM) (EVC 821)

Ecological Vegetation Classes

- Plains Grassy Woodland (PGW) (EVC 55)

N

0 45 90

Metres

Map Scale: 1:5,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig05_HabFeat_PMB 5/08/2025 dvaladares

Aerial source: Nearmap 2024

Figure 6

Potential habitat for threatened species

Existing Ecological Conditions for the East of Aberline Growth Corridor, Warrnambool

Legend

- Study Area
- Tozer Memorial Reserve

Potential habitat for threatened species

- Potential habitat for Southern Toadlet
- Potential habitat for Glossy Grass Skink
- Potential habitat for Swamp Skink
- Potential habitat for Growling Grass Frog

N

0 100 200

Metres

Map Scale: 1:13,500 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

16390_Fig06_ThrSpeciesHab_P 5/08/2025 dvaladares

ecology & heritage partners

Aerial source: Nearmap 2024

APPENDIX 1 FLORA

Appendix 1.1 Flora Results

Legend:

e Listed as Endangered under the FFG Act (DEECA 2024e)
P Listed as Protected under restricted use under the FFG Act (DEECA 2024f)
^ Naturally growing (i.e. non-planted) indigenous species to the study area
+ Naturally growing indigenous species that also occurs as planted indigenous vegetation to the study area
****** Planted indigenous species to the study area
# Planted Victorian (non-indigenous) and Australian species
***** Listed as a noxious weed under the CaLP Act
w Weed of National Significance

Table A1.1. Flora within the study area.

Scientific Name	Common Name	Notes
NATIVE SPECIES		
Acacia dealbata	Silver Wattle	#
Acacia implexa	Light Wood	**
Acacia longifolia subsp. *sophorae*	Coastal Wattle	^
Acacia mearnsii	Black Wattle	P
Acacia melanoxylon	Blackwood	^
Acacia paradoxa	Hedge Wattle	+
Acacia pycnantha	Golden Wattle	**
Acaena novae-zelandiae	Bidgee-widgee	^
Allocasuarina paludosa	Scrub Sheoak	**
Arthropodium strictum	Chocolate Lily	^
Austrostipa sp.	Spear Grass	^
Banksia marginata	Silver Banksia	**
Bulbine bulbosa	Bulbine Lily	^
Callistemon sieberi	River Bottlebrush	**
Carex appressa	Tall Sedge	^
Carex tereticaulis	Poong'ort	^
Casuarina obesa	Swamp Sheoak	**
Centella cordifolia	Swamp Pennywort	^
Ceratophyllum demersum	Hornwort	^
Chloris truncata	Windmill Grass	^

Scientific Name	Common Name	Notes
Dianella brevicaulis	Small-flower Flax-lily	^
Dianella callicarpa	Swamp Flax-lily	^e
Dichondra repens	Kidney-weed	^
Eleocharis acuta	Spike sedge	^
Eucalyptus camaldulensis	River Red-gum	+
Eucalyptus obliqua	Messmate	+
Eucalyptus ovata	Swamp Gum	+
Eucalyptus sideroxylon	Ironbark	**
Eucalyptus viminalis	Manna Gum	+
Exocarpos cupressiformis	Cherry Ballart	**
Ficinia nodosa	Knobby Club-sedge	^
Goodenia ovata	Hop Goodenia	**
Hypericum sp.	St. John's Wort	^
Isolepis sp.	Isolepis	^
Lachnagrostis filiformis	Pacific bent grass	^
Lepidosperma laterale	Variable Sword-sedge	**
Leptospermum continentale	Prickly Tea-tree	**
Leptospermum laevigatum	Coast Tea-tree	**
Lomandra filiformis	Wattle Mat-rush	**
Lomandra longifolia	Spiny-headed Mat-rush	**
Juncus spp.	Rush	^
Juncus pallidus	Pale Rush	^
Juncus procerus	Tall Rush	^
Lemna dispersa	Common Duckweed	^
Lythrum sp.	Lythrum	^
Melaleuca lanceolata	Moonah	**
Melaleuca squarossa	Scented Paperbark	**
Ozothamnus ferrugineus	Tree Everlasting	^
Poa labillardierei	Common Tussock Grass	**
Pomaderris aspera	Hazel Pomaderris	**
Ranunculus sp.	Buttercup	^
Rhagodia candolleana	Sea-berry Saltbush	**
Themeda triandra	Kangaroo Grass	**
Typha sp.	Cumbungi	^

