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Final Report

Biodiversity Assessment for the Proposed Shepparton South East Precinct Structure Plan, Shepparton, Victoria

Prepared for

Greater Shepparton City Council

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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Greater Shepparton City Council to undertake a Biodiversity Assessment for the Proposed Shepparton South East Precinct Structure Plan, Shepparton, Victoria.

We understand that Greater Shepparton City Council, in consultation with the Victorian Planning Authority (VPA), is seeking to develop a Precinct Structure Plan (PSP) that will guide the future development of the land.

The purpose of this assessment was to identify the extent and type of native vegetation present within the study area and to determine the likely presence of significant flora and fauna species and/or ecological communities. This report presents the results of the assessment and discusses the potential ecological and legislative implications associated with the proposed action.

1.2 Study Area

The study area is located approximately four kilometres south-east of Shepparton's CBD and 160 kilometres north of Melbourne's CBD (Figure 1). The study area covers approximately 385 hectares and is bound by Broken River to the south, Doyles Road to the east, a mix of rural residential and residential properties to the west and industrial land to the north.

The study area is currently used predominantly for agricultural and pastoral purposes, with properties comprising open pastures, and planted crops and orchards. The study area is relatively flat, with the Broken River demarcating the southern boundary of the proposed precinct, with open irrigation channels present throughout the study area. There are no ridges or crests in the area.

According to the Department of Environment, Land, Water and Planning (DELWP) NatureKit Map (DELWP 2021a), the study area is located within the Victorian Riverina bioregion, Goulburn Broken Catchment Management Authority (CMA) and Greater Shepparton City Council.

2 METHODS

2.1 Desktop Assessment

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

- The DELWP NatureKit Map (DELWP 2021a) and Native Vegetation Information Management (NVIM) Tool (DELWP 2021b) 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 (DELWP 2021c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2021e);
- The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017) and Atlas of Living Australia (ALA) (ALA 2021) for assistance with the distribution and identification of flora species;
- The Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DAWE 2021);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DELWP 2021f) and Protected (DELWP 2019a) Lists;
- The online VicPlan Map (DELWP 2021d) to ascertain current zoning and environmental overlays in the study area;
- Flora and Fauna and Assessment of the Shepparton South East Growth Corridor - Shepparton South East Growth Corridor Framework Plan: Environmental values background report (Ecology Partners 2009); and,
- Aerial photography of the study area.

2.2 Field Assessment

A field assessment was undertaken from 22 – 26 November 2021 to obtain information on flora and fauna values within the study area. The field surveys focussed on areas potentially supporting ecological values, such as the Broken River environs, with small residential lots and developed and/or cropped land excluded from the assessment. Surveys focussed on the Broken River and immediately adjacent private properties, with commonly observed vascular flora and fauna species recorded, significant records mapped and the overall condition of vegetation and habitats noted. Ecological Vegetation Classes (EVCs) were determined with reference to DELWP pre-1750 and extant EVC mapping (DELWP 2021a) and their published descriptions (DELWP 2021c).

2.2.1 *Vegetation Assessment*

Native vegetation (as defined 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 habitat hectare assessment.

Table 1. Determination of a patch 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 touches the drip line of at least one other tree, forming a continuous canopy; OR any mapped wetland included in the *Current Wetlands map*, available in DELWP systems and tools.	Measured in hectares. Based on hectare area of the native patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.
Scattered tree	A native canopy tree that does not form part of a native patch.	Measured in hectares. Each Large scattered tree is assigned an extent of 0.071 hectares (15m radius). Each Small scattered tree is assigned a default extent of 0.031 hectares (10 metre radius).	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'.

2.2.2 *Current Wetlands (DELWP)*

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. They do, however, recover rapidly after periods of increased rainfall. As a result, under the Guidelines (DELWP 2017a) all mapped wetlands (based on 'Current Wetlands' layer in the DELWP NatureKit Map) that are to be impacted must be included as native vegetation, with the modelled condition score assigned to them (DELWP 2021b).

Note that mapped wetlands do not apply if they are covered by a hardened, man-made surface, for example, a roadway. If covered by any vegetation including crops, bare soil, a mapped wetland must be treated as a native patch.

2.2.3 *Nocturnal fauna surveys*

Nocturnal fauna surveys were undertaken over four nights within suitable habitat (Figure 2). Arboreal fauna, owls (Powerful Owl and Barking Owl) and frogs were the target of these surveys. Spotlighting surveys were conducted after call playback. Spotlighting and call play-back was repeated at each identified survey location

to improve detection probability. Survey locations were chosen where certain ecological values were present, such as woodland vegetation, large trees, wetlands and irrigation channels.

Call play-back was employed at the start of each spotlighting transect. Call playback methodology followed DELWP survey guidelines, using a full playback sequence of each forest owl species (Barking and Powerful Owls) possibly occurring in the area. Two observers both listened and searched (by eye or with the aid of binoculars) for animals throughout the call playback period, then spotlight for 15 minutes.

Similarly, ecologists searched fringing, emergent and floating vegetation within and adjacent to the watercourse/waterbody with hand-held spotlights and used call-playback to initiate a response from any Bibron's Toadlet *Pseudophryne bibronii* (Brown Toadlet; noting surveys were undertaken outside of the species known peak calling period) and Growling Grass Frog *Litoria raniformis* males that may have been present.

2.3 Assessment Qualifications and Limitations

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.

Not all properties within the study area were assessed. Properties identified during the desktop assessment as having potential to hold ecological values were prioritised, with ecological values within sites not accessed mapped from adjacent properties or the road reserve.

The 'snapshot' nature of a rapid ecological assessment, meant that migratory, transitory or uncommon fauna species may have been 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.

A comprehensive list of all terrestrial flora and fauna present within the study area was not undertaken as this was not the objective of the assessment. Rather a list of commonly observed species was recorded to assist in determining the broader biodiversity values present within the study area.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of +/-5 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.

3 RESULTS

3.1 Vegetation Condition

The study area is representative of many areas within the Victorian Riverina, with large areas of improved pasture and orchards, scattered patches of remnant vegetation and regrowth from past clearing. The majority (>80%) of the study area was highly modified due to historic and current agricultural practices.

Given that much of the indigenous shrub and tree layer has been cleared throughout the study area, and there are extensive areas of planted indigenous and non-indigenous trees, it is difficult to determine whether patches of indigenous understorey species are representative of Plains Woodland, Floodplain Riparian Woodland or another similar EVC. In most cases, the decision for classifying patches was guided by the modelled pre-1750s native vegetation mapping (DELWP 2021c), with native flora in the study area best represented by two EVCs: Floodplain Riparian Woodland (EVC 56) and Plains Woodland (EVC 803).

Native vegetation mapping completed as part of this assessment identified 19.54 hectares of native vegetation representative of two EVCs (Figure 2), including:

- 17.65 hectares of Floodplain Riparian Woodland;
- 1.89 hectares of Plains Woodland; and,
- 34 Scattered Trees.

The remaining assessed portions of the study area were identified as being either developed or supporting non-remnant vegetation (i.e. planted indigenous and non-indigenous species, grassland/pasture dominated by introduced species or crops/orchards).

Specific details relating to the observed EVCs and other vegetation/ habitat types are provided below.

3.1.1 Patches of Native Vegetation

Floodplain Riparian Woodland

Floodplain Riparian Woodland is described as an open eucalypt woodland or open forest to 20 metres tall over a medium to tall shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges, occurring along the banks and floodplains of large meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities.

Modified Floodplain Riparian Woodland within the study area was generally confined to the banks and floodplain of the Broken River, which also serves as the southern border of the study area. The overstorey was dominated by River Red-gum *Eucalyptus camaldulensis,* over a predominantly exotic understorey dominated by pasture grasses including Oat and Toowoomba Canary-grass (Plate 3). Juvenile River Red-gums and understorey trees and shrubs, including Black Wattle *Acacia mearnsii* and Sweet Bursaria *Bursaria spinosa* were also sporadically present within the understorey (Plate 4). Indigenous grasses such as Kangaroo Grass *Themeda triandra,* Wallaby Grass and Spear Grass were occasionally observed within the ground layer.

Plate 1. Floodplain Riparian Woodland along the southern boundary of the study area (Ecology and Heritage Partners Pty Ltd 24/11/2021).

Plate 2. Floodplain Riparian Woodland along the southern boundary of the study area (Ecology and Heritage Partners Pty Ltd 25/11/2021).

Plains Woodland

Plains Woodland is characterised as a eucalypt woodland to 15 metres tall, with an understorey of comprised of a diversity of grassy and herbaceous flora species. Plains Woodland occurs on a range of geologies, occupying fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with an average annual rainfall of less than 600 millimetres.

Modified Plains Woodland was recorded in the south-east of the study area and consisted of two patches, present as canopy trees (dominated by Grey Box *Eucalyptus macrocarpa*) over a predominantly exotic understorey dominated by pasture grasses, including Wild Oat *Avena fatua*, Toowoomba Canary-grass *Phalaris aquatica* and Cocksfoot *Dactylis glomerata,* with Wallaby Grass *Rytidosperma* spp. and Spear Grass *Austrostipa* spp. sporadically present (Plate 3 and Plate 4).

Plate 3. Plains Woodland within the study area (Ecology and Heritage Partners Pty Ltd 25/11/2021).

Plate 4. Plains Woodland within the study area (Ecology and Heritage Partners Pty Ltd 25/11/2021).

3.1.2 Scattered Trees and Large Trees in Patches

Thirty-four (34) scattered trees (predominantly River Red-gum and Grey Box) were recorded within the study area, which consisted of 15 large and 19 small scattered trees (Figure 2; Appendix 1.2). These trees would have

once formed part of the Plains Woodland or Floodplain Riparian Woodland EVCs; however, the understorey vegetation contained predominantly introduced species (mainly exotic pasture grasses) and the trees no longer formed a patch of native vegetation (Plate 5).

One-hundred and thirty-eight (138) large trees in patches of native vegetation were also recorded within the study area (Figure 2; Appendix 1.2). The majority of the large trees in patches were River Red-gums within patches of Floodplain Riparian Woodland associated with the Broken River (Plate 6).

Plate 5. A scattered large tree (Grey Box) within the study area (Ecology and Heritage Partners Pty Ltd 24/11/2021).

Plate 6. Several large trees (River Red-gums and a dead stag) within a patch of Floodplain Riparian Woodland within the study area (Ecology and Heritage Partners Pty Ltd 24/11/2021).

3.1.3 Introduced and Planted Vegetation

Areas not supporting native vegetation had a high cover (>90%) of exotic grass species, many of which were direct-seeded for use as pasture or cereal crop. Scattered native grasses were generally present in these areas, however they did not have the required 25% relative cover to be considered a patch. Native and introduced trees and shrubs were also planted for ornamental purposes within the study area, primarily around existing dwellings and sheds and in windrows.

Non-native areas were dominated by orchards, cereal crops, pasture grasses and environmental weeds such as Toowoomba Canary-grass, Barley *Hordeum* spp., Rye-grass *Lolium* spp., Couch *Cynodon dactylon* var. *dactylon* and Wild Oat (Plate 7, Plate 8 and Plate 9).

Noxious weeds, as defined under the CaLP Act, were present within the study area, namely Spear Thistle *Cirsium vulgare*, Horehound *Marrubium vulgare,* Prickly pear *Opuntia* spp., Sweet Briar *Rosa rubiginosa,* Blackberry *Rubus fruticosus* spp. agg. and African Box-thorn *Lycium ferocissimum* (Plate 10). Blackberry and African Box-thorn are also Weeds of National Significance (WoNS). Blackberry was the most prevalent weed, consistently present along the Broken River banks.

