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Final Report

Ecological Investigations for the Proposed Kialla North Growth Corridor, Kialla, 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 Ecological Investigations for the Proposed Kialla North Growth Corridor, Kialla, Victoria.

We understand that Greater Shepparton City Council is seeking to develop a Precinct Structure Plan (PSP) and Development Contributions Plan (DCP) for the Kialla North Growth Corridor. The PSP will guide the future development of the land and the DCP will identify and cost the quantum of infrastructure required to support the future development of the land and planning application in order to facilitate future development works, including residential and commercial development, as well as a program of landscaping and ecological work to enhance the parklands and areas of open space.

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 at Kialla, immediately east of the Kialla township and approximately 180 kilometres north of Melbourne's CBD (Figure 1). The study area covers approximately 450 hectares and is bound by Broken River to the north, River Road to the south, Doyles Road to the east and Archer Road to the west.

The study area is currently used predominantly for agricultural and pastoral purposes, with properties comprising open pastures and planted crops. The study area is relatively flat, with the Broken River demarcating the northern boundary of the township and is the only waterway in the 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 2020);
- 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 2019a) and Protected (DELWP 2019b) Lists;
- The online VicPlan Map (DELWP 2021d) to ascertain current zoning and environmental overlays in the study area; and
- Aerial photography of the study area.

2.2 Field Assessment

A field assessment was undertaken on 18 December 2020 to obtain information on flora and fauna values within the study area. The field surveys focussed on areas potentially supporting ecological values, with small residential lots and developed and/or cropped land excluded from the assessment. Select properties were walked and driven, 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 2017).

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 2017) 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.

2.3 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.

The terrestrial flora and fauna data collected during the field assessment and information obtained from relevant desktop sources is considered to adequately inform the assessment of the broad ecological values present within the study area and to assist council as part of the preparation of the Kialla North PSP.

3 RESULTS

3.1 Vegetation Condition

The study area is representative of many areas within the Victorian Riverina, with large areas of improved pastures and derived native grasslands, 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 2020c), with native flora in the study area best represented by three EVCs: Floodplain Riparian Woodland (EVC 56), Plains Woodland (EVC 803) and Tall Marsh (EVC 821).

Native vegetation mapping completed as part of this identified 61.94 hectares of native vegetation representative of three EVCs (Figure 2), including:

- 49.50 hectares of Floodplain Riparian Woodland;
- 8.57 hectares of 'tree-less' Plains Woodland (derived native grassland);
- 3.78 hectares of 'treed' Plains Woodland;
- 0.09 hectares of Tall Marsh; and
- 27 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).

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

3.1.1 Patches of Native Vegetation

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.

Plains Woodland patches within the study area generally consisted of small, isolated patches predominately present as canopy trees (typically Grey Box *Eucalyptus macrocarpa*) over an exotic understorey dominated by pasture grasses, including Wild Oat *Avena fatua*, Toowoomba Canary-grass *Phalaris aquatica* and Cocksfoot *Dactylis glomerata* (Plate 1). Several patches of low-moderate quality treeless Plains Woodland, present as

native grassland, were also present. These areas were dominated by wallaby grass *Rytidosperma* spp., with low species diversity (Plate 2).

Plate 1. PW1 - Low quality Plains Woodland within the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

Plate 2. PW2 - treeless Plains Woodland, dominated by Wallaby Grass (Ecology and Heritage Partners Pty Ltd 18/12/2020).

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.

Floodplain Riparian Woodland within the study area was generally confined to the banks and floodplain of the Broken River, which also serves as the northern border of the study area. The overstorey was dominated by River Red-gum *Eucalyptus camaldulensis,* over an exotic understorey dominated by pasture grasses including Oat and Toowoomba Canary-grass (Plate 3). Juvenile River Red-gums were also sporadically present within the understorey (Plate 3).

Tall Marsh

Tall Marsh is a wetland dominated by tall emergent graminoids (rushes, sedges, reeds), typically in thick species-poor swards. Occupies wetlands usually associated with anabranch creeks. Soils are almost permanently moist. Dominant species are tolerant of relatively deep and sustained inundation, but not total immersion for any sustained period.

Tall Marsh within the study area was present as a dense thicket of reeds, dominated by Common Reed and Broadleaf Cumbungi *Typha orientalis*, with very low species diversity (Plate 4).

Plate 3. Floodplain Riparian Woodland along the northern boundary of the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

Plate 4. Tall Marsh (left) within the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

3.1.2 Scattered Trees

Twenty-seven scattered trees (predominately Grey Box) were recorded within the study area, which consisted of 22 large and five small scattered trees (Figure 2; Appendix 1.2). These trees would have once formed part of the Plains Woodland EVC; 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).

Plate 5. A large scattered tree (Grey Box) within the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

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. 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 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 6, Plate 7 and Plate 8).

Noxious weeds, as defined under the CaLP Act, were present within the study area, namely Spear Thistle *Cirsium vulgare* and Blackberry *Rubus fruticosus* spp. agg. (Plate 9). Blackberry is also a Weed of National Significance (WoNS).

Plate 6. Mown lawn near the study area's northern boundary (Ecology and Heritage Partners Pty Ltd 18/12/2020).

Plate 7. Cereal crop within the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

Plate 8. Exotic pasture grasses dominate most of the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

Plate 9. Exotic grasses and Spear Thistle within the study area (Ecology and Heritage Partners Pty Ltd 18/12/2020).