Scientific Name	Common Name	Notes
NON-NATIVE OR INTRODUCED SPECIES		
Acacia baileyana	Cootamundra Wattle	#
Acacia longifolia subsp. *sophorae*	Coast Wattle	#
Agapanthus sp.	Lily of the Nile	-
Asparagus asparagoides	Bridal Creeper	*w
Avena fatua	Wild oat	-
Brassica spp.	Turnip	-
Bromus catharticus	Prairie Grass	-
Bromus diandrus	Great Brome	-
Cenchrus clandestinus	Kikuyu	-
Cerastium vulgare	Common Mouse-ear Chickweed	-
Cirsium vulgare	Spear Thistle	*
Coprosma repens	Mirror Bush	-
Corymbia ficifolia	Pink Flowering Gum	-
Corymbia maculata	Spotted Gum	#
Crataegus monogyna	Hawthorn	*
Cytisus scoparius	English Broom	*w
Dactylis glomerata	Cocksfoot	-
Dimorphotheca sp.	Daisy	-
Dipsacus fullonum	Wild Teasel	*
Ehrhata erecta	Panic Veldtgrass	-
Eucalyptus cinerea	Argyle apple	#
Eucalyptus cladocalyx	Sugar Gum	#
Eucalyptus globulus	Southern Blue-gum	#
Eucalyptus platypus	Moort	#
Foeniculum vulgare	Fennel	*
Fraxinus augustifolia	Ash	-
Ulex europaeus	Gorse	*w
Hedera helix	English Ivy	-
Holcus lanatus	Yorkshire Fog	-
Lactuca serriola	Prickly Lettuce	-
Lycium ferocissimum	African Boxthorn	*w
Malva parviflora	Small-flower Mallow	-
Melaleuca nesophila	Showy Honey-myrtle	#
Paspalum dilatatum	Paspalum	-

Scientific Name	Common Name	Notes
Paspalum distichum	Water couch	-
Phalaris aquatica	Toowoomba Canary-grass	-
Pinus radiata	Radiata Pine	-
Pittosporum undulatum	Sweet Pittosporum	-
Plantago lanceolata	Ribwort	-
Plume albizia	Cape Wattle	-
Prunus sp.	Plum	-
Quercus canariensis	Algerian Oak	-
Romulea rosea	Onion grass	-
Rosa rubiginosa	Sweet briar	*
Rubus fruticosus spp. agg.	Blackberry	*W
Sonchus oleraceus	Common Sow-thistle	-
Taraxacum officinale spp. agg.	Garden Dandelion	-
Valerian sp.	Valerian	-
Vicia sativa	Vetch	-

Appendix 1.2 Habitat Hectare Assessment

Table A1.2. Habitat Hectare Assessment Table.

Vegetation Zone		PGW1 (Various Shrub patches)	PGW2 (Tozer Reserve)	TM1	AH1
Bioregion		VVP	VVP	VVP	VVP
EVC		Hr-PGW	Hr-PGW	TM	AH
EVC Number		55_63	55_63	821	653
EVC Conservation Status		Endangered	Endangered	Depleted	Endangered
Site Condition /75	Large Trees /10	0	0	NA	NA
	Tree Canopy Cover /5	0	5	NA	NA
	Lack of Weeds /15	0	9	7	0
	Understorey /25	5	15	5	5
	Recruitment /10	0	5	3	3
	Organic Matter /5	0	5	0	0
	Logs /5	0	0	NA	NA
	Treeless EVC Multiplier	1.00	1.00	1.36	1.36
	Subtotal =	5.00	39.00	20.40	10.88
Landscape Context /25	Patch Size /10	1	6	1	1
	Neighbourhood /10	0	1	0	0
	Distance to Core Area /5	0	0	0	0
	Subtotal =	1	7	1	1
Habitat Points /100		6	46	12	21
Habitat Score		**0.06**	**0.46**	**0.12**	**0.21**

Note: PGW = Plains Grassy Woodland, VVP = Victorian Volcanic Plain, TM = Tall Marsh, AH = Aquatic Herbland, Hr-PGW = High Rainfall Plains Grassy Woodland.

Appendix 1.3 Significant Flora Species

Significant flora within 10 kilometres of the study area is provided in the Table A1.3.3 at the end of this section, with Tables A1.3.1 and A1.3.2 below providing the background context for the values in Table 1.3.3.