Plate 7. Mown lawn and ornamental plantings adjacent to the roadside (Ecology and Heritage Partners Pty Ltd 24/11/2021).

Plate 8. Cereal crop within the study area (Ecology and Heritage Partners Pty Ltd 24/11/2021).

Plate 9. Exotic pasture grasses within the study area (Ecology and Heritage Partners Pty Ltd 23/11/2021).

Plate 10. African Box-thorn within the study area (Ecology and Heritage Partners Pty Ltd 24/11/2021).

3.2 Fauna Habitat

Nocturnal surveys for arboreal fauna, owls and frogs were undertaken over four nights at six sites (Figure 2) within and adjacent to the study area. Call-playback for Powerful Owl, Barking Owl, Squirrel Glider and Growling Grass Frog were undertaken at each location, followed by spotlighting. However, these species were not detected, nor were any additional national or state significant fauna species. Fauna survey results are presented in Appendix 2.1.

3.2.1 Terrestrial Fauna Habitat

Woodland and Scattered Trees

Woodland (Plains Woodland and Floodplain Riparian Woodland) and scattered remnant trees occur throughout the study area and provide an important resource for arboreal fauna. The majority of the eucalypts are mature, providing an array of small, medium, large and very large hollows, bark fissures and crevices. These are likely to be used for shelter and nesting by a range of hollow-dependent fauna including parrots, microbats, possums, gliders and owls. Scattered trees provide habitat for more mobile fauna species, vantage

points and nesting areas for diurnal and nocturnal raptors, as well as stepping-stones for more mobile fauna moving through the study area, enhancing landscape permeability for native fauna.

During the current survey a variety of birds were observed foraging amongst trees and shrubs in these areas, including Sacred Kingfisher *Todiramphus sanctus,* Superb Fairy-wren *Malurus* cyaneus and White-winged Chough *Corcorax melanorhamphos*. Hollows and fissures within mature eucalypts and stags (dead trees) provide roosting, nesting and sheltering habitat for hollow-dependent birds and mammals, including Common Brushtail Possum *Trichosurus vulpecula* and Australian Wood Duck *Chenonetta jubata*. Microbats are also likely to roost within hollows in these areas and forage within, over and around canopy vegetation. While the ground layer and mid-storey within this vegetation is relatively open, there was a low-moderate cover of woody ground debris, likely to be inhabited and used by a range of reptile species.

Native and Introduced Grasslands

The majority of the study area consists of paddocks which contain improved exotic pastures. The large areas of exotic grassland within the study area are likely to be utilised by common mammal, bird and species. A number of bird species common to modified, grassy or open habitats were recorded during the current assessment. Diurnal and nocturnal raptors are likely to forage over these areas.

3.2.2 Aquatic Fauna Habitat

The Broken River is a major waterway on the southern boundary of the study area and is likely to provide habitat for aquatic fauna species. Irrigation channels and farm dams (when inundated) within the study area are likely to support a range of common fauna species. The modified (irrigation channel) and ephemeral (farm dams) nature of the waterbodies, and the site's proximity to areas of high-quality habitat provided by the extensive Broken River and Goulburn River systems to the north and west, minimises the likelihood of migratory/ threatened waterbird species making significant use of these resources within the study area.

3.2.3 Connectivity of Habitat

The Broken River on the southern boundary of the study area is likely to provide high habitat connectivity for species reliant upon both aquatic habitat (including frogs, fish and waterbirds) and terrestrial habitat associated with Floodplain Riparian Woodland.

Scattered trees within paddocks throughout the project area may act as means of connection for more mobile fauna, including birds, microbats and arboreal mammals.

Wildlife corridors and scattered connections of vegetation have numerous benefits to native fauna populations, particularly in modified landscapes where much of the surrounding vegetation is restricted to linear strips along roadsides or streams. They can, and often do constitute valuable habitat. Some of the key benefits of wildlife corridors associated with the maintenance of biodiversity on a local, and at a landscape level, include:

- Protection and ongoing maintenance of ecosystem functionality through the reduction of threatening processes, such as erosion, weed spread and hydrological alterations;
- Provision of habitat (refuge, shelter, breeding opportunities) for a range of fauna either residing within corridors, or moving through the landscape;
- Maintenance of species richness and diversity;

- Immigration of animals to supplement declining populations, thus reducing the likelihood of local extinctions;
- Availability of habitat for reintroduction following extinction events;
- Prevention of demographic changes occurring in populations that may result from prolonged isolation from other populations of the same species by aiding gene flow, thus enhancement of genetic variation and prevention of inbreeding; and
- Facilitation of fauna movement through modified landscapes to more optimal habitats.

Aside from the large, generally contiguous patch of Floodplain Riparian Woodland associated with the Broken River, other areas of native vegetation in the study area do not constitute a wildlife corridor as such (i.e. not contiguous with larger areas of habitat in the local area). They are however likely to act as a means of connectivity, providing habitat and facilitating the movement of more mobile fauna species throughout the landscape.

3.3 Significance Assessment

3.3.1 Flora

The VBA contains records of one nationally significant and 18 State significant flora species previously recorded within 10 kilometres of the study area; however, there are no previous records of significant flora within the study area (DELWP 2021e; Figure 3). The PMST nominated an additional six nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2021) (Figure 3; Appendix 1.3).

Of these species, there is suitable habitat within the study area for Buloke *Allocasuarina luehmannii,* Buloke Mistletoe *Amyema linophylla* subsp. *orientalis* and Late-flowering Flax Lily *Dianella tarda*. Based on the modified nature of the study area, landscape context and the proximity of previous records, additional significant flora species are considered unlikely to occur within the study area due to the high levels of disturbance and absence of suitable habitat.

3.3.2 Fauna

The VBA contains records of 13 nationally significant and 35 State significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2021e) (Figure 4). The PMST nominated an additional seven nationally significant species which have not been previously recorded but have the potential to occur in the locality (DAWE 2021) (Figure 4; Appendix 2.1).

Of these species, there is suitable habitat within Floodplain Riparian Woodland within the study area for the nationally significant Painted Honeyeater *Grantiella picta* and State-significant Powerful Owl, Barking Owl, Squirrel Glider *Petaurus norfolcensis*, Musk Duck *Biziura lobata*, Freckled Duck *Stictonetta naevosa,* Hardhead *Aythya australis,* Blue-billed Duck *Oxyura* australis and Square-tailed Kite *Lophoictinia isura.*

The Broken River also provides potential habitat for aquatic species Bluenose Cod (Trout Cod) *Maccullochella macquariensis*, Murray Cod *Maccullochella peelii*, Murray Short-necked Turtle *Emydura macquarii*, Crimson-spotted Rainbowfish *Melanotaenia fluviatilis*, Silver Perch *Bidyanus bidyanus* and Platypus *Ornithorhynchus anatinus*.

Nocturnal surveys for arboreal fauna, owls and frogs, including Powerful Owl, Barking Owl, Squirrel Glider, Brown Toadlet and Growling Grass Frog were undertaken; however no national or State-significant species were detected. Similarly, no evidence of resident significant fauna species was observed during the diurnal surveys and habitat assessments. Based on the results of the nocturnal surveys and diurnal habitat assessments, Powerful Owl and Barking Owl are considered unlikely to reside in the study area, but may visit the study area occasionally when foraging. Similarly, Growling Grass Frog is considered unlikely to occur within the study area. Despite the species not being detected during the nocturnal surveys, Squirrel Glider has a moderate likelihood of residing within the study area, predominantly restricted to Floodplain Riparian Woodlands associated with the Broken River.

Brown Toadlet was previously recorded in the study area (Ecology Partners 2009) and cannot be ruled out from occurring within the study area as the surveys completed as part of this assessment were undertaken outside of the species peak calling period (April-May). It is recommended that additional targeted surveys for Brown Toadlet be undertaken during the species peak calling period (April-May).

Based on the modified nature of the study area, landscape context and the proximity of previous records, additional significant fauna species are considered unlikely to rely on habitat within the study area for foraging or breeding purposes due to the lack of suitable and/or important habitat features.

3.3.3 Ecological Communities

Five nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DAWE 2021):

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions;
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia;
- Natural Grasslands of the Murray Valley Plains;
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains;
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

However, vegetation within the study area did not meet the condition thresholds that define any national or State-significant communities due to the absence of key indicator species, the low diversity of native flora and high cover of exotic vegetation.

Floodplain Riparian Woodland vegetation in the north-east of the study area supports suitable habitat for a number of woodland bird species associated with the FFG Act-listed Victorian Temperate Woodland Bird Community.

4 SUMMARY OF ECOLOGICAL VALUES

The desktop review and field survey identified the following key ecological values within the study area:

- Remnant patches of native vegetation and native scattered trees:
    - 17.65 hectares of Floodplain Riparian Woodland;
    - 1.89 hectares of Plains Woodland; and
    - 34 Scattered Trees.
- 17.65 hectares of Floodplain Riparian Woodland also provides potential habitat for woodland birds associated State-significant Victorian Temperate Woodland Bird Community.
- Potential habitat for flora species of State conservation significance (Late-flowering Flax-lily, Buloke and Buloke mistletoe).
- Potential habitat for fauna species within Floodplain Riparian Woodland and the Broken River for Painted Honeyeater, Squirrel Glider, Blue-billed Duck, Square-tailed Kite, Bluenose Cod (Trout Cod), Murray Cod, Murray Short-necked Turtle, Crimson-spotted Rainbowfish, Silver Perch, Platypus and Brown Toadlet.

5 IMPLICATIONS FOR FUTURE DEVELOPMENT

Any future development of the study area will need to consider and mitigate any potential indirect and/or offsite impacts to the Broken River as this is likely to provide habitat to a range of significant fauna species, including Murray Cod and Silver Perch. If any matter of National Environmental Significance is proposed to be impacted, a referral to the Commonwealth Environment Minister will be required if impacts to the species or associated habitat(s) are not avoidable.

Similarly, key ecological constraints within the study area are concentrated within the Broken River environs, including extensive areas of remnant native woodland. As a portion of the Broken River environs is considered public land, threatened ecological communities (e.g. Victorian Temperate Woodland Bird community) and species of flora and fauna are subject to the requirement to obtain a permit for the removal or disturbance of listed/ protected plants, ecological communities and fish species under the FFG Act. Any such action on public land affecting these values would require a permit from DELWP.

Permitting requirements associated with the removal of native vegetation will be dependent on the future planning process; however, any permitted clearing of native vegetation within the study area would be required to be offset in accordance with the Guidelines (DELWP 2017a).

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 2.

Table 2. Further requirements associated with development of the study area.