3.2 Fauna Habitat

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. Hollows and fissures within mature eucalypts and stags (dead trees) provide roosting, nesting and sheltering habitat for hollow-dependent birds and mammals. 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, several patches support 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 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.

Plains Woodland derived grasslands within the study area provides potential habitat for a diversity of fauna species. This habitat type is likely to support a range of native and introduced birds (including a diversity of raptors), mammals (e.g. Eastern Grey Kangaroo *Macropus giganteus* and Red Fox *Vulpes Vulpes*), reptiles (e.g. Eastern Brown Snake *Pseudonaja textilis*) and frogs (e.g. Spotted Marsh Frog *Limnodynastes tasmaniensis*).

3.2.2 Aquatic Fauna Habitat

The Broken River is a major waterway on the northern 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.

3.2.3 Connectivity of Habitat

The Broken River on the northern 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, 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 species throughout the landscape. The study area therefore contributes to the role that remnant native vegetation in the local area has in conserving fauna.

3.3 Significance Assessment

3.3.1 Flora

The VBA contains records of one nationally significant and 23 State significant flora species previously recorded within 10 kilometres of the study area (DELWP 2020) (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.* 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 and high levels of disturbance and absence of suitable habitat.

3.3.2 Fauna

The VBA contains records of 10 nationally significant and 32 State significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2020) (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 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*. 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:
    - 49.50 hectares of Floodplain Riparian Woodland;
    - 8.57 hectares of 'tree-less' Plains Woodland (derived native grassland);
    - 3.78 hectares of 'treed' Plains Woodland;
    - 0.09 hectares of Tall Marsh; and
    - 27 Scattered Trees.
- 47.80 hectares of 'high' ecological value Floodplain Riparian Woodland, which also provides potential habitat for woodland birds associated State-significant Victorian Temperate Woodland Bird Community.
- Potential habitat for flora species of State (Buloke and Buloke Mistletoe) conservation significance.
- 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 and Platypus.

5 IMPLICATIONS FOR FUTURE DEVELOPMENT

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'.

Relevant Legislation	Implications
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.
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). 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 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.

Relevant Legislation	Implications
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 2017). 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 2017). Any permitted clearing of native vegetation within the study area would be offset in accordance with the Guidelines.
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.

Relevant Legislation	Implications
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 Kialla North Growth Corridor ('study area') has been identified as a significant growth area with the potential to support population growth. The PSP will guide the future development of the land, and the DCP will identify and cost the quantum of infrastructure required to support the future development of the land.

The purpose of the ecological assessment was to provide a high-level assessment of the ecological values within the study area to inform the early stage of the precinct planning process. Therefore, it is recommended that detailed ecological assessments be undertaken prior to the commencement of any development within the study area.

Desktop-based assessments and field surveys were undertaken to broadly 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.

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

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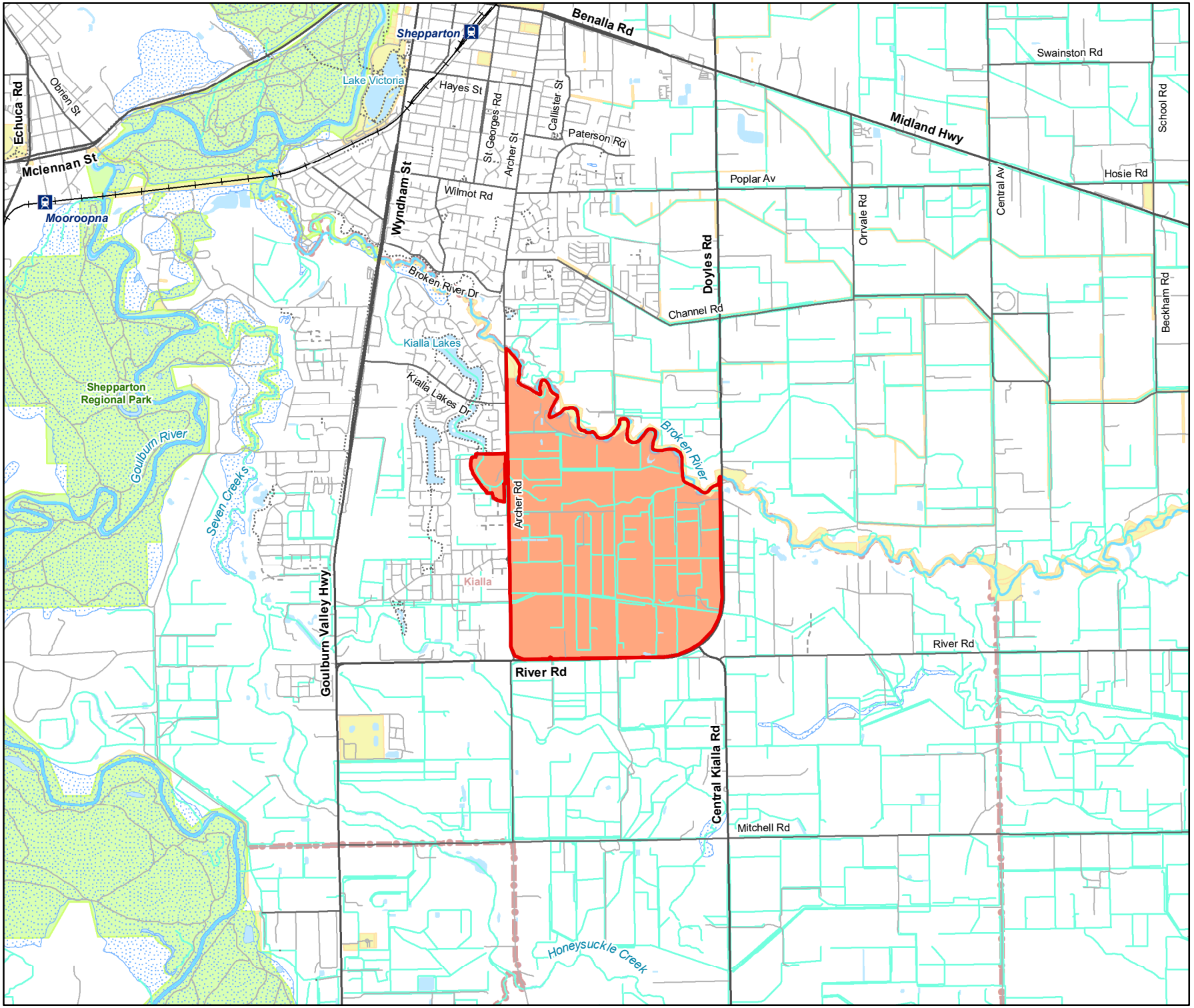