Table A1.3.1 Conservation status of each species for each Act. The values in this table correspond to Columns 5 and 6 in Table A1.3.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):		FFG (*Flora and Fauna Guarantee Act 1988*):	
EX	Extinct	ex	Extinct
CR	Critically endangered	cr	Critically endangered
EN	Endangered	en	Endangered
VU	Vulnerable	vu	Vulnerable
#	Listed on the Protected Matters Search Tool		

Table A1.3.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 7 in Table A1.3.3.

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 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.

Table A1.3.3 Significant flora recorded within 10 kilometres of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE							
Amphibromus fluitans #	River Swamp Wallaby-grass	-	-	VU	en	4	Generally found in permanent swamps. Low likelihood due to lack of records and the highly isolated and disturbed nature of permanent waterbodies within the study area (i.e. farm dams).
Dianella amoena #	Matted Flax-lily	-	-	EN	cr	4	No suitable habitat. On the edge of species distribution, and prefers drier grassland and grassy woodland communities.
Glycine latrobeana #	Clover Glycine	-	-	VU	vu	4	Poor quality habitat, generally limited to remnant Plains Grassy Woodland vegetation within the northern portion of Tozers Reserve. Previous agricultural land use and lack of species records suggests a low likelihood of occurrence.
Lepidium aschersonii #	Spiny Peppercress	-	-	VU	en	5	No suitable habitat. Species generally occurs on heavy clay soils near salt-lakes within the Victorian Volcanic Plain.
Lepidium hyssopifolium	Basalt Pepper-cress	2	1872	EN	en	4	Poor quality habitat, generally limited to remnant Plains Grassy Woodland vegetation within the northern portion of Tozers Reserve. Previous agricultural land use and lack of recent species records result in a low likelihood of occurrence.
Prasophyllum spicatum #	Dense Leek-orchid	-	-	VU	cr	5	No suitable habitat. Species prefers coastal heath and sandhills.
Prasophyllum suaveolens #	Fragrant Leek-orchid	-	-	EN	cr	4	Poor quality habitat, generally limited to remnant Plains Grassy Woodland vegetation within the northern portion of Tozers Reserve. Previous agricultural land

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
							use and lack of species records result in a low likelihood of occurrence.
Pterostylis chlorogramma #	Green-striped Greenhood	-	-	VU	en	5	No suitable habitat. Species utilises moist areas of heathy and shrubby forests on well-drained soils.
Pterostylis cucullata #	Leafy Greenhood	-	-	VU	en	5	No suitable habitat. Species typically occurs in coastal areas but can occasionally occur within inland watercourses. The Russells Creek watercourse is highly degraded comprising no suitable habitat.
Pterostylis tenuissima #	Swamp Greenhood	-	-	VU	-	5	No suitable habitat. Species utilises black peaty mud and co-occurs with Woolly Tea-tree.
Senecio macrocarpus #	Large-fruit Fireweed	-	-	VU	cr	5	No suitable habitat. Species typically prefers remnant grasslands comprising a dominant cover of Kangaroo grass.
Senecio psilocarpus #	Swamp Fireweed	-	-	VU	-	4	Poor quality habitat, limited to one isolated patch of Aquatic Herbland within the study area's north. Lack of previous records. Typically occurs in silty clay soils in high quality herb-rich wetlands with a high cover of grasses and sedges.
Thelymitra epipactoides #	Metallic Sun-orchid	-	-	EN	en	5	No suitable habitat. Species prefers coastal heathland, woodland, grassland, in moist or dry sandy soils.
Thelymitra matthewsii #	Spiral Sun-orchid	-	-	VU	en	5	No suitable habitat. Species prefers well-drained soil in coastal sandy flats or open forest.
Thelymitra orientalis #	Hoary Sun-orchid	-	-	CR	cr	5	No suitable habitat. Species occurrence is rare and limited to damp heathy flats and seepage areas in peaty white sands.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Xerochrysum palustre #	Swamp Everlasting	-	-	VU	cr	5	No suitable habitat. No preferred lowland swamp habitat or black cracking clay soils. Further, no local records.
STATE SIGNIFICANCE							
Adriana quadripartita	Coast Bitter-bush	2	1940	-	en	5	No suitable habitat or recent records. Species relies on sandy coastal soil in open or disturbed coastal areas (i.e. dunes and open woodlands).
Amphibromus sinuatus	Wavy Swamp Wallaby-grass	1	2010	-	en	5	No suitable habitat. Species confined to permanent swamps.
Coronidium gunnianum	Pale Swamp Everlasting	3	2014	-	cr	4	Unlikely due to historical an on-going agricultural disturbance. Species confined to moist heavy soils in riverine woodlands and swamps.
Dianella callicarpa	Swamp Flax-lily	6	2023	-	en	1	Species identified within the northern portion of Tozers Reserve. large population likely presnet.
Dianella longifolia var. *grandis* s.l.	Glaucous Flax-lily	1	2000	-	cr	4	Species considered to have a low likelihood of occurrence within the Tozers Reserve. The species is not expected to occur outside of the Tozers Reserve due to the historical and on-going agricultural land use and general lack of species records (one record greater than 20 years old).
Diuris behrii	Golden Cowslips	-	-	-	en	3	Species recorded within Tozers Reserve during 2013/14 (Landtech Consulting 2014a).