Relevant Legislation	Implications
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on matters of NES, or those that are undertaken on Commonwealth Land. An action, unless otherwise exempt, requires approval from the Commonwealth Minister for the Environment if it is likely to have an impact on any of the following matters of NES: World Heritage properties, National Heritage places, Ramsar wetlands of international significance, nationally listed threatened species and ecological communities, Migratory species protected under international agreements, Commonwealth marine areas, the Great Barrier Reef Marine Park, nuclear actions and water resources (for coal seam gas and large coal mining projects). Key ecological constraints associated with the EPBC Act relate to the known or potential presence of threatened species of flora and fauna and ecological communities (Section 4). Any action that is likely to significantly impact upon these values or any other matter of NES would need to be referred to DAWE for assessment and approval. Referrals are assessed over a period of 20 working days, including a ten-day public comment period. A referred action will subsequently be classed as one of the following: • *Not a controlled action* – approval is not required if the action is undertaken in accordance with the referral. • *Not a controlled Action 'particular manner'* – approval is not required if the action is undertaken in accordance with the manner specified. • *Controlled action* – the action is subject to the assessment and approval process under the EPBC Act. Should matters of NES be identified within the study area following a detailed ecological assessment, a referral to the Commonwealth via an EPBC Act referral may be required. The Minister will decide whether the proposed action is a 'controlled action' and, if so, will require further assessment to determine whether approval will be granted under the EPBC Act. However, if the impact area avoids all known matters of NES, then it is considered unlikely that the proposed development will be a 'controlled action'.
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. The "*Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978*" provides triggers for which an EES is required, such as the removal of 10 or more hectares of native vegetation or potential impacts on remaining habitat or populations of threatened species. 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. Actions undertaken in accordance with a prescribed Precinct Structure Plan (PSP) are exempt from the requirements of the EE Act.

Relevant Legislation	Implications
Flora and Fauna Guarantee Act 1988	The FFG Act is the primary legislation dealing with biodiversity conservation and the sustainable use of native flora and fauna in Victoria. The provisions of the FFG Act bind all public agencies, public landowners and land managers. The Act contains lists of threatened flora and fauna species, 'protected flora species' and threatened vegetation communities, as well as action statements to protect the long-term viability of these values. The Act applies to the removal of listed threatened species and communities, as well as protected flora species. Protected flora species include any of the Asteraceae (Daisies) family, all orchids, ferns (excluding *Pteridium esculentum*) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*); in addition to any taxa that forms a component of a listed FFG Act vegetation community. A species may be both listed and protected. Proponents are required to apply for an FFG Act permit to 'take' listed and/or protected flora species and listed vegetation communities in areas of public land (i.e. within road reserves and crown land associated with the Broken River). An FFG Act permit is generally not required for removal of listed and/or protected flora species and communities on private land. There are currently no requirements for proponents to apply for a permit under the FFG Act where a proposed activity requires the removal of habitat for a listed terrestrial fauna species. The Act does however regulate the removal, salvage, temporary holding, relocation, taking, trading and keeping of FFG Act-listed fish species, and as such, an FFG Act permit is required if listed fish species are likely to be affected by a proposed activity. Key ecological constraints within the study area associated with the FFG Act are likely to include threatened ecological communities (e.g. Victorian Temperate Woodland Bird community) and species of flora and fauna. The majority of land within the study area is privately owned and therefore is exempt from most provisions under the FFG Act including the requirement to obtain a permit for the removal or disturbance of listed/ protected plants, ecological communities and fish species. Any such action on public land affecting these values would require a permit from DELWP.
Planning and Environment Act 1987	The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption clause under 52.17-6 of the Victorian Planning Schemes applies, or if the proposed clearing is in accordance with a Native Vegetation Precinct Plan (NVPP) (Clause 52.16) that has been incorporated into the Planning Scheme. Permitting requirements associated with the removal of native vegetation will be dependent on the future planning process.
Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines)	The assessment process for the clearing of vegetation follows the '*Guidelines for the removal, destruction or lopping of native vegetation*' (the Guidelines) (DELWP 2017a). The '*Assessor's handbook: Applications to remove, destroy or lop native vegetation*' (Assessor's handbook) (DELWP 2018) provides clarification regarding the application of the Guidelines (DELWP 2017a). Any permitted clearing of native vegetation within the study area would be offset in accordance with the Guidelines.

Relevant Legislation	Implications
Catchment and Land Protection Act 1994	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. A number of weeds listed as noxious under the CaLP Act are known occur throughout the study area (Section 3). Similarly, it is likely that the region is occupied by several pest fauna species listed under the Act. 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 any development activity to minimise their spread and impact on ecological values within the study area.
Wildlife Act 1975 and Wildlife Regulations 2013	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*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*, issued by DELWP.
Water Act 1989	A 'works on waterways' permit is likely to be required from the Goulburn Broken CMA where any action impacts on waterways within the study area.

6 CONCLUSION

The Shepparton South East PSP area ('study area') has been identified as a significant growth area with the potential to support population growth.

The purpose of the ecological assessment was to provide a detailed assessment of the ecological values within the south of the study area (Broken River environs) to inform the early stage of the precinct planning process and to assist in the wetland and drainage design process.

Desktop-based assessments and field surveys were undertaken to assess the biodiversity value of the study area and inform early stage of the precinct planning process. The findings of the assessment confirmed that the majority (>80%) of the study area supports non-native vegetation and is highly disturbed. Despite its modified nature, the study area supports a diversity of natural assets (Section 3), which 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 (particularly scattered trees), 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. To preserve the ecological values within the Shepparton South East PSP area, and broader landscape:

- The retention of native vegetation should be prioritised within, and immediately adjacent to, the Broken River environs;
- Where possible, scattered trees outside of the Broken River environs and immediate surrounds should be retained within public open-space areas, drainage reserves, small pocket parks and within larger development parcels;
- Any drainage reserves and retarding basins required to be constructed within the precinct to service future development should have consideration for the *Growling Grass Frog Habitat Design Standards* (DELWP 2017b) to provide potential habitat for a range of local indigenous fauna species; and,
- Any revegetation or amenity plantings within the precinct should be undertaken using indigenous species of local provenance.

Based on the findings of the assessment, it is considered that the study area can accommodate the medium and longer term growth of Shepparton, whilst maintaining and enhancing the key ecological values present.

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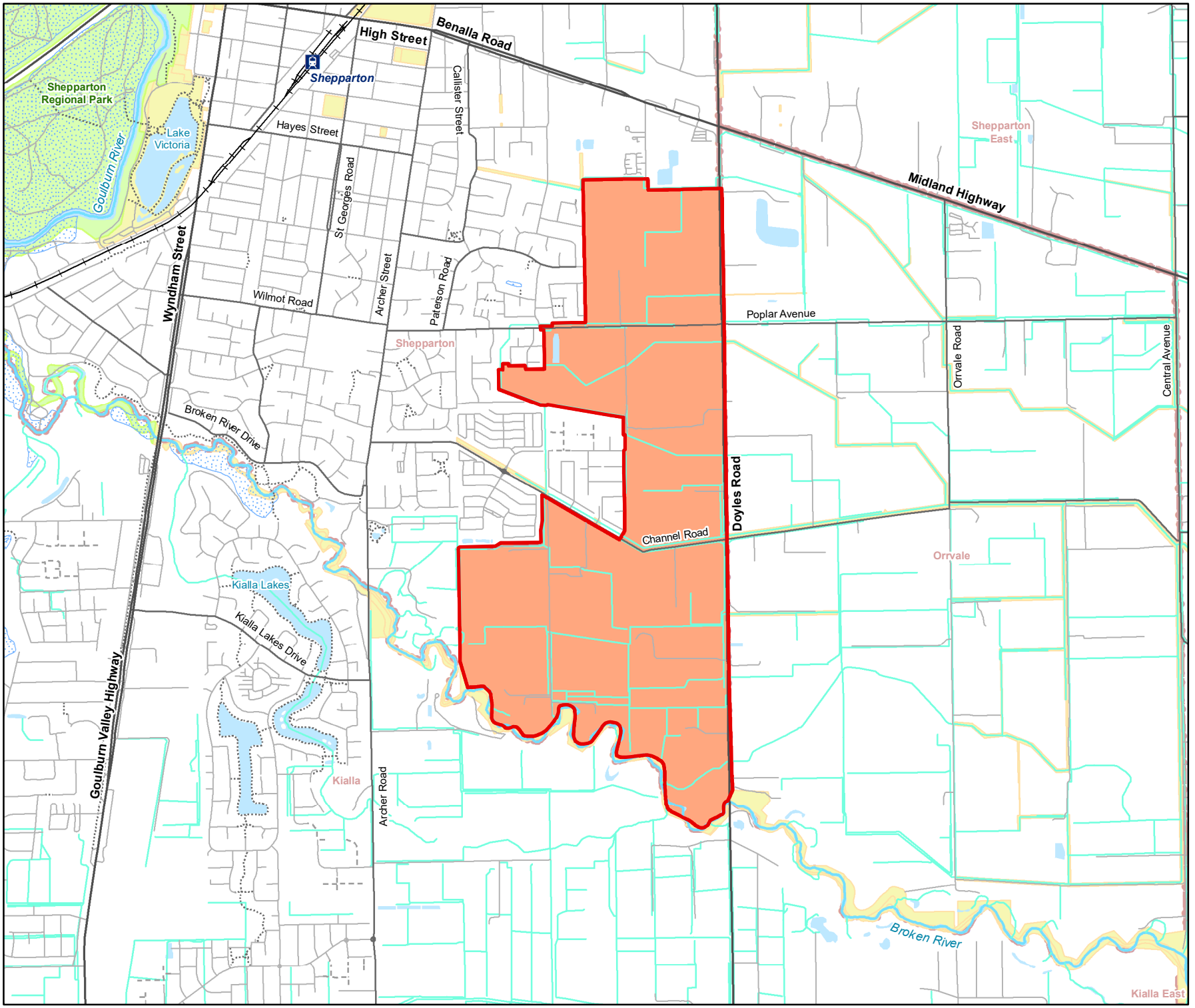

Legend

- Study Area
- Railway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the study area