Legend

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

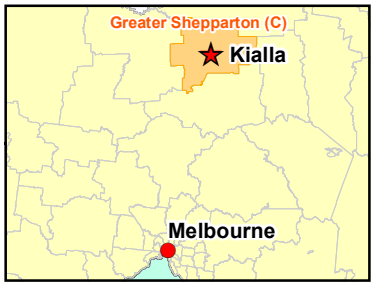


Figure 1

Location of the study area

Ecological Assessments for the Proposed Kialla North Growth Corridor, Kialla

N

0 500 1,000

Metres

Map Scale: 1:50,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

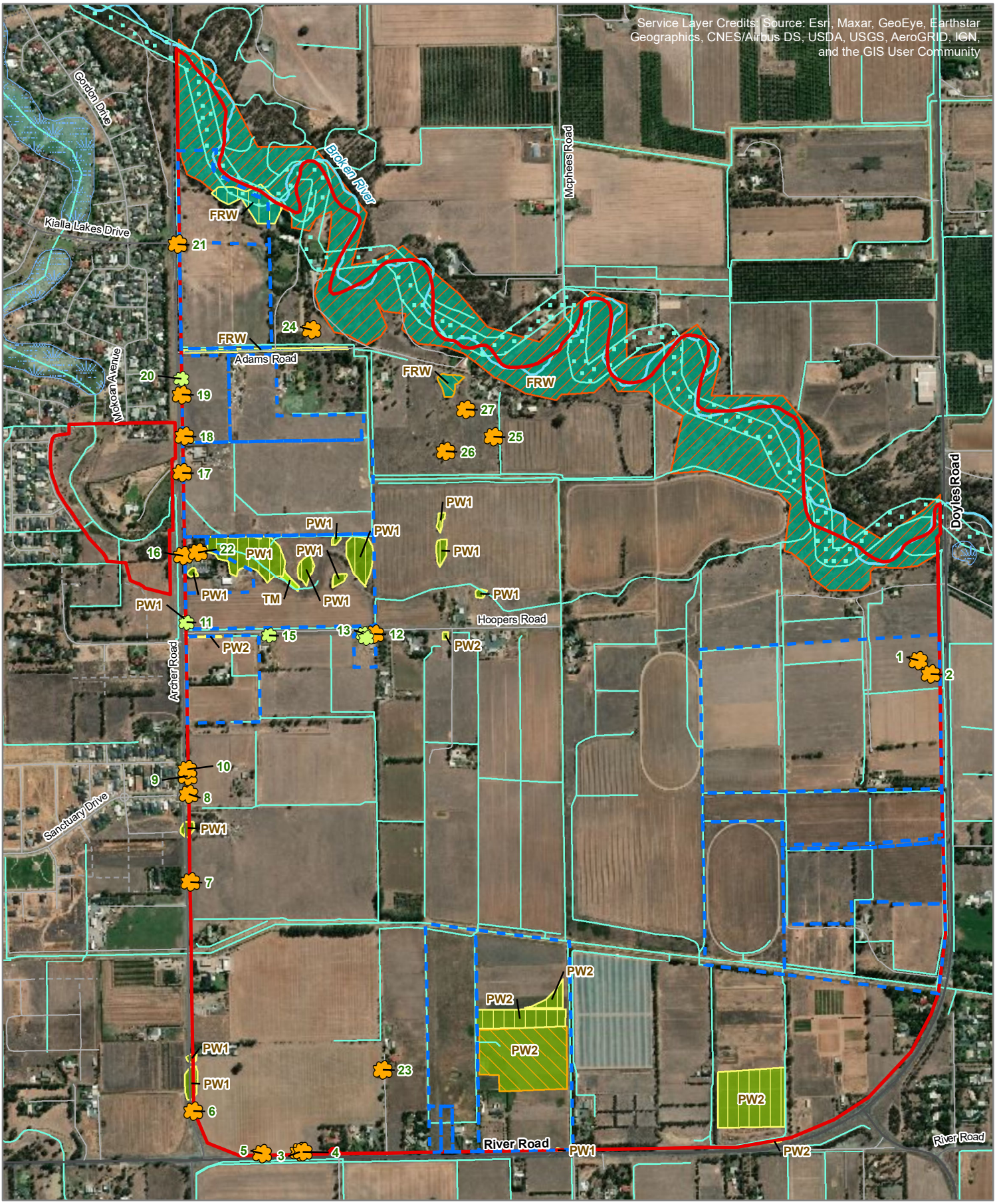


Figure 2

Ecological features

Ecological Assessments for the Proposed Kialla North Growth Corridor, Kialla

ecology & heritage partners

Legend

- Study Area
- Properties assessed
- Current Wetlands
- Important Victorian Wetlands
- Scattered Large Tree
- Scattered Small Tree