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Exocarpos syrticola	Coast Ballart	1	2008	-	en	5	No suitable habitat. Species confined to coastal dunes and cliffs.
Lachnagrostis robusta	Salt Blown-grass	1	1997	-	en	5	No suitable habitat. Species occurs in salt lakes and saline depressions).
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle	1	2018	-	en	4	Outside natural distribution. None observed. Any specimens most likely planted as species is commonly planted.
Poa billardierei	Coast Fescue	8	2020	-	en	5	No suitable habitat. Species confined to coastal dunes and cliffs.
Prasophyllum viretrum	Basalt Leek-orchid	4	2019	-	cr	4	Two records of the species exist within 5 kilometres of the study area, from 2019, near a wetland. In Victoria, species only known from five populations, typically in moist to wet grassland on dark basaltic loam. Limited suitable habitat present within Tozers Reserve.
Pultenaea canaliculata	Coast Bush-pea	7	1904	-	en	5	No suitable habitat or recent records. Species confined to dunes and limestone cliffs in coastal areas.
Roepera billardierei	Coast Twin-leaf	2	2000	-	en	5	No suitable habitat. Species confined to dunes and limestone cliffs in coastal areas.
Scaevola calendulacea	Dune Fan-flower	1	1895	-	en	5	No suitable habitat or recent records. Species confined to dunes in coastal areas.
Senecio glomeratus subsp. *longifructus*	Annual Fireweed	1	2010	-	vu	3	Recorded close to study area (approximately 850 metres southeast). Potential habitat exists with Tozers Reserve.

Data Sources: Victorian Biodiversity Atlas (DEECA 2025d); Protected Matters Search Tool (DCCEEW 2025).

APPENDIX 2 FAUNA

Appendix 2.1 Significant Fauna Species

Significant fauna within 10 kilometres of the study area is provided in the Table A2.1.3 at the end of this section, with Tables A2.1.1 and A2.1.2 below providing the background context for the values in Table 2.1.3.

Table A2.1.1 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 8 in Table A2.1.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):				FFG (*Flora and Fauna Guarantee Act 1988*):			
EX	Extinct	VU	Vulnerable	ex	Extinct	vu	Vulnerable
CR	Critically endangered	CD	Conservation Dependent	cr	Critically endangered	cd	Conservation Dependent
EN	Endangered	#	Listed on the Protected Matter Search Tool	en	Endangered		

Table A2.1.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 9 in Table A2.1.3.

1	Known Occurrence	• Recorded within the project area recently (i.e. within 10 years).
2	High Likelihood	• Likely 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 2018); and/or, • The study area contains the species' preferred habitat.
3	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 (DEECA 2025d); and/or, • The study area contains some characteristics of the species' preferred habitat.
4	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.

5	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.