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

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Metres

Map Scale: 1:30,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

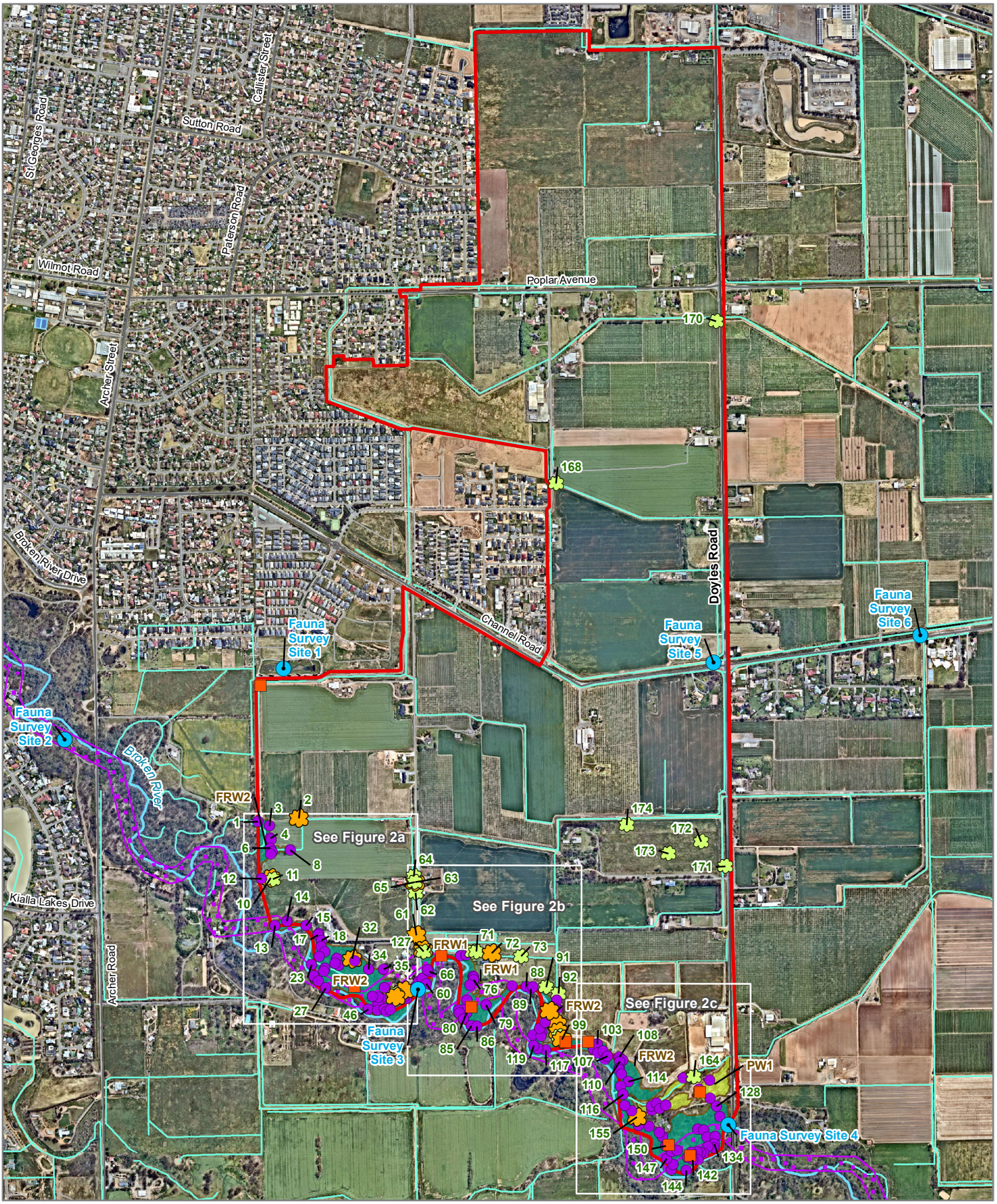


Figure 2 Overview

Ecological features

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

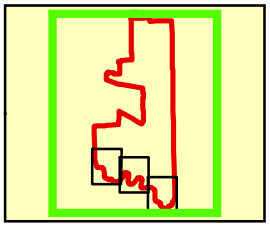
ecology & heritage partners

Legend

- Study Area
- Important Victorian Wetlands
- Fauna survey location
- CaLP Act listed weed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch

Ecological Vegetation Classes

- Floodplain Riparian Woodland (EVC 56)
- Plains Woodland (EVC 803)



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Metres

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Aerial source: Nearmap 2021

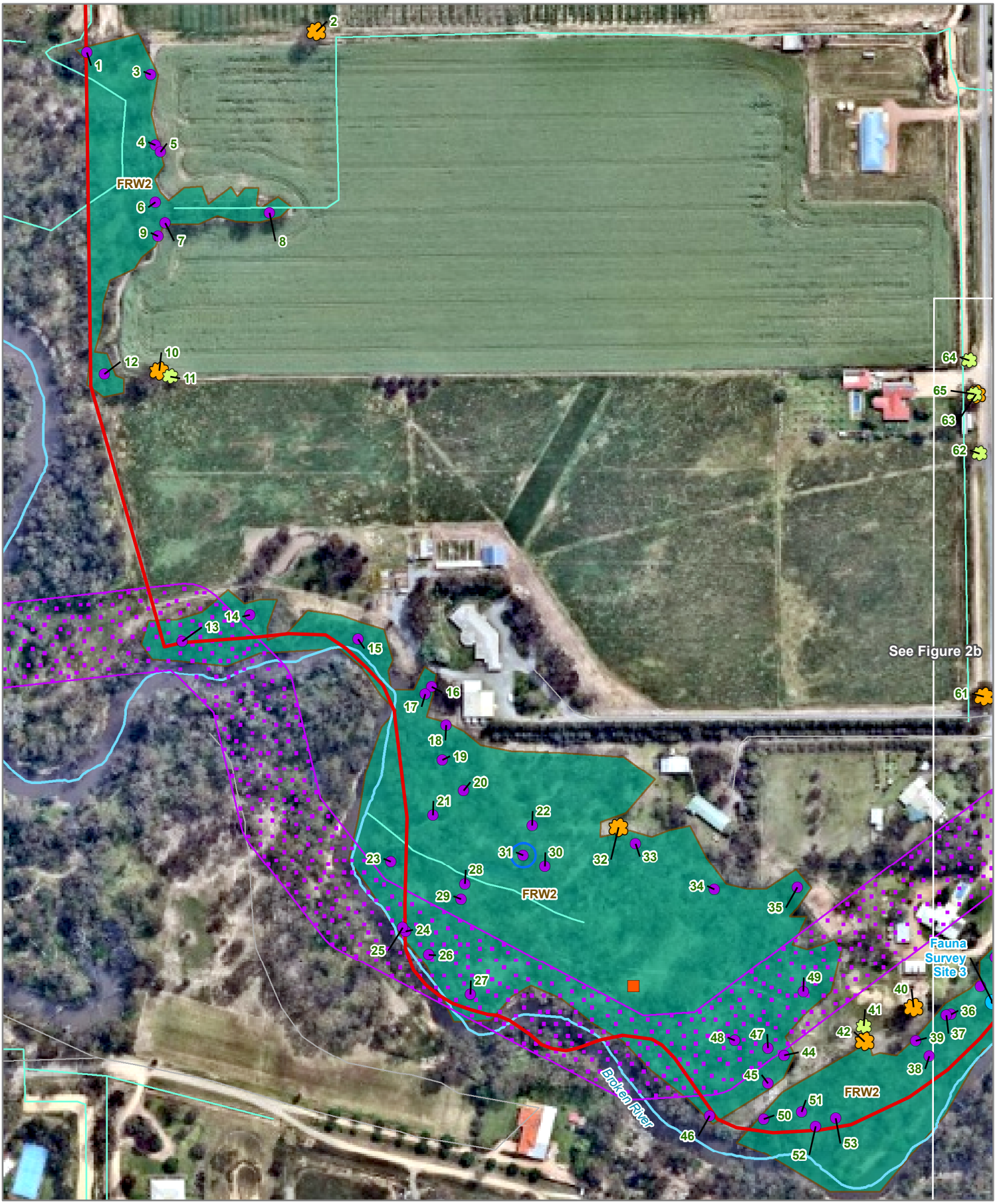

Figure 2a

Ecological features

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

ecology & heritage partners

Legend

- Study Area
- Important Victorian Wetlands
- Fauna survey location
- CaLP Act listed weed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Tree with hollows

Ecological Vegetation Classes

- Floodplain Riparian Woodland (EVC 56)

N

0 25 50

Metres

Map Scale: 1:3,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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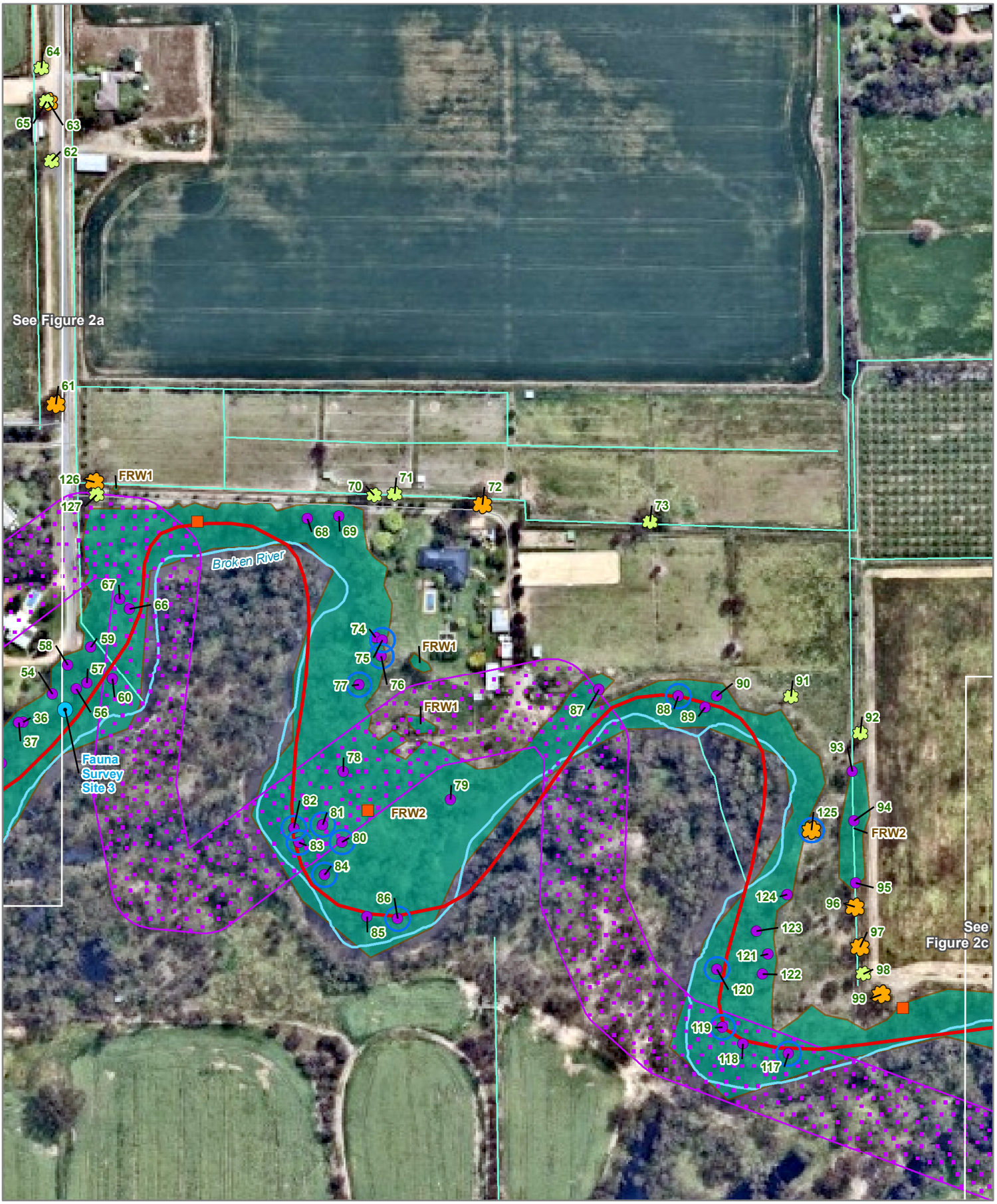


Figure 2b

Ecological features

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

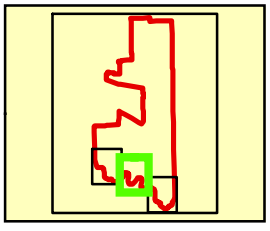
ecology & heritage partners

Legend

- Study Area
- Important Victorian Wetlands
- Fauna survey location
- CaLP Act listed weed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Tree with hollows

Ecological Vegetation Classes

- Floodplain Riparian Woodland (EVC 56)