Ecological Vegetation Classes

- Floodplain Riparian Woodland
- Plains Woodland
- Tall Marsh

Vegetation quality

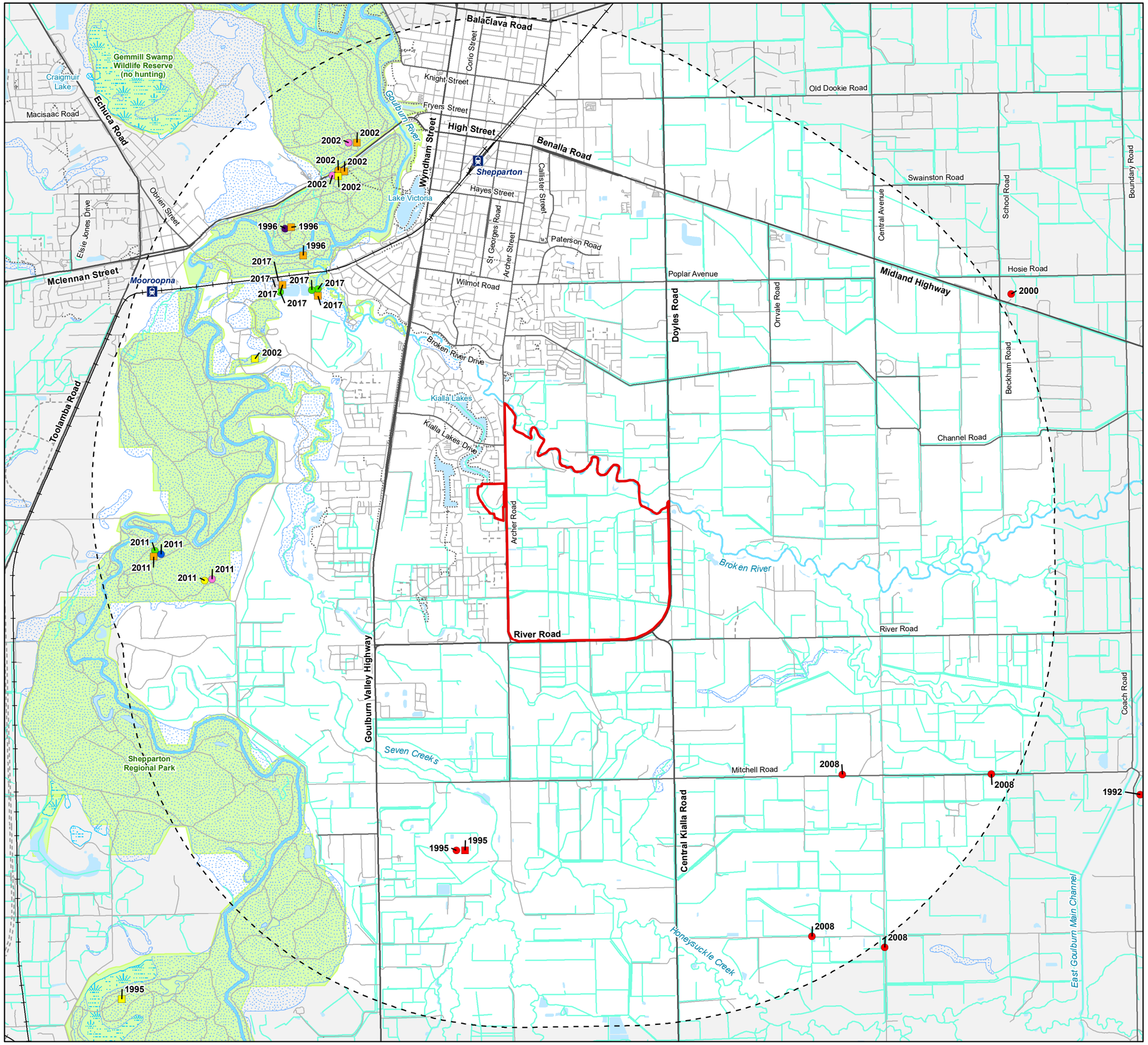
- High
- Moderate
- Low

N

0 150 300

Metres

Map Scale: 1:14,000 @ A4
Coordinate System: GDA2020 MGA Zone 55



Legend

Study Area

Significant flora

- Annual Buttercup
- Buloke
- Chinese Lespedeza
- Delicate Crane's-bill
- Late-flower Flax-lily
- Pale Spike-sedge
- Plains Joyweed
- River Swamp Wallaby-grass
- Riverina Bitter-cress
- Sand Rush
- Short-awned Wheat-grass
- Small Scurf-pea