Table A2.1.3 Significant fauna recorded within 10 kilometres of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE							
Antechinus minimus maritimus #	Swamp Antechinus (mainland)	-	-	VU	vu	5	No suitable habitat. Species prefers wet heath, healthy woodland, sedgeland and dense tussock grasslands
Arctophoca tropicalis	Subantarctic Fur Seal	8	2018	EN	-	5	No marine habitat within study area.
Ardenna grisea	Sooty Shearwater	2	1978	VU	-	5	No suitable habitat.
Arenaria interpres	Ruddy Turnstone	30	2019	VU	en	5	No suitable habitat.
Balaenoptera musculus	Blue Whale	5	2011	EN	en	5	No marine habitat within study area.
Botaurus poiciloptilus	Australasian Bittern	10	2019	EN	cr	5	No suitable habitat.
Calidris acuminata	Sharp-tailed Sandpiper	42	2006	VU	-	5	No suitable habitat.
Calidris canutus	Red Knot	2	1978	VU	en	5	No suitable habitat.
Calidris ferruginea	Curlew Sandpiper	14	1992	CR	cr	5	No suitable habitat.
Calidris tenuirostris	Great Knot	1	1977	VU	cr	5	No suitable habitat.
Callocephalon fimbriatum	Gang-gang Cockatoo	2	2000	EN	en	4	Limited poor quality foraging habitat exists within the Tozers Reserve within the study areas north. Species may opportunistically visit Tozers Reserve when moving to other areas of high-quality habitat. No recent records.
Carcharodon carcharias #	Great White Shark	-	-	VU	en	5	No marine habitat within study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Caretta caretta #	Loggerhead Turtle	-	-	EN	-	5	No marine habitat within study area.
Charadrius leschenaultii #	Greater Sand Plover	-	-	VU	vu	5	No suitable habitat.
Charadrius mongolus #	Lesser Sand Plover	-	-	EN	en	5	No suitable habitat.
Chelonia mydas #	Green Turtle	-	-	VU	-	5	No Marine habitat within study area.
Climacteris picumnus victoriae #	Brown Treecreeper (south-eastern)	-	-	VU	-	4	Limited poor quality foraging habitat exists within the Tozers Reserve within the study areas north. Species may opportunistically visit Tozers Reserve when moving to other areas of high-quality habitat. No species recorded within 10 kilometres.
Dasyurus maculatus maculatus (SE mainland population) #	Spot-tailed Quoll	-	-	EN	en	4	Limited poor quality habitat within the Tozers Reserve within the study areas north. No species recorded within 10 kilometres.
Dasyurus viverrinus	Eastern Quoll	1	1900	EN	en	4	Limited poor quality habitat within Tozers Reserve within the study areas north. Only one historic record within 10 kilometres.
Delma impar #	Striped Legless Lizard	-	-	VU	en	5	No suitable habitat. Native grasses were limited to Tozers Reserve, were of low cover and abundance when present and were in highly shaded areas.
Dermochelys coriacea	Leathery Turtle	1	2004	EN	cr	5	No marine habitat within study area.
Diomedea antipodensis #	Antipodean Albatross	-	-	VU	-	5	No suitable habitat.
Diomedea epomophora #	Southern Royal Albatross	-	-	VU	cr	5	No suitable habitat.
Diomedea exulans	Wandering Albatross	2	1998	VU	cr	5	No suitable habitat.
Diomedea sanfordi #	Northern Royal Albatross	-	-	EN	-	5	No suitable habitat.
Eubalaena australis	Southern Right Whale	2412	2021	EN	en	5	No Marine habitat within study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Falco hypoleucos #	Grey Falcon	-	-	VU	vu	5	No suitable habitat (usually restricted to arid and semi-arid regions) and no previous records.
Galeorhinus galeus #	School Shark	-	-	CD	-	5	No Marine habitat within study area.
Gallinago hardwickii	Latham's Snipe	38	2018	VU	-	5	No suitable habitat.
Grantiella picta #	Painted Honeyeater	-	-	VU	vu	4	Limited poor quality habitat within the Tozers Reserve within the study areas north. No species recorded within 10 kilometres.
Halobaena caerulea	Blue Petrel	1	1990	VU	-	5	No suitable habitat.
Hirundapus caudacutus	White-throated Needletail	2	1986	VU	vu	4	Species is migratory and mostly aerial. May opportunistically fly over the study area. Species typically roosts in tree hollows, but seldom comes to ground. No hollows were identified within the study area.
Isoodon obesulus obesulus #	Southern Brown Bandicoot (eastern)	-	-	EN	en	5	No suitable habitat. No previous records.
Lathamus discolor #	Swift Parrot	-	-	CR	cr	4	Species may occasionally utilise the study area opportunistically for foraging during migration from Tasmania to north-east Victoria.
Limosa lapponica	Bar-tailed Godwit	9	1999	EN	vu	5	No suitable habitat.
Limosa lapponica baueri #	Nunivak Bar-tailed Godwit	-	-	EN	-	5	No suitable habitat.
Limosa limosa	Black-tailed Godwit	1	1999	EN	cr	5	No suitable habitat.
Lissolepis coventryi	Swamp Skink	5	2018	EN	en	3	Species was recorded within Tozers Reserve in 2013/14 (Landtech Consulting 2014b). The species may utilise seasonally damp areas within Tozers Reserve.
Litoria raniformis major	Growling Grass Frog	12	1972	VU	vu	3	Two adult males were recorded within Tozers Reserve in 2014 (Landtech