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Metres

Map Scale: 1:3,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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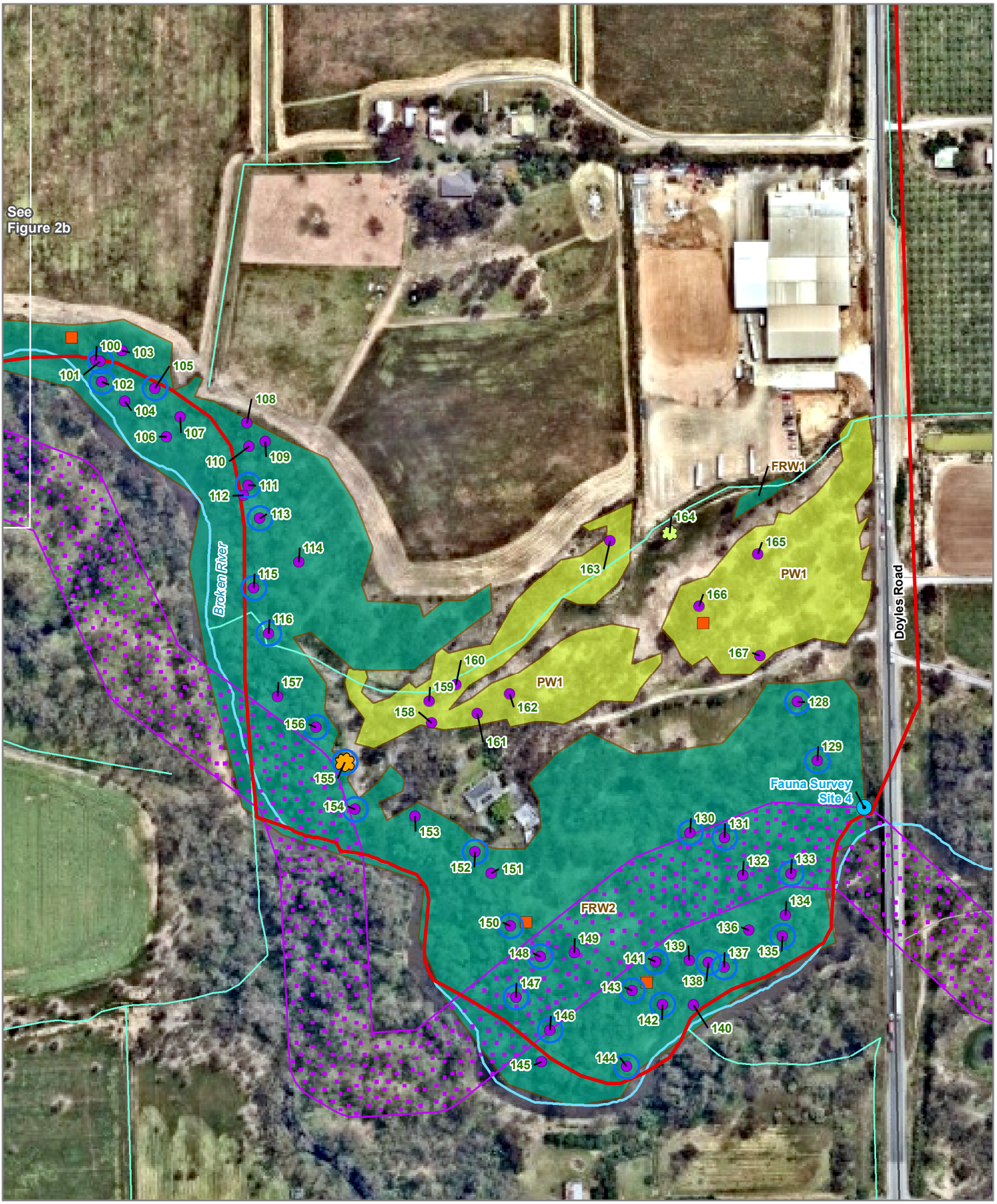


Figure 2c

Ecological features

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

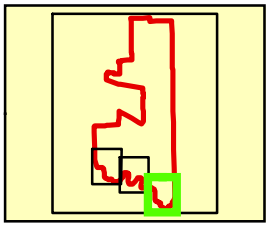
ecology & heritage partners

Legend

- Study Area
- Important Victorian Wetlands
- Fauna survey location
- CaLP Act listed weed
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Tree with hollows

Ecological Vegetation Classes

- Floodplain Riparian Woodland (EVC 56)
- Plains Woodland (EVC 803)



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Metres

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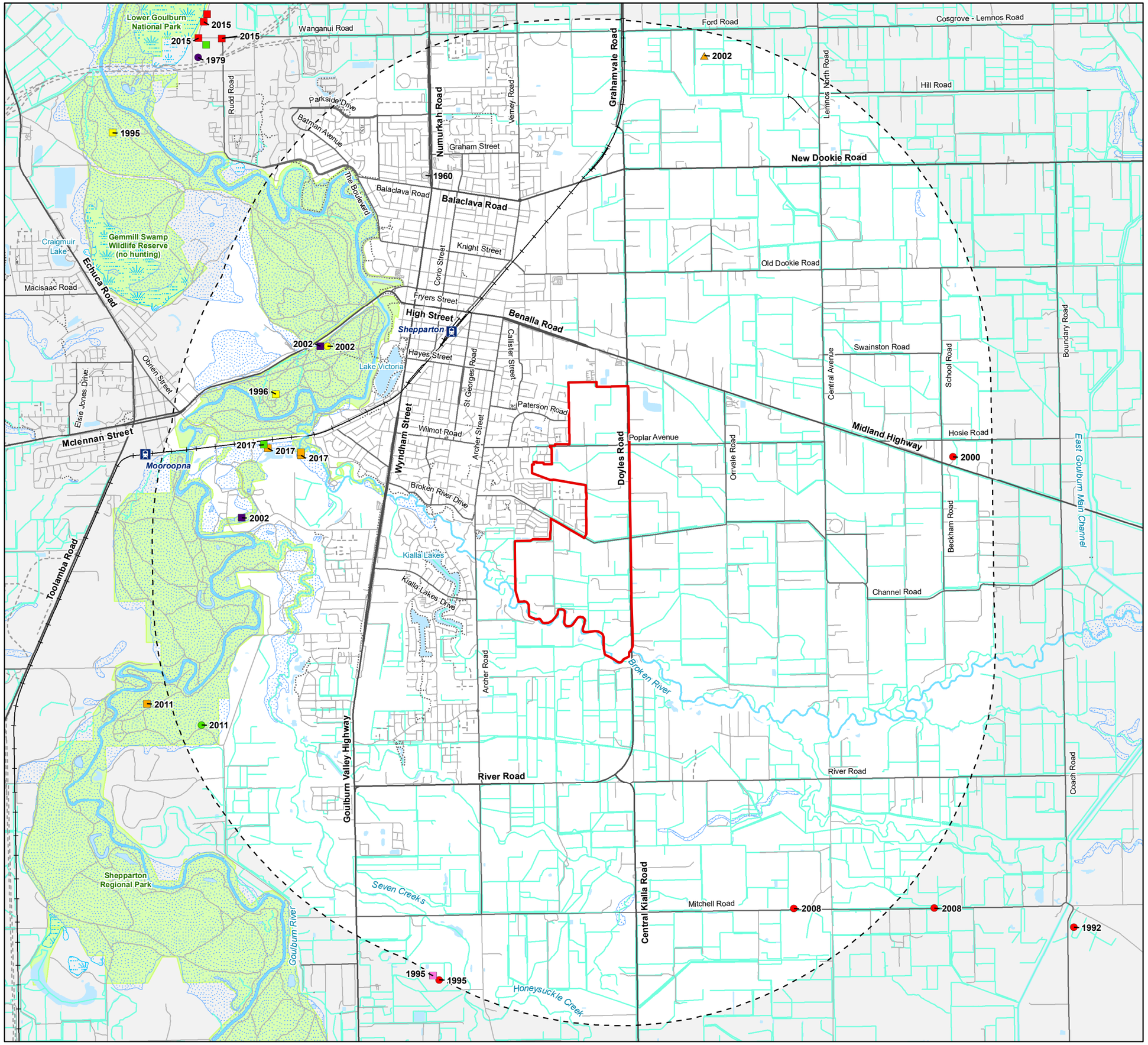

Legend

Study Area

Signifcant flora

- Bent-leaf Wattle
- Buloke
- Chinese Lespedeza
- Delicate Crane's-bill
- Glistening Dock
- Jericho Wire-grass
- Late-flower Flax-lily
- River Swamp Wallaby-grass
- Riverina Bitter-cress
- Sand Rush
- Small Scurf-pea
- Yellow-tongue Daisy

Figure 3

Previously documented significant flora within 5km of the study area

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

N

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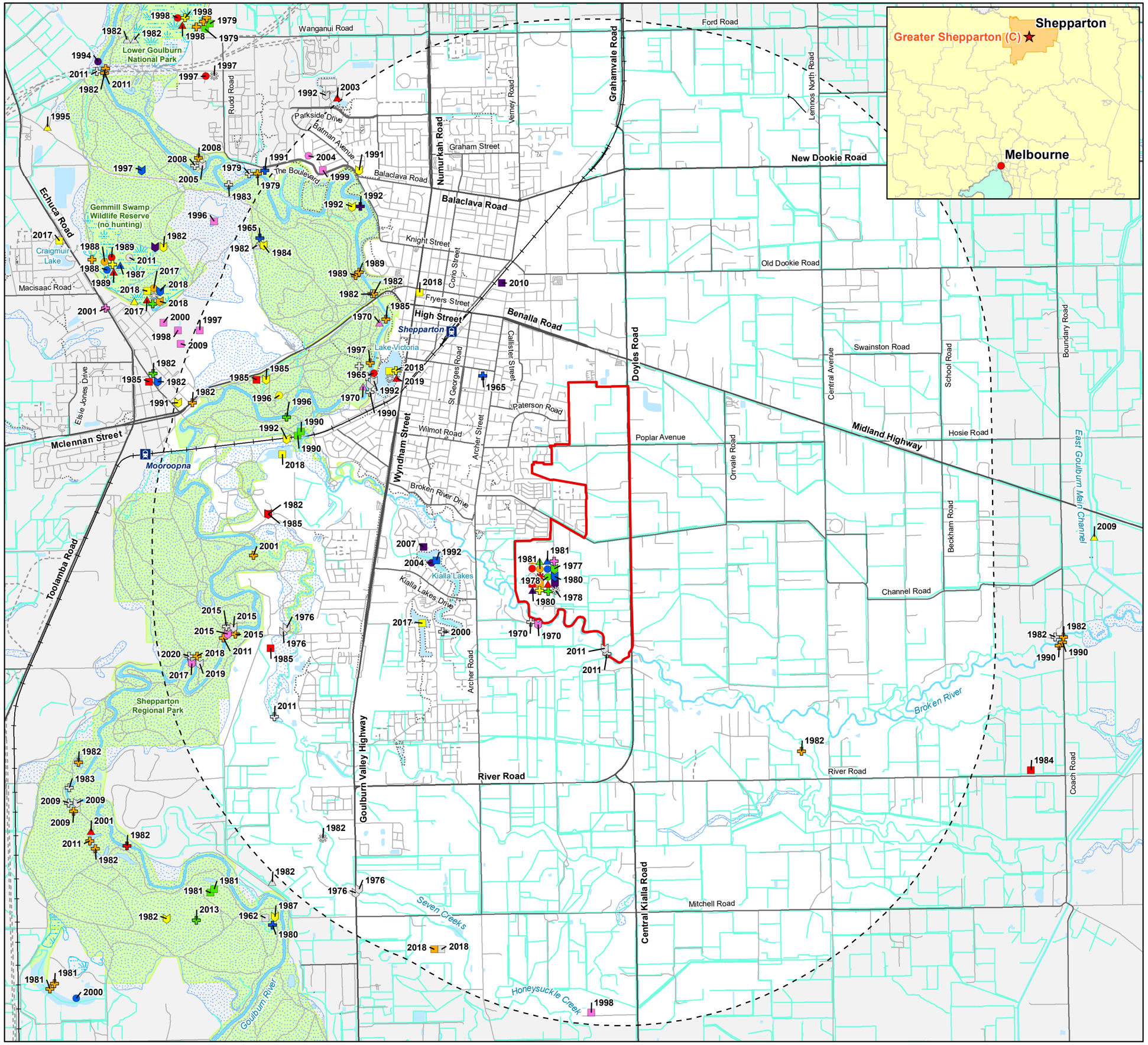
Kilometres