Figure 3

Previously documented significant flora within 5km of the study area

Ecological Assessments for the Proposed Kialla North Growth Corridor, Kialla

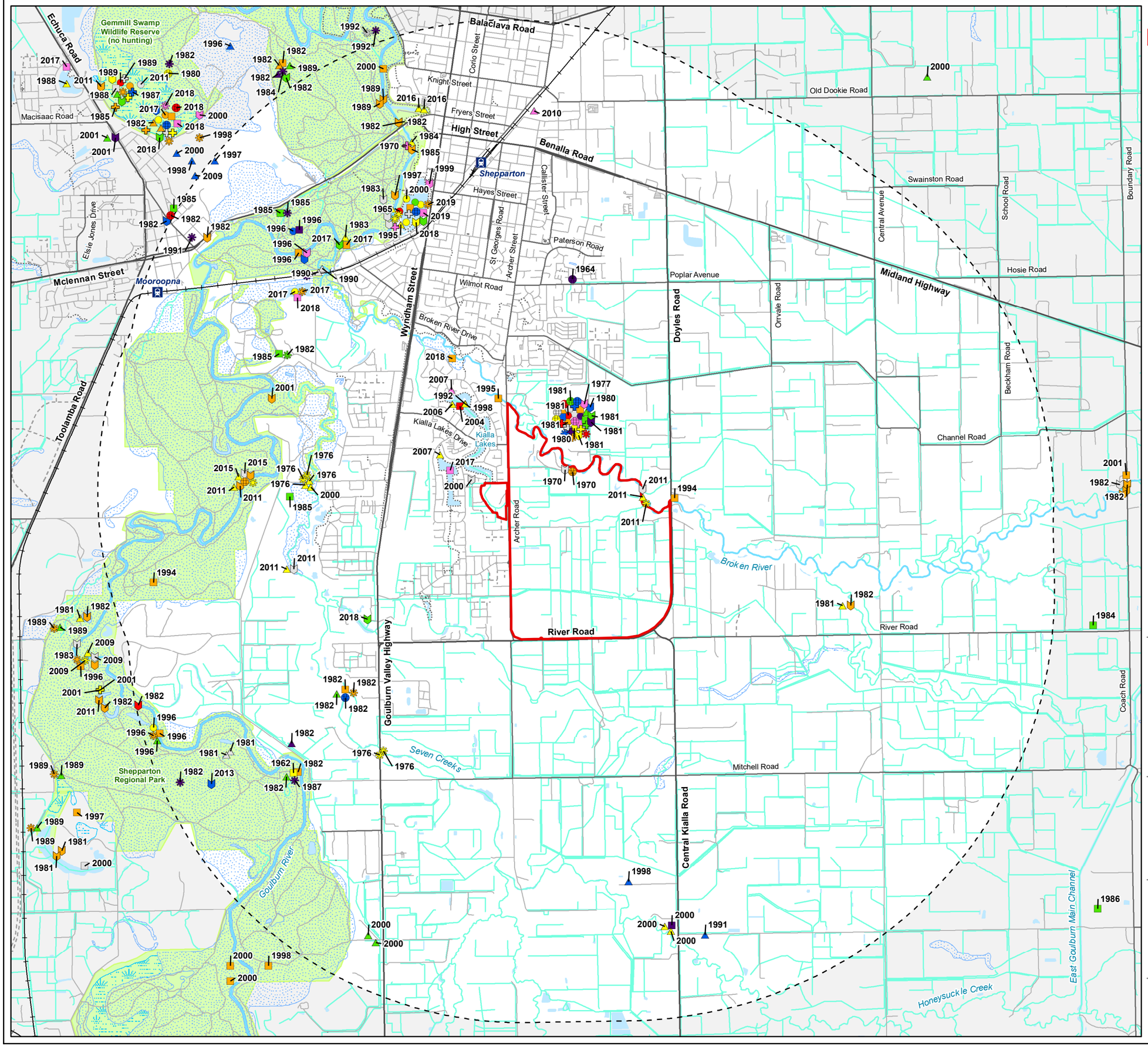
N

0 1 2

Kilometres

Map Scale: 1:47,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners



Legend

- Study Area

Signifcant fauna

- Australasian Bittern
- Australasian Shoveler
- Australian Little Bittern
- Azure Kingfisher
- Baillon's Crake
- Barking Owl
- Black Falcon
- Black-eared Cuckoo
- Blue-billed Duck
- Brown Toadlet
- Brown Treecreeper
- Brush-tailed Phascogale
- Bush Stone-curlew
- Diamond Firetail
- Eastern Great Egret
- Eastern Snake-necked Turtle
- Flat-headed Galaxias
- Freshwater Catfish
- Glossy Ibis
- Golden Perch
- Great Egret
- Grey-crowned Babbler
- Grey-headed Flying-fox
- Growling Grass Frog
- Hardhead
- Hooded Robin
- Lace Monitor
- Latham's Snipe
- Little Button-quail
- Little Egret
- Macquarie Perch
- Marsh Sandpiper
- Murray Cod
- Murray River Turtle
- Murray-Darling Rainbowfish
- Musk Duck
- Nankeen Night Heron
- Painted Honeyeater
- Pied Cormorant
- Plumed Egret
- Powerful Owl
- Red-backed Kingfisher
- Royal Spoonbill
- Silver Perch
- Speckled Warbler
- Spotted Harrier
- Square-tailed Kite
- Squirrel Glider
- Superb Parrot
- Swift Parrot
- Trout Cod
- Turquoise Parrot
- Whiskered Tern
- White-bellied Sea-Eagle
- White-throated Needletail
- Woodland Blind Snake