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
							Consulting 2014b). While no wetlands were recorded at the time of assessment, the species may utilise seasonally damp areas within Tozers Reserve, Russells Creek and nearby farm dams as a dispersal corridor.
Macronectes giganteus	Southern Giant-Petrel	4	1987	EN	en	5	No suitable habitat.
Macronectes halli #	Northern Giant Petrel	-	-	VU	en	5	No suitable habitat.
Melanodryas cucullata cucullata #	South-eastern Hooded Robin	-	-	EN	vu	4	Poor quality foraging habitat within Tozers Reserve, and no previous records. Species may visit the study area opportunistically when moving to areas of higher quality habitat.
Miniopterus orianae bassanii	Southern Bent-wing Bat	52	2021	CR	cr	4	Low quality foraging habitat exists within Tozers Reserve and surrounding agricultural land. As a known Southern Bent-wing Bat maternity cave is located near Warrnambool and the species can travel over 70 kilometres at a time, the species may opportunistically utilise the study area enroute to areas of more suitable habitat.
Mirounga leonina	Southern Elephant Seal	5	1991	VU	-	5	No Marine or coastal habitat within study area.
Nannoperca obscura	Yarra Pygmy Perch	18	2017	EN	vu	4	No suitable habitat. The species has not been recorded within Russells Creek. Russells Creek is highly degraded and subject to historical and on-going agricultural disturbance.
Neophema chrysogaster	Orange-bellied Parrot	3	2005	CR	cr	4	No suitable habitat. In Victoria, they generally occur in coastal habitats, such as

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
							bays, lagoons and estuaries; in low herbland and occasionally on golf courses or agricultural land.
Neophema chrysostoma	Blue-winged Parrot	5	2000	VU	-	4	Poor quality foraging habitat within Tozers Reserve. Species may visit the study area opportunistically when moving to areas of higher quality habitat. No recent records.
Neophoca cinerea	Sea-lion	2	2007	EN	en	5	No Marine or coastal habitat within study area.
Numenius madagascariensis #	Eastern Curlew	-	-	CR	cr	5	No suitable habitat.
Pachyptila turtur subantarctica #	Fairy Prion (southern)	-	-	VU	-	5	No suitable habitat.
Petaurus australis australis #	Yellow-bellied Glider (south-eastern)	-	-	VU	vu	4	No suitable habitat. Species prefers old growth forests. No recent records.
Phoebetria fusca #	Sooty Albatross	-	-	VU	cr	5	No suitable habitat.
Pluvialis squatarola	Grey Plover	4	1979	VU	vu	5	No suitable habitat.
Potorous tridactylus trisulcatus #	Long-nosed Potoroo (southern mainland)	-	-	VU	vu	4	No suitable habitat. Species prefers coastal heaths and eucalypt forests with dense understorey. No recent records.
Prototroctes maraena	Australian Grayling	11	2024	VU	en	4	No suitable habitat, and only one recent record (from 2024, in Merri Creek). The species has not been recorded within Russells Creek. Russells Creek is highly degraded and subject to historical and on-going agricultural disturbance.
Pseudomys novaehollandiae #	New Holland Mouse	-	-	VU	en	4	Poor quality habitat within Tozers Reserve. Species prefers established woodlands and dry scleophyll forests. Species not identified during camera