Map Scale: 1:50,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners



Legend

- Study Area

Significant fauna

- Australasian Bittern
- Australasian Shoveler
- Australian Little Bittern
- Barking Owl
- Black Falcon
- Blue-billed Duck
- Broad-shelled Turtle
- Brown Toadlet
- Brush-tailed Phascogale
- Bush Stone-curlew
- Diamond Firetail
- Eastern Great Egret
- Flat-headed Galaxias
- Freshwater Catfish
- Grey-crowned Babbler
- Grey-headed Flying-fox
- Growling Grass Frog
- Hardhead
- Hooded Robin
- Lace Monitor
- Little Eagle
- Little Egret
- Macquarie Perch
- Marsh Sandpiper
- Murray Cod
- Murray River Turtle
- Murray-Darling Rainbowfish
- Musk Duck
- Painted Honeyeater
- Platypus
- Plumed Egret
- Powerful Owl
- Silver Perch
- Speckled Warbler
- Square-tailed Kite
- Squirrel Glider
- Superb Parrot
- Swift Parrot
- Trout Cod
- Turquoise Parrot
- White-bellied Sea-Eagle
- White-throated Needletail

Figure 4

Previously documented significant fauna within 5km of the study area

Ecological Assessment for the proposed Shepparton South East Precinct Structure Plan, Shepparton

N

0 1 2

Kilometres

Map Scale: 1:50,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

APPENDIX 1 FLORA

Appendix 1.1 – Flora Results

Legend:

I Protected under the FFG Act (DELWP 2019a);

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

w Weed of National Significance;

+ Planted indigenous species that also occur in native vegetation in the study area;

Planted Victorian and non-Victorian species.

Table A1.1. Flora within the study area.

Scientific Name	Common Name	Notes
INDIGENOUS SPECIES		
Acacia dealbata	Silver Wattle	+
Acacia mearnsii	Black Wattle	+ I
Arthropodium strictum	Chocolate Lily	-
Bursaria spinosa	Sweet Bursaria	-
Chloris truncata	Windmill Grass	-
Dianella revoluta	Black-anther Flax-lily	-
Eucalyptus camaldulensis	River Red-gum	-
Eucalyptus melliodora	Yellow Box	-
Eucalyptus microcarpa	Grey Box	-
Eucalyptus tricarpa	Red Ironbark	#
Juncus spp.	Rush	-
Panicum spp.	Panic	-
Phragmites australis	Common Reed	-
Poa labillardierei	Common Tussock-grass	-
Rytidosperma caespitosum	Common Wallaby-grass	-
Rytidosperma spp.	Wallaby Grass	-
Typha spp.	Bulrush	-
Wahlenbergia gracilis	Sprawling Bluebell	-
NON-INDIGENOUS OR INTRODUCED SPECIES		
Agapanthus spp.	Agapanthus	#
Allium spp.	Garlic	-
Arctotheca calendula	Cape weed	-
Avena fatua	Wild Oat	-

Scientific Name	Common Name	Notes
Avena spp.	Oat	-
Cichorium intybus	Chicory	-
Cirsium vulgare	Spear Thistle	*
Dactylis glomerata	Cocksfoot	-
Echinochloa colona	Awnless Barnyard-grass	-
Echium plantagineum	Paterson's Curse	-
Eucalyptus cladocalyx	Sugar Gum	#
Fraxinus spp.	Ash	#
Helminthotheca echioides	Ox-tongue	-
Ipomoea spp.	Morning Glory	-
Lactuca serriola	Prickly Lettuce	-
Lolium spp.	Rye Grass	-
Lycium ferocissimum	African Box-thorn	W *
Lysimachia arvensis	Pimpernel	-
Marrubium vulgare	Horehound	*
Melaleuca ericifolia	Swamp Paperbark	#
Opuntia spp.	Prickly pear	*
Phalaris aquatica	Toowoomba Canary-grass	-
Plantago lanceolata	Ribwort	-
Rosa rubiginosa	Sweet Briar	*
Rubus fruticosus spp. agg.	Blackberry	W *
Rumex crispus	Curled Dock	-
Schinus molle	Pepper Tree	#

Appendix 1.2 – Tree Data

Table A1.2. Tree data

Tree ID	Species Name	Common Name	DBH	Size Class	Scattered / In Patch	Contains Hollows
1	*Eucalyptus melliodora*	Yellow Box	110	Large	Patch	-
2	*Eucalyptus camaldulensis*	River Red-gum	95	Large	Scattered	-
3	*Eucalyptus camaldulensis*	River Red-gum	139	Large	Patch	-
4	*Eucalyptus camaldulensis*	River Red-gum	148	Large	Patch	-
5	*Eucalyptus camaldulensis*	River Red-gum	115	Large	Patch	-
6	*Eucalyptus camaldulensis*	River Red-gum	89	Large	Patch	-
7	*Eucalyptus camaldulensis*	River Red-gum	107	Large	Patch	-
8	*Eucalyptus camaldulensis*	River Red-gum	134	Large	Patch	-
9	*Eucalyptus camaldulensis*	River Red-gum	95	Large	Patch	-
10	*Eucalyptus camaldulensis*	River Red-gum	149	Large	Scattered	-
11	*Eucalyptus camaldulensis*	River Red-gum	36	Small	Scattered	-
12	*Eucalyptus camaldulensis*	River Red-gum	94	Large	Patch	-
13	*Eucalyptus camaldulensis*	River Red-gum	95	Large	Patch	-
14	*Eucalyptus camaldulensis*	River Red-gum	113	Large	Patch	-
15	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	-
16	*Eucalyptus camaldulensis*	River Red-gum	101	Large	Patch	-
17	*Eucalyptus camaldulensis*	River Red-gum	82	Large	Patch	-
18	*Eucalyptus camaldulensis*	River Red-gum	124	Large	Patch	-
19	*Eucalyptus* sp.	Stag	119	Large	Patch	-
20	*Eucalyptus melliodora*	Yellow Box	84	Large	Patch	-
21	*Eucalyptus camaldulensis*	River Red-gum	128	Large	Patch	-
22	*Eucalyptus camaldulensis*	River Red-gum	125	Large	Patch	-
23	*Eucalyptus camaldulensis*	River Red-gum	110	Large	Patch	-
24	*Eucalyptus camaldulensis*	River Red-gum	105	Large	Patch	-
25	*Eucalyptus camaldulensis*	River Red-gum	100	Large	Patch	-
26	*Eucalyptus camaldulensis*	River Red-gum	98	Large	Patch	-
27	*Eucalyptus camaldulensis*	River Red-gum	126	Large	Patch	-
28	*Eucalyptus camaldulensis*	River Red-gum	110	Large	Patch	-
29	*Eucalyptus camaldulensis*	River Red-gum	91	Large	Patch	-
30	*Eucalyptus camaldulensis*	River Red-gum	86	Large	Patch	-
31	*Eucalyptus* sp.	Stag	105	Large	Patch	y
32	*Eucalyptus camaldulensis*	River Red-gum	86	Large	Scattered	-
33	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	-

Tree ID	Species Name	Common Name	DBH	Size Class	Scattered / In Patch	Contains Hollows
34	***Eucalyptus*** sp.	Stag	133	Large	Patch	-
35	*Eucalyptus camaldulensis*	River Red-gum	*90	Large	Patch	-
36	*Eucalyptus camaldulensis*	River Red-gum	117	Large	Patch	-
37	*Eucalyptus camaldulensis*	River Red-gum	95	Large	Patch	-
38	*Eucalyptus camaldulensis*	River Red-gum	88	Large	Patch	-
39	*Eucalyptus microcarpa*	Grey Box	92	Large	Patch	-
40	***Eucalyptus melliodora***	Yellow Box	90	Large	Scattered	-
41	***Eucalyptus*** sp.	Stag	76	Small	Scattered	-
42	*Eucalyptus camaldulensis*	River Red-gum	97	Large	Scattered	-
44	*Eucalyptus camaldulensis*	River Red-gum	*90	Large	Patch	-
45	***Eucalyptus*** sp.	Stag	125	Large	Patch	-
46	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	-
47	*Eucalyptus camaldulensis*	River Red-gum	130	Large	Patch	-
48	*Eucalyptus camaldulensis*	River Red-gum	*85	Large	Patch	-
49	*Eucalyptus camaldulensis*	River Red-gum	*100	Large	Patch	-
50	*Eucalyptus camaldulensis*	River Red-gum	*130	Large	Patch	-
51	*Eucalyptus camaldulensis*	River Red-gum	123	Large	Patch	-
52	*Eucalyptus camaldulensis*	River Red-gum	114	Large	Patch	-
53	*Eucalyptus camaldulensis*	River Red-gum	155	Large	Patch	-
54	*Eucalyptus camaldulensis*	River Red-gum	80	Large	Patch	-
56	*Eucalyptus camaldulensis*	River Red-gum	*90	Large	Patch	-
57	*Eucalyptus camaldulensis*	River Red-gum	*105	Large	Patch	-
58	*Eucalyptus camaldulensis*	River Red-gum	94	Large	Patch	-
59	*Eucalyptus camaldulensis*	River Red-gum	85	Large	Patch	-
60	*Eucalyptus camaldulensis*	River Red-gum	115	Large	Patch	-
61	*Eucalyptus camaldulensis*	River Red-gum	115	Large	Scattered	-
62	*Eucalyptus microcarpa*	Grey Box	50	Small	Scattered	-
63	*Eucalyptus camaldulensis*	River Red-gum	96	Large	Scattered	-
64	*Eucalyptus microcarpa*	Grey Box	32	Small	Scattered	-
65	*Eucalyptus microcarpa*	Grey Box	*70	Small	Scattered	-
66	*Eucalyptus camaldulensis*	River Red-gum	157	Large	Patch	-
67	*Eucalyptus camaldulensis*	River Red-gum	104	Large	Patch	-
68	*Eucalyptus camaldulensis*	River Red-gum	103	Large	Patch	-
69	*Eucalyptus camaldulensis*	River Red-gum	90	Large	Patch	-
70	*Eucalyptus camaldulensis*	River Red-gum	74	Small	Scattered	-
71	*Eucalyptus camaldulensis*	River Red-gum	25	Small	Scattered	-
72	*Eucalyptus camaldulensis*	River Red-gum	92	Large	Scattered	-