Figure 4

Previously documented significant fauna within 5km of the study area

Ecological Assessments for the Proposed Kialla North Growth Corridor, Kialla

N

0 1 2

Kilometres

Map Scale: 1:47,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

APPENDIX 1 FLORA

Appendix 1.1 – Flora Results

Legend:

***** 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	+
Chloris truncata	Windmill Grass	-
Eucalyptus camaldulensis	River Red-gum	+
Eucalyptus microcarpa	Grey Box	+
Juncus spp.	Rush	-
Panicum spp.	Panic	-
Phragmites australis	Common Reed	-
Rytidosperma caespitosum	Common Wallaby-grass	-
Rytidosperma spp.	Wallaby Grass	-
Typha spp.	Bulrush	-
NON-INDIGENOUS OR INTRODUCED SPECIES		
Agapanthus spp.	Agapanthus	#
Avena fatua	Wild Oat	-
Avena spp.	Oat	-
Cichorium intybus	Chicory	-
Cirsium vulgare	Spear Thistle	*
Convolvulus alba	Bindweed	-
Dactylis glomerata	Cocksfoot	-
Echinochloa colona	Awnless Barnyard-grass	-
Helminthotheca echioides	Ox-tongue	-
Ipomoea spp.	Morning Glory	-
Lactuca serriola	Prickly Lettuce	-
Lolium spp.	Rye Grass	-

Scientific Name	Common Name	Notes
Melaleuca ericifolia	Swamp Paperbark	#
Phalaris aquatica	Toowoomba Canary-grass	-
Plantago lanceolata	Ribwort	-
Rubus fruticosus spp. agg.	Blackberry	W *
Rumex crispus	Curled Dock	-

Appendix 1.2 – Tree Data

Table A1.2. Tree data

Tree # (Figure 2)	Species Name	Common Name	Size Class	Scattered / Parch
1	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
2	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
3	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
4	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
5	*Eucalyptus* spp.	Stag	Large	Scattered
6	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
7	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
8	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
9	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
10	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
11	*Eucalyptus* spp.	Stag	Small	Scattered
12	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
13	*Eucalyptus microcarpa*	Grey Box	Small	Scattered
14	*Eucalyptus microcarpa*	Grey Box	Small	Scattered
15	*Eucalyptus* spp.	-	Small	Scattered
16	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
17	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
18	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
19	*Eucalyptus* spp.	Stag	Large	Scattered
20	*Eucalyptus* spp.	-	Small	Scattered
21	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
22	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
23	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
24	*Eucalyptus camaldulensis*	River Red-gum	Large	Scattered
25	*Eucalyptus microcarpa*	Grey Box	Large	Scattered
26	*Eucalyptus camaldulensis*	River Red-gum	Large	Scattered
27	*Eucalyptus microcarpa*	Grey Box	Large	Scattered

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*):		DELWP (Advisory List of Rare or Threatened Plants in Victoria [DEPI 2014]):	
EX	Extinct	L	Listed as threatened	x	Presumed extinct in Victoria
CR	Critically endangered	N	Nominated for listing as threatened	e	Endangered in Victoria
EN	Endangered	D	Delisted as threatened	v	Vulnerable in Victoria
VU	Vulnerable	I	Rejected for listing as threatened; taxon invalid	r	Rare in Victoria
#	Listed on the Protected Matters Search Tool	X	Rejected for listing as threatened; taxon ineligible	k	Poorly known in Victoria

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	DELWP	Likelihood of occurrence in study area	Rationale for occurrence likelihood
NATIONAL SIGNIFICANCE								
Amphibromus fluitans	River Swamp Wallaby-grass	3	1996	VU	X	-	4	Potential habitat within Floodplain Riparian Woodland, but very unlikely due to agricultural disturbance
Brachyscome muelleroides	Mueller Daisy	-	-	VU	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Glycine latrobeana	Clover Glycine	-	-	VU	L	v	5	No suitable habitat
Myriophyllum porcatum	Ridged Water-milfoil	-	-	VU	L	v	4	Potential habitat, but very unlikely due to agricultural disturbance
Pimelea spinescens subsp. *pubiflora*	Wimmera Rice-flower	-	-	CR	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Sclerolaena napiformis	Turnip Copperburr	-	-	EN	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Senecio psilocarpus	Swamp Fireweed	-	-	VU	-	v	5	Outside distribution range
STATE SIGNIFICANCE								
Acacia flexifolia	Bent-leaf Wattle	2	2008	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DELWP	Likelihood of occurrence in study area	Rationale for occurrence likelihood
Allocasuarina luehmannii	Buloke	20	2008	-	L	e	3	Potential habitat within the study area
Alternanthera sp. 1 (Plains)	Plains Joyweed	8	2011	-	-	k	4	Potential habitat, but very unlikely due to agricultural disturbance
Amyema linophylla subsp. *orientalis*	Buloke Mistletoe	1	2008	-	-	v	3-4	Potential habitat for host plant (Buloke)
Anthosachne kingiana subsp. *multiflora*	Short-awned Wheat-grass	15	2017	-	-	k	4	Potential habitat, but very unlikely due to agricultural disturbance
Aristida jerichoensis var. *subspinulifera*	Jericho Wire-grass	5	2015	-	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Brachyscome chrysoglossa	Yellow-tongue Daisy	1	2002	-	L	v	4	Potential habitat, but very unlikely due to agricultural disturbance
Cardamine moirensis	Riverina Bitter-cress	2	2017	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance
Cullen parvum	Small Scurf-pea	3	2002	-	L	e	4	Potential habitat, but very unlikely due to agricultural disturbance
Dianella tarda	Late-flower Flax-lily	4	2017	-	-	v	3-4	Potential habitat within roadsides, unlikely to occur within private property due to agricultural disturbance