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
							trapping undertaken in 2014 (Landtech Consulting 2014b).
Pterodroma leucoptera leucoptera #	Gould's Petrel	-	-	EN	-	5	No suitable habitat.
Pterodroma mollis #	Soft-plumaged Petrel	-	-	VU	-	5	No suitable habitat.
Pteropus poliocephalus	Grey-headed Flying-fox	12	2022	VU	vu	4	The study area provides poor quality foraging habitat for this species, which is capable of nightly flights of to 50 kilometres from roost sites. Foraging resources include nectar and pollen from Eucalypts and other native/ introduced plants. As a camp exists within the Warrnambool Botanic Gardens (approximately four kilometres southwest of the study area), the species may opportunistically utilise Tozers Reserve and surrounding windrows.
Rostratula australis	Australian Painted-snipe	1	1995	EN	cr	4	Limited poor quality habitat. Species prefers freshwater wetlands. The small, isolated patch of Aquatic Herbland vegetation identified within the study areas north has a low likelihood of providing habitat for the species. No recent records.
Seriolella brama #	Blue Warehou	-	-	CD	cd	4	No suitable habitat. Species mostly occurs in offshore marine waters.
Stagonopleura guttata #	Diamond Firetail	-	-	VU	vu	4	Limited poor quality habitat within Tozers Reserve, and no previous records. Species prefers riparian areas, and occasionally lightly wooded farmland.
Sternula nereis	Fairy Tern	4	2017	VU	cr	5	No suitable habitat. Generally occurs in coastal environs.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Sternula nereis nereis #	Australian Fairy Tern	-	-	VU	cr	5	No suitable habitat. Generally occurs in coastal environs.
Synemon plana #	Golden Sun Moth	-	-	VU	vu	4	No suitable habitat. Native grasses were limited to Tozers Reserve, were of low cover and abundance when present and were in highly shaded areas.
Thalassarche bulleri #	Buller's Albatross	-	-	VU	en	5	No suitable habitat.
Thalassarche bulleri platei #	Northern Buller's Albatross	-	-	VU	-	5	No suitable habitat.
Thalassarche carteri	Indian Yellow-nosed Albatross	2	1978	VU	en	5	No suitable habitat.
Thalassarche cauta	Shy Albatross	8	2000	EN	en	5	No suitable habitat.
Thalassarche chrysostoma	Grey-headed Albatross	1	1957	EN	en	5	No suitable habitat.
Thalassarche impavida #	Campbell Albatross	-	-	VU	-	5	No suitable habitat.
Thalassarche melanophris	Black-browed Albatross	14	2018	VU	-	5	No suitable habitat.
Thalassarche salvini #	Salvin's Albatross	-	-	VU	-	5	No suitable habitat.
Thalassarche steadi #	White-capped Albatross	-	-	VU	-	5	No suitable habitat.
Thinornis cucullatus	Hooded Plover	371	2022	VU	vu	5	No suitable habitat.
Thinornis cucullatus cucullatus #	Eastern Hooded Plover	-	-	VU	-	5	No suitable habitat.
Tringa nebularia	Common Greenshank	56	2006	EN	en	5	No suitable habitat.
STATE SIGNIFICANCE							
Accipiter novaehollandiae	Grey Goshawk	8	2018	-	en	4	Limited poor quality habitat within Tozers Reserve. Species may opportunistically utilise the study area on route to other areas of higher quality habitat. The species prefers established, tall woodlands and forests.
Actitis hypoleucos	Common Sandpiper	13	2018	-	vu	4	No suitable habitat.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Anseranas semipalmata	Magpie Goose	67	2019	-	vu	4	Limited poor quality habitat. The species may opportunistically visit the various farm dams throughout the study area when on route to higher quality habitat.
Arctophoca forsteri	Long-nosed Fur Seal	4	2020	-	vu	5	No marine habitat within study area.
Ardea alba modesta	Eastern Great Egret	18	2019	-	vu	4	The species may opportunistically visit the study area (e.g. Russells Creek, farm dams, inundated pasture) whilst on route to higher quality habitat.
Ardea intermedia plumifera	Plumed Egret	2	1999	-	cr	4	The species may opportunistically visit the study area (e.g. Russells Creek, farm dams, inundated pasture) whilst on route to higher quality habitat. No recent records.
Ardeotis australis	Australian Bustard	17	2018	-	cr	4	No suitable habitat. The species utilises grasslands.
Biziura lobata	Musk Duck	65	2019	-	vu	3	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River,
Dinotoperla walkeri	Stonefly	1	2004	-	en	4	No suitable habitat. recent records.
Egretta garzetta	Little Egret	9	2018	-	en	4	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat.
Engaeus sericatus	Hairy Burrowing Crayfish	7	2008	-	vu	4	Species associated with aquatic habitats including creeks and streams where it forms burrows.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