Tree ID	Species Name	Common Name	DBH	Size Class	Scattered / In Patch	Contains Hollows
73	*Eucalyptus camaldulensis*	River Red-gum	73	Small	Scattered	-
74	*Eucalyptus camaldulensis*	River Red-gum	135	Large	Patch	-
75	*Eucalyptus camaldulensis*	River Red-gum	88	Large	Patch	y
76	*Eucalyptus camaldulensis*	River Red-gum	156	Large	Patch	y
77	*Eucalyptus camaldulensis*	River Red-gum	134	Large	Patch	y
78	*Eucalyptus camaldulensis*	River Red-gum	107	Large	Patch	-
79	*Eucalyptus camaldulensis*	River Red-gum	138	Large	Patch	-
80	*Eucalyptus camaldulensis*	River Red-gum	187	Large	Patch	y
81	*Eucalyptus camaldulensis*	River Red-gum	100	Large	Patch	y
82	*Eucalyptus camaldulensis*	River Red-gum	98	Large	Patch	y
83	*Eucalyptus camaldulensis*	River Red-gum	151	Large	Patch	y
84	*Eucalyptus camaldulensis*	River Red-gum	*180	Large	Patch	y
85	*Eucalyptus camaldulensis*	River Red-gum	173	Large	Patch	-
86	*Eucalyptus camaldulensis*	River Red-gum	*150	Large	Patch	y
87	*Eucalyptus camaldulensis*	River Red-gum	102	Large	Patch	-
88	*Eucalyptus* sp.	Stag	*90	Large	Patch	y
89	*Eucalyptus camaldulensis*	River Red-gum	85	Large	Patch	-
90	*Eucalyptus camaldulensis*	River Red-gum	80	Large	Patch	-
91	*Eucalyptus camaldulensis*	River Red-gum	25	Small	Scattered	-
92	*Eucalyptus camaldulensis*	River Red-gum	35	Small	Scattered	-
93	*Eucalyptus camaldulensis*	River Red-gum	99	Large	Patch	-
94	*Eucalyptus camaldulensis*	River Red-gum	144	Large	Patch	-
95	*Eucalyptus camaldulensis*	River Red-gum	113	Large	Patch	-
96	*Eucalyptus camaldulensis*	River Red-gum	99	Large	Scattered	-
97	*Eucalyptus camaldulensis*	River Red-gum	81	Large	Scattered	-
98	*Eucalyptus camaldulensis*	River Red-gum	50	Small	Scattered	-
99	*Eucalyptus camaldulensis*	River Red-gum	99	Large	Scattered	-
100	*Eucalyptus camaldulensis*	River Red-gum	*80	Large	Patch	-
101	*Eucalyptus* sp.	Stag	*90	Large	Patch	y
102	*Eucalyptus camaldulensis*	River Red-gum	*90	Large	Patch	y
103	*Eucalyptus camaldulensis*	River Red-gum	85	Large	Patch	-
104	*Eucalyptus camaldulensis*	River Red-gum	*95	Large	Patch	-
105	*Eucalyptus camaldulensis*	River Red-gum	*100	Large	Patch	y
106	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	-
107	*Eucalyptus camaldulensis*	River Red-gum	*100	Large	Patch	-
108	*Eucalyptus camaldulensis*	River Red-gum	*85	Large	Patch	-
109	*Eucalyptus camaldulensis*	River Red-gum	107	Large	Patch	-

Tree ID	Species Name	Common Name	DBH	Size Class	Scattered / In Patch	Contains Hollows
110	*Eucalyptus camaldulensis*	River Red-gum	86	Large	Patch	-
111	***Eucalyptus*** sp.	Stag	*110	Large	Patch	y
112	*Eucalyptus camaldulensis*	River Red-gum	*100	Large	Patch	-
113	***Eucalyptus*** sp.	Stag	*200	Large	Patch	y
114	*Eucalyptus camaldulensis*	River Red-gum	108	Large	Patch	-
115	*Eucalyptus camaldulensis*	River Red-gum	*100	Large	Patch	y
116	*Eucalyptus camaldulensis*	River Red-gum	*115	Large	Patch	y
117	***Eucalyptus*** sp.	Stag	*100	Large	Patch	y
118	*Eucalyptus camaldulensis*	River Red-gum	111	Large	Patch	-
119	***Eucalyptus*** sp.	Stag	175	Large	Patch	y
120	***Eucalyptus*** sp.	Stag	167	Large	Patch	y
121	*Eucalyptus camaldulensis*	River Red-gum	119	Large	Patch	-
122	*Eucalyptus camaldulensis*	River Red-gum	90	Large	Patch	-
123	*Eucalyptus camaldulensis*	River Red-gum	*90	Large	Patch	-
124	*Eucalyptus camaldulensis*	River Red-gum	121	Large	Patch	-
125	*Eucalyptus microcarpa*	Grey Box	*95	Large	Scattered	y
126	*Eucalyptus camaldulensis*	River Red-gum	117	Large	Scattered	-
127	*Eucalyptus camaldulensis*	River Red-gum	55	Small	Scattered	-
128	***Eucalyptus*** sp.	Stag	138	Large	Patch	y
129	*Eucalyptus camaldulensis*	River Red-gum	*130	Large	Patch	y
130	*Eucalyptus camaldulensis*	River Red-gum	217	Large	Patch	y
131	*Eucalyptus camaldulensis*	River Red-gum	89	Large	Patch	y
132	*Eucalyptus camaldulensis*	River Red-gum	87	Large	Patch	-
133	*Eucalyptus microcarpa*	Grey Box	96	Large	Patch	y
134	*Eucalyptus camaldulensis*	River Red-gum	80	Large	Patch	-
135	***Eucalyptus*** sp.	Stag	147	Large	Patch	y
136	*Eucalyptus camaldulensis*	River Red-gum	82	Large	Patch	-
137	*Eucalyptus camaldulensis*	River Red-gum	*110	Large	Patch	y
138	*Eucalyptus camaldulensis*	River Red-gum	94	Large	Patch	y
139	*Eucalyptus camaldulensis*	River Red-gum	134	Large	Patch	-
140	*Eucalyptus camaldulensis*	River Red-gum	83	Large	Patch	-
141	***Eucalyptus*** sp.	Stag	91	Large	Patch	y
142	***Eucalyptus*** sp.	Stag	110	Large	Patch	y
143	*Eucalyptus camaldulensis*	River Red-gum	*100	Large	Patch	y
144	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	y
145	*Eucalyptus camaldulensis*	River Red-gum	136	Large	Patch	-
146	*Eucalyptus camaldulensis*	River Red-gum	200	Large	Patch	y

Tree ID	Species Name	Common Name	DBH	Size Class	Scattered / In Patch	Contains Hollows
147	*Eucalyptus camaldulensis*	River Red-gum	162	Large	Patch	y
148	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	y
149	*Eucalyptus camaldulensis*	River Red-gum	92	Large	Patch	-
150	*Eucalyptus* sp.	Stag	*140	Large	Patch	y
151	*Eucalyptus camaldulensis*	River Red-gum	90	Large	Patch	-
152	*Eucalyptus camaldulensis*	River Red-gum	130	Large	Patch	y
153	*Eucalyptus camaldulensis*	River Red-gum	83	Large	Patch	-
154	*Eucalyptus camaldulensis*	River Red-gum	145	Large	Patch	y
155	*Eucalyptus microcarpa*	Grey Box	83	Large	Scattered	y
156	*Eucalyptus camaldulensis*	River Red-gum	*120	Large	Patch	y
157	*Eucalyptus camaldulensis*	River Red-gum	*90	Large	Patch	-
158	*Eucalyptus microcarpa*	Grey Box	80	Large	Patch	-
159	*Eucalyptus camaldulensis*	River Red-gum	89	Large	Patch	-
160	*Eucalyptus camaldulensis*	River Red-gum	*95	Large	Patch	-
161	*Eucalyptus microcarpa*	Grey Box	93	Large	Patch	-
162	*Eucalyptus camaldulensis*	River Red-gum	102	Large	Patch	-
163	*Eucalyptus camaldulensis*	River Red-gum	94	Large	Patch	-
164	*Eucalyptus camaldulensis*	River Red-gum	68	Small	Scattered	-
165	*Eucalyptus microcarpa*	Grey Box	78	Large	Patch	-
166	*Eucalyptus microcarpa*	Grey Box		Large	Patch	-
167	*Eucalyptus microcarpa*	Grey Box	81	Large	Patch	-
168	*Eucalyptus microcarpa*	Grey Box	60	Small	Scattered	-
170	*Eucalyptus camaldulensis*	River Red-gum	*40	Small	Scattered	-
171	*Eucalyptus microcarpa*	Grey Box	*40	Small	Scattered	-
172	*Eucalyptus microcarpa*	Grey Box	*20	Small	Scattered	-
173	*Eucalyptus camaldulensis*	River Red-gum	*45	Small	Scattered	-
174	*Eucalyptus microcarpa*	Grey Box	*50	Small	Scattered	-

Note: * denotes DBH estimate where tree could not be accessed for measurement due to site access or safety reasons.

Appendix 1.3 – Significant Flora Species

Significant flora within 10 kilometres of the study area is provided in the Table A1.4.3 at the end of this section, with Tables A1.4.1 and A1.4.2 below providing the background context for the values in Table 1.4.3.

Table A1.3 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 7 in Table A1.4.3.

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

Table A1.4.2 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 8 in Table A1.4.3.

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 A1.4.3 Significant flora recorded within 10 kilometres of the study area.

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likelihood of occurrence in study area	Rationale for occurrence likelihood
NATIONALLY SIGNIFICANT SPECIES							
Amphibromus fluitans	River Swamp Wallaby-grass	3	1996	VU	-	4	Potential habitat within Floodplain Riparian Woodland, but very unlikely due to agricultural disturbance
Brachyscome muelleroides #	Mueller Daisy	-	-	VU	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Glycine latrobeana #	Clover Glycine	-	-	VU	vu	5	No suitable habitat
Lepidium monoplocoides #	Winged Pepper-cress	-	-	EN	en	5	Potential habitat within Floodplain Riparian Woodland, but very unlikely due to agricultural disturbance
Myriophyllum porcatum #	Ridged Water-milfoil	-	-	VU	cr	4	Potential habitat, but very unlikely due to agricultural disturbance
Pimelea spinescens subsp. *spinescens #*	Spiny Rice-flower	-	-	CR	cr	4	Potential habitat, but very unlikely due to agricultural disturbance

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likelihood of occurrence in study area	Rationale for occurrence likelihood
Sclerolaena napiformis #	Turnip Copperburr	-	-	EN	cr	4	Potential habitat, but very unlikely due to agricultural disturbance
Senecio macrocarpus #	Large-fruit Fireweed	-	-	VU	cr	4	Potential habitat, but very unlikely due to agricultural disturbance
Senecio psilocarpus #	Swamp Fireweed	-	-	VU	-	5	Outside distribution range
STATE SIGNIFICANT SPECIES							
Acacia flexifolia	Bent-leaf Wattle	2	2008	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Allocasuarina luehmannii	Buloke	20	2008	-	vu	3	Potential habitat within the study area
Amyema linophylla subsp. *orientalis*	Buloke Mistletoe	1	2008	-	cr	3-4	Potential habitat for host plant (Buloke)
Aristida jerichoensis var. *subspinulifera*	Jericho Wire-grass	5	2015	-	cr	4	Potential habitat, but very unlikely due to agricultural disturbance
Brachyscome chrysoglossa	Yellow-tongue Daisy	1	2002	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Cardamine moirensis	Riverina Bitter-cress	2	2017	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likelihood of occurrence in study area	Rationale for occurrence likelihood
Cullen parvum	Small Scurf-pea	3	2002	-	cr	4	Potential habitat, but very unlikely due to agricultural disturbance
Dianella tarda	Late-flower Flax-lily	4	2017	-	en	3	Potential habitat within native vegetation associated with the Broken River environs, limited habitat due to agricultural disturbance
Geranium sp. 6	Delicate Crane's-bill	1	2011	-	cr	4	Potential habitat, but very unlikely due to agricultural disturbance
Juncus psammophilus	Sand Rush	3	2000	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Lespedeza juncea subsp. *sericea*	Chinese Lespedeza	1	2002	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle	1	2006	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Myriophyllum striatum	Striped Water-milfoil	1	1996	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance
Rumex crystallinus s.s.	Glistening Dock	1	1979	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	Likelihood of occurrence in study area	Rationale for occurrence likelihood
Senecio campylocarpus	Floodplain Fireweed	6	2008	-	en	3	Potential habitat within Floodplain Riparian Woodland.
Senecio longicollaris	Riverina Fireweed	1	2008	-	en	4	Potential habitat within Floodplain Riparian Woodland.
Sida intricata	Twiggy Sida	1	1996	-	en	4	Potential habitat, but very unlikely due to agricultural disturbance

Data Sources: Victorian Biodiversity Atlas (DELWP 2021e); Protected Matters Search Tool (DAWE 2021)

APPENDIX 2 – FAUNA

Appendix 2.1 – Fauna Survey Results

Table A2.1.1 Fauna survey results.