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DELWP	Likelihood of occurrence in study area	Rationale for occurrence likelihood
Diplachne fusca subsp. *fusca*	Brown Beetle-grass	2	1987	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance
Eleocharis pallens	Pale Spike-sedge	1	2011	-	-	k	4	Potential habitat, but very unlikely due to agricultural disturbance
Fimbristylis velata	Veiled Fringe-sedge	2	2000	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance
Geranium sp. 6	Delicate Crane's-bill	1	2011	-	-	v	4	Potential habitat, but very unlikely due to agricultural disturbance
Juncus psammophilus	Sand Rush	3	2000	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance
Lespedeza juncea subsp. *sericea*	Chinese Lespedeza	1	2002	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle	1	2006	-	-	r	4	Potential habitat, but very unlikely due to agricultural disturbance
Myriophyllum striatum	Striped Water-milfoil	1	1996	-	L	v	4	Potential habitat, but very unlikely due to agricultural disturbance
Ranunculus sessiliflorus var. *pilulifer*	Annual Buttercup	1	2017	-	-	k	4	Potential habitat, but very unlikely due to agricultural disturbance

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DELWP	Likelihood of occurrence in study area	Rationale for occurrence likelihood
Rumex crystallinus s.s.	Glistening Dock	1	1979	-	-	v	4	Potential habitat, but very unlikely due to agricultural disturbance
Senecio campylocarpus	Floodplain Fireweed	6	2008	-	-	r	3	Potential habitat within Floodplain Riparian Woodland.
Senecio longicollaris	Riverina Fireweed	1	2008	-	-	v	4	Potential habitat within Floodplain Riparian Woodland.
Sida intricata	Twiggy Sida	1	1996	-	-	v	4	Potential habitat, but very unlikely due to agricultural disturbance

Data Sources: Victorian Biodiversity Atlas (DELWP 2020); Protected Matters Search Tool (DAWE 2021)

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	L	Listed as threatened
CR	Critically endangered	N	Nominated for listing as threatened
EN	Endangered	D	Delisted as threatened
VU	Vulnerable	I	Rejected for listing as threatened; taxon invalid or ineligible
CD	Conservation dependent		
#	Listed on the Protected Matters Search Tool		
DELWP (Advisory List of Threatened Vertebrate Fauna in Victoria [DSE 2013]; Advisory List of Threatened Invertebrate Fauna in Victoria [DSE 2009]):		NAP (National Action Plans for several Australian species [Cogger *et al.* 1993; Duncan *et al.* 1999; Garnet *et al.* 2011; Sands and New 2002; Tyler 1997: Woinarski *et al.* 2014)):	
EX	Extinct in Victoria	EX	Extinct
RX	Regionally extinct in Victoria	CR	Critically endangered
EW	Extinct in the wild in Victoria	EN	Endangered
CR	Critically endangered in Victoria	VU	Vulnerable
EN	Endangered in Victoria	NT	Near threatened
VU	Vulnerable in Victoria	CD	Conservation dependent
NT	Near threatened in Victoria	DD	Data deficient (insufficient or poorly known)
DD	Data deficient (insufficient or poorly known)	LC	Least concern