							Species has a low likelihood of occurring within aquatic habitats within the study area (e.g. Russells Creek) due to historical and on-going agricultural disturbance.
Euastacus armatus	Murray Spiny Crayfish	1	2014	-	th	4	The study area is outside the species' distribution. One record exists within 10km, but all other Victorian records occur within the Murray-Darling Basin at least 250km north-east of the study area.
Falco subniger	Black Falcon	3	1977	-	cr	4	Poor quality foraging habitat within Tozers Reserve. Species may visit the study area opportunistically when moving to areas of higher quality habitat. No recent records.
Galaxiella toourtkoourt	Little Galaxias	3	2007	-	en	4	Although Russells creek bisects the study areas middle from east to west, no suitable habitat exists due to the general absence of habitat features (i.e. emergent and fringing vegetation).
Gelochelidon macrotarsa	Australian Gull-billed Tern	1	1977	-	en	4	No suitable habitat.
Geocharax falcata	Western Bush Yabby	2	2001	-	en	4	Limited poor quality habitat within the degraded farm dams and Russells creek. Species has a low likelihood of occurrence within the study areas riparian zones due to historical and on-going agricultural disturbance. No recent records.
Haliaeetus leucogaster	White-bellied Sea-Eagle	1	2000	-	en	4	Species may use the study area opportunistically en-route to areas of more suitable habitat (i.e closer to coast). No recent records.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Hieraaetus morphnoides	Little Eagle	8	2005	-	vu	4	Species may use the study area opportunistically en-route to areas of more suitable habitat.
Hydroprogne caspia	Caspian Tern	30	2000	-	vu	4	No suitable habitat.
Ixobrychus dubius	Australian Little Bittern	2	1995	-	en	4	No suitable habitat. Species prefers freshwater swamps with dense cover. recent records.
Lewinia pectoralis	Lewin's Rail	7	2018	-	vu	4	Limited poor quality habitat. Species prefers permanent wetlands with dense vegetation. The water bodies within the study area appeared to be ephemeral, containing a very low amount of water.
Megaptera novaeangliae australis	Southern Humpback Whale	69	2020	-	cr	5	No marine habitat within study area.
Ninox connivens	Barking Owl	1	1960	-	cr	4	No suitable habitat. Species prefers eucalypt dominated woodland and forest edges. Large hollows in mature trees required for nesting. No recent records.
Numenius phaeopus	Whimbrel	1	1960	-	en	4	No suitable habitat. No recent records.
Ornithorhynchus anatinus	Platypus	46	2023	-	vu	4	The closest recent records are from the Merri River approximately 2.5 kilometres west of the study area. Despite the proximity to recent records, the species has a low likelihood of occurring within the study area due to the highly degraded nature of riparian habitats within the study area and the historical and on-going agricultural disturbance. No records identified within Russells Creek.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Oxyura australis	Blue-billed Duck	10	2018	-	vu	3	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River,
Pelagodroma marina	White-faced Storm-Petrel	2	1977	-	en	5	No suitable habitat.
Pluvialis fulva	Pacific Golden Plover	3	1977	-	vu	5	No suitable habitat.
Pseudemoia rawlinsoni	Glossy Grass Skink	-	-	-	en	3	Suitable habitat includes drainage lines and swamps with a dense cover of low vegetation. Recorded west and northwest of Warrnambool. Potential low-quality habitat exists by way of Russells Creek.
Pseudophryne semimarmorata	Southern Toadlet	-	-	-	en	3	The species was recorded within Tozers Reserve in 2013/14 (Landtech Consulting 2014b) and may continue to utilise seasonally damp areas within the reserve.
Spatula rhynchotis	Australasian Shoveler	61	2019	-	vu	4	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat.
Sternula albifrons	Little Tern	1	2017	-	cr	5	No suitable habitat.
Stictonetta naevosa	Freckled Duck	13	2018	-	en	3	The species may opportunistically visit Russells creek and the various farm dams throughout the study area when on route to higher quality habitat such as Lake Pertobe, the Hopkins River and the Merri River.
Tringa brevipes	Grey-tailed Tattler	2	1977	-	cr	5	No suitable habitat.
Tringa glareola	Wood Sandpiper	1	2019	-	en	5	No suitable habitat.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likely occurrence in study area	Rationale for likelihood of occurrence
Tringa stagnatilis	Marsh Sandpiper	3	1994	-	en	5	No suitable habitat.

Data Sources: Victorian Biodiversity Atlas (DEECA 2025d); Protected Matters Search Tool (DCCEEW 2025).