Common Name	Scientific Name	Native/Introduced	Hollow Use	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Incidental siting in study area
Australasian Grebe	*Tachybaptus novaehollandiae*	N	-	y						
Australian Magpie	*Gymnorhina tibicen*	N	-							y
Australian Wood Duck	*Chenonetta jubata*	N	Total						y	y
Cat	*Felis catus*	I	-							y
Collared Sparrowhawk	*Accipiter cirrhocephalus*	N	-							y
Common Brushtail Possum	*Trichosurus vulpecula*	N	Total		y	y	y			
Common Froglet	*Crinia signifera*	N	-	y	y	y	y			
Common Myna	*Acridotheres tristis*	I	-							y
Plains Froglet	*Crinia parinsignifera*	N	-						y	
Eurasian Coot	*Fulica atra*	N	-	y						y
European Hare	*Lepus europeaus*	I	-							y
European Rabbit	*Oryctolagus cuniculus*	I	-							y
Galah	*Eolophus roseicapilla*	N	Total							y
Little Raven	*Corvus mellori*	N	-							y

Common Name	Scientific Name	Native/Introduced	Hollow Use	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Incidental siting in study area
Long-billed Corella	*Cacatua tenuirostris*	N	Total							y
Long-necked Turtle	*Chelodina longicollis*	N	-	y						y
Noisy Miner	*Manorina melanocephala*	N	-							y
Pacific Black Duck	*Anas superciliosa*	N	-	y						y
Peron's Tree Frog	*Litoria peronii*	N	Partial	y		y	y			
Pobblebonk Frog	*Limnodynastes dumerilii dumerilii*	N	-	y		y			y	
Purple Swamphen	*Porphyrio porphyrio*	N	-	y						y
Red Fox	*fam. Canidae gen. Vulpes*	I	-	y						
Sacred Kingfisher	*Todiramphus sanctus*	N	Partial							y
Southern Boobook	*Ninox novaeseelandiae*	N	Total	y						
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	N	-	y			y	y		
Straw-necked Ibis	*Threskiornis spinicollis*	N	-							y
Sulphur-crested Cockatoo	*Cacatua galerita*	N	Total							y
Superb Fairy-wren	*Malurus cyaneus*	N	-							y
Tawny Frogmouth	*Podargus strigoides*	N	-		y	y				
White-faced Heron	*Egretta novaehollandiae*	N	-							y
White-winged Chough	*Corcorax melanorhamphos*	N	-							y
Willie Wagtail	*Rhipidura leucophrys*	N	-							y

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	cr	Critically endangered
CR	Critically endangered	en	Endangered
EN	Endangered	vu	Vulnerable
VU	Vulnerable		
CD	Conservation dependent		
#	Listed on the Protected Matters Search Tool		

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

4	Unlikely	• No previous records of the species in the local area; and/or, • The species may fly over the study area when moving between areas of more suitable habitat; and/or, • Out of the species' range; and/or, • No suitable habitat present.

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

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
NATIONALLY SIGNIFICANT							
Australasian Bittern	*Botaurus poiciloptilus*	3	2011	EN	cr	3	Potential habitat, but unlikely due to disturbance and more suitable habitat to the north-west. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.
Australian Painted Snipe	*Rostratula australis*	#	-	EN	cr	4	No suitable habitat. No known records within the area.
Curlew Sandpiper	*Calidris ferruginea*	#	-	CR	cr	4	No suitable habitat. No known records within the area.
Eastern Curlew, Far Eastern Curlew	*Numenius madagascariensis*	#	-	CR	cr	4	No suitable habitat. No known records within the area.
Flat-headed Galaxias	*Galaxias rostratus*	6	1990	CR	vu	3	Only limited and old records in the area. Potential habitat although unlikely to be suitable quality.

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Golden Sun Moth	*Synemon plana*	#	-	VU	vu	3	Outside known distribution. No records within the area.
Grey Falcon	*Falco hypoleucos*	#	-	VU	vu	3	May visit the study area om rare occasionally or on an opportunistic basis. No recent records within the area.
Grey-headed Flying-fox	*Pteropus poliocephalus*	2	2010	VU	vu	3	May visit the study area occasionally or on an opportunistic basis to feed. No recent records within the area.
Growling Grass Frog	*Litoria raniformis*	7	1982	VU	vu	3	Study area is unlikely to provide suitable habitat. No recent records nearby.
Macquarie Perch	*Macquaria australasica*	6	1975	EN	en	3	Potential habitat. May utilise the study area occasionally. No recent records.
Murray Cod	*Maccullochella peelii*	74	2020	VU	en	1	Suitable habitat within the Broken River and recent records within the study area.
Painted Honeyeater	*Grantiella picta*	5	2018	VU	vu	2	Potential habitat for the species. May visit the study area occasionally to forage or whilst moving to more suitable sites.
Plains-wanderer	*Pedionomus torquatus*	#	-	CR	cr	4	No suitable habitat. No known records in the area.
Regent Honeyeater	*Anthochaera phrygia*	#	-	CR	cr	4	No suitable habitat. No known records in the area.

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Silver Perch	*Bidyanus bidyanus*	17	2020	CR	en	2	Suitable habitat and recent records around the study area.
Sloane's Froglet	*Crinia sloanei*	1	1996	EN	en	4	Study area is unlikely to provide suitable habitat. No recent records nearby.
Superb Parrot	*Polytelis swainsonii*	1	1977	VU	en	3	Potential habitat. May utilise the study area occasionally. No recent records.
Swift Parrot	*Lathamus discolor*	12	2018	CR	cr	3	Potential habitat. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.
Trout Cod	*Maccullochella macquariensis*	9	2020	EN	en	2	Suitable habitat and previous old records in the area.
White-throated Needletail	*Hirundapus caudacutus*	11	2017	VU	vu	4	Possible visitor (flyover) during the warmer months of the year (migratory species).
STATE SIGNIFICANT							
Australasian Shoveler	*Spatula rhynchotis*	101	2019		vu	2	May visit the study area occasionally or on an opportunistic basis.
Australian Little Bittern	*Ixobrychus dubius*	8	2017		en	2	May visit the study area occasionally or on an opportunistic basis.
Barking Owl	*Ninox connivens*	1	1995		cr	3	Potential habitat. May visit the study area occasionally or on an

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
							opportunistic basis whilst moving to more suitable sites.
Black Falcon	*Falco subniger*	1	1978		cr	3	May visit the study area occasionally or on an opportunistic basis. Unlikely due to disturbance and lack of recent records within the area.
Blue-billed Duck	*Oxyura australis*	25	2009		vu	2	May visit the study area occasionally or on an opportunistic basis.
Broad-shelled Turtle	*Chelodina expansa*	1	2003		en	3	Potential habitat, but unlikely due to disturbance and lack of recent records within the area.
Brown Toadlet	*Pseudophryne bibronii*	3	2009		en	3	Potential habitat, but unlikely due to lack of records within the area.
Brush-tailed Phascogale	*Phascogale tapoatafa*	3	2018		vu	3	Potential habitat, but unlikely due to disturbance and lack of recent records within the area.
Bush Stone-curlew	*Burhinus grallarius*	29	2018		cr	4	Not suitable habitat. No recent records nearby.
Diamond Firetail	*Stagonopleura guttata*	8	2018		vu	4	Unlikely due to disturbance and lack poor quality habitat.
Eastern Great Egret	*Ardea alba modesta*	58	2019		vu	3	Potential habitat. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Freckled Duck	*Stictonetta naevosa*	9	2009		en	2	May visit the study area occasionally or on an opportunistic basis.
Freshwater Catfish	*Tandanus tandanus*	1	1992		en	3	Potential habitat. May utilise the study area occasionally. No recent records.
Grey-crowned Babbler	*Pomatostomus temporalis*	12	2018		vu	3	Potential habitat for the species. May visit the study area occasionally to forage or whilst moving to more suitable sites.
Hardhead	*Aythya australis*	115	2019		vu	1	Recent records nearby. Likely to visit the study area (i.e. farm dams and other waterbodies) occasionally or whilst moving to more suitable habitat.
Hooded Robin	*Melanodryas cucullata*	4	2018		vu	3	Potential habitat for the species. May visit the study area occasionally to forage or whilst moving to more suitable sites.
Lace Monitor	*Varanus varius*	6	2016		en	4	Unlikely due to disturbance and lack of recent records within the area.
Lewin's Rail	*Lewinia pectoralis*	1	2009		vu	4	Potential low-quality habitat. Unlikely due to lack of records within the area.
Little Eagle	*Hieraaetus morphnoides*	19	2011		vu	2	May visit the study area occasionally or on an opportunistic basis.
Little Egret	*Egretta garzetta*	8	2017		en	4	Lack of suitable habitat. May visit the study area occasionally.

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Magpie Goose	*Anseranas semipalmata*	3	1990		vu	3	No recent records nearby. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.
Marsh Sandpiper	*Tringa stagnatilis*	2	1995		en	4	Unlikely due to disturbance and lack of recent records within the area.
Murray River Turtle	*Emydura macquarii*	6	2009		cr	2	Potential habitat. Likely to utilise the study area occasionally.
Murray-Darling Rainbowfish	*Melanotaenia fluviatilis*	84	2018		en	2	Potential habitat. Likely to utilise the study area occasionally.
Musk Duck	*Biziura lobata*	66	2018		vu	1	Recent records nearby. Likely to visit the study area occasionally or whilst moving to more suitable habitat.
Pacific Golden Plover	*Pluvialis fulva*	1	1987		vu	4	Unlikely due to disturbance and lack of recent records within the area.
Platypus	*Ornithorhynchus anatinus*	6	1994		vu	2	Suitable habitat within Broken River.
Plumed Egret	*Ardea intermedia plumifera*	23	2009		cr	3	May visit the study area occasionally or on an opportunistic basis.
Powerful Owl	*Ninox strenua*	1	1992		vu	3	Potential habitat. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.
Speckled Warbler	*Pyrrholaemus sagittatus*	2	1982		en	4	Unlikely due to disturbance and lack of recent records within the area.

Common Name	*Scientific Name*	Number of Previous Records	Most Recent Record (Year)	EPBC	FFG	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Square-tailed Kite	*Lophoictinia isura*	1	2018		vu	2	May visit the study area occasionally or on an opportunistic basis.
Squirrel Glider	*Petaurus norfolcensis*	27	2018		vu	2	Suitable habitat within Floodplain Riparian Woodland and recent records within the area.
Turquoise Parrot	*Neophema pulchella*	3	2018		vu	3	Potential habitat for the species. May visit the study area occasionally to forage or whilst moving to more suitable sites.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	48	2019		en	3	May visit the study area occasionally or on an opportunistic basis when moving into areas of more suitable habitat.
Wood Sandpiper	*Tringa glareola*	5	2009		en	3	May visit the study area occasionally or on an opportunistic basis when moving into areas of more suitable habitat.