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	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
NATIONAL SIGNIFICANCE								
Australasian Bittern	*Botaurus poiciloptilus*	-	4	EN	L	EN	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*	#	-	VU	L	CR	4	No suitable habitat. No known records within the area.
Bluenose Cod (Trout Cod)	*Maccullochella macquariensis*	2015	4	EN	L	CR	2	Suitable habitat and previous old records in the area.
Curlew Sandpiper	*Calidris ferruginea*	#	-	CR	-	EN	4	No suitable habitat. No known records within the area.
Eastern Curlew	*Numenius madagascariensis*	#	-	CR	-	VU	4	No suitable habitat. No known records within the area.
Grey Falcon	*Falco hypoleucos*	#	-	VU	L	EN	3	May visit the study area om rare occasionally or on an opportunistic basis. No recent records within the area.
Flat-headed Galaxias	*Galaxias rostratus*	1990	7	CR	-	VU	3	Only limited and old records in the area. Potential habitat although unlikely to be suitable quality.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Grey-headed Flying-fox	*Pteropus poliocephalus*	-	3	VU	L	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*	1982	8	VU	L	EN	3	Study area is unlikely to provide suitable habitat. No recent records nearby.
Macquarie Perch	*Macquaria australasica*	1975	9	EN	L	EN	3	Potential habitat. May utilise the study area occasionally. No recent records.
Murray Cod	*Maccullochella peelii*	2017	57	VU	L	VU	1	Suitable habitat within the Broken River and recent records within the study area.
Painted Honeyeater	*Grantiella picta*	2018	6	VU	L	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	L	CR	4	No suitable habitat. No known records in the area.
Regent Honeyeater	*Anthochaera phrygia*	#	-	CR	L	CR	4	No suitable habitat. No known records in the area.
Superb Parrot	*Polytelis swainsonii*	1977	3	VU	L	EN	3	Potential habitat. May utilise the study area occasionally. No recent records.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Swift Parrot	*Lathamus discolor*	2018	14	CR	L	EN	3	Potential habitat. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.
Golden Sun Moth	*Synemon plana*	#	-	CR	L	CR	3	Outside known distribution. No records within the area.
STATE SIGNIFICANCE								
Brush-tailed Phascogale	*Phascogale tapoatafa*	1962	2	-	L	VU	3	Potential habitat, but unlikely due to disturbance and lack of recent records within the area.
Squirrel Glider	*Petaurus norfolcensis*	2005	27	-	L	EN	2	Suitable habitat within Floodplain Riparian Woodland and recent records within the area.
Magpie Goose	*Anseranas semipalmata*	1990	3	-	L	NT	3	No recent records nearby. May visit the study area occasionally or on an opportunistic basis whilst moving to more suitable sites.
Musk Duck	*Biziura lobata*	2018	38	-	-	VU	1	Recent records nearby. Likely to visit the study area occasionally or whilst moving to more suitable habitat.
Freckled Duck	*Stictonetta naevosa*	2009	4	-	L	EN	2	May visit the study area occasionally or on an opportunistic basis.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Hardhead	*Aythya australis*	2019	80	-	-	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.
Blue-billed Duck	*Oxyura australis*	2009	18	-	L	EN	2	May visit the study area occasionally or on an opportunistic basis.
Diamond Dove	*Geopelia cuneata*	1971	1	-	L	NT	4	No suitable habitat.
White-throated Needletail	*Hirundapus caudacutus*	1981	11	-	-	VU	4	Possible visitor (flyover) during the warmer months of the year (migratory species).
Square-tailed Kite	*Lophoictinia isura*	2018	1	-	L	VU	2	May visit the study area occasionally or on an opportunistic basis.
Black Falcon	*Falco subniger*	1978	1	-	L	VU	3	May visit the study area occasionally or on an opportunistic basis. Unlikely due to disturbance and lack of recent records within the area.
Bush Stone-curlew	*Burhinus grallarius*	1985	25	-	L	EN	4	Not suitable habitat. No recent records nearby.
Pacific Golden Plover	*Pluvialis fulva*	1987	1	-	-	VU	4	Not suitable habitat. No recent records nearby.
Marsh Sandpiper	*Tringa stagnatilis*	1995	2	-	-	VU	4	Unlikely due to disturbance and lack of recent records within the area.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Wood Sandpiper	*Tringa glareola*	2009	5	-	-	VU	3	May visit the study area occasionally or on an opportunistic basis when moving into areas of more suitable habitat.
Turquoise Parrot	*Neophema pulchella*	2018	3	-	L	NT	3	Potential habitat for the species. May visit the study area occasionally to forage or whilst moving to more suitable sites.
Powerful Owl	*Ninox strenua*	1992	1	-	L	VU	4	Lack of suitable habitat. No recent records nearby.
Diamond Firetail	*Stagonopleura guttata*	1981	5	-	L	NT	4	Unlikely due to disturbance and lack of recent records within the area.
Murray Short-necked Turtle	*Emydura macquarii*	2009	6	-	-	VU	2	Potential habitat. Likely to utilise the study area occasionally.
Lace Goanna	*Varanus varius*	1995	3	-	-	EN	4	Unlikely due to disturbance and lack of recent records within the area.
Brown Toadlet	*Pseudophryne bibronii*	2009	3	-	L	EN	3	Not suitable habitat for the species.
Freshwater Catfish	*Tandanus tandanus*	1992	1	-	L	EN	3	Potential habitat. May utilise the study area occasionally. No recent records.
Crimson-spotted Rainbowfish	*Melanotaenia fluviatilis*	2015	75	-	L	VU	2	Suitable habitat and recent records around the study area.
Silver Perch	*Bidyanus bidyanus*	2015	15	-	L	VU	2	Suitable habitat and recent records around the study area.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Platypus	*Ornithorhynchus anatinus*	1991	5	-	L	VU	1	Suitable habitat within Broken River and landholder observation (pers. comm.).
Little Button-quail	*Turnix velox*	1981	1	-	-	NT	3	Unlikely due to disturbance and lack of recent records within the area.
Pied Cormorant	*Phalacrocorax varius*	2008	8	-	-	NT	3	May visit the study area occasionally or on an opportunistic basis when moving into areas of more suitable habitat.
Black-eared Cuckoo	*Chrysococcyx osculans*	1981	3	-	-	NT	3	Unlikely due to disturbance and lack of recent records within the area.
Spotted Harrier	*Circus assimilis*	1978	1	-	-	NT	3	May visit the study area occasionally or on an opportunistic basis. Unlikely due to disturbance and lack of recent records within the area.
Latham's Snipe	*Gallinago hardwickii*	2018	34	-	-	NT	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.
REGIONAL SIGNIFICANCE								

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	Likelihood of occurrence in the study area	Rationale for occurrence likelihood
Glossy Ibis	*Plegadis falcinellus*	2017	25	-	-	NT	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.
Royal Spoonbill	*Platalea regia*	2019	94	-	-	NT	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.