ecology & heritage partners

FINAL REPORT:

Vegetation assessment of 440 Ballan Road, Wyndham Vale

PREPARED FOR:

Taylors Development Strategists
July 2012

Ecology and Heritage Partners Pty Ltd

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Acknowledgments

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EXECUTIVE SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Taylors Development Strategists to undertake a Flora and Fauna assessment at 440 Ballan Road, Wyndham Vale, Victoria, in the urban fringe of Melbourne. This study area is located approximately 40 kilometres west of the Melbourne Central Business District and contains private land that is used for pasture.

The purpose of the biodiversity assessment was to provide a detailed account of the ecological values across the study area and this information will be incorporated into the Growth Areas Authority Precinct Structure Planning process (i.e. the development of a Native Vegetation Precinct Plan.

Methods

The following resources and databases were reviewed over the duration of the project:

- The Victorian Biodiversity Atlas, Atlas of Victorian Wildlife and Flora Information System databases.
- Department of Sustainability and Environment Biodiversity Interactive Maps showing historic and current Ecological Vegetation Classes.
- Department of Sustainability, Environment, Water, Population and Communities Protected Matters Search Tool providing matters of National Environmental Significance (e.g. listed taxa and ecological communities, Ramsar wetlands) protected under the *Environment Protection and Biodiversity Conservation Act 1999*.
- Planning Schemes Online providing the current zone and overlays.
- Relevant legislation and policies.
- Ecological reports relevant to the precinct.

Liaison was undertaken with the Growth Areas Authority and the Department of Sustainability and Environment to confirm the extent and intensity of the proposed methodology.

Biodiversity assessment methods followed the methodology used in the 2011–2012 Biodiversity Mapping Project for the Growth Areas Authority, and included the following:

- *General flora and fauna survey*: Information regarding vegetation (both patches of vegetation and scattered remnant trees) quality and extent, and the presence of significant flora and fauna species were recorded into a hand-held Personal Digital Assistant. Flora and fauna species observed within the study area during the assessments were noted.
- *Targeted flora Assessment*: Targeted flora surveys were undertaken across all of the Department of Sustainability and Environments time stamped data in spring and

summer. Nationally significant species targeted in included Austral Toadflax *Thesium australe*, Basalt Peppercress *Lepidium hyssopifolium*, Basalt Podolepis *Podolepis jaceoides*, Basalt Sun Orchid *Thelymitra gregaria*, Button Wrinklewort *Rutidosis leptorhynchoides*, Clover Glycine *Glycine latrobeana*, Large Fruit Fireweed *Senecio macrocarpus*, Matted Flax Lily *Dianella amoena*, Pale Swamp Everlasting *Helichrysum* aff. *Rutidolepis*, Purple Diuris *Diuris punctata*, River Swamp Wallaby Grass *Amphibromus fluitans*, Slender Tick Trefoil *Desmodium varians*, Small Golden Moths *Diuris basaltica*, Sunshine Diuris *Diuris fragrantissima*, Swamp Everlasting *Xerochrysum* palustre, Swamp Fireweed *Senecio psilocarpus*, Swollen Swamp Wallaby Grass *Amphibromus pithogastrus* and Tough Scurf Pea *Cullen tenax*.

- *Incidental records*: All incidental observation of significant flora and fauna species observed were recorded with a hand-held Personal Digital Assistant.

Results

Flora

The study area contains remnant patches of vegetation scattered throughout the property, although these patches were modified through historical grazing and slashing. No remnant trees were recorded within the study area.

No significant flora species were recorded during the current assessment, while one state-listed species (Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*) was recorded within areas mapped as remnant vegetation. This species is listed as poorly known in the Department of Sustainability and Environment advisory list.

Habitat hectare assessment

Habitat hectare assessments were completed based on the time stamped data provided by the Department of Sustainability and Environment where areas have been defined as a 'patch' under the *Native Vegetation Management – A Framework for Action*.

Overall approximately **2.68 habitat hectares** (6.11 hectares) of remnant vegetation is present within the precinct, including:

- **2.34 habitat hectares** of Very High conservation significance Plains Grassland; and,
- **0.34 habitat hectares** of High conservation significance Plains Grassland.

There are no scattered trees within the study area.

Fauna

Twenty-six terrestrial fauna species were recorded within the precinct. This is comprised of 24 birds (17 native and seven exotic) and two mammals (all exotic). The various landform types in the study area range from low to high quality and provide important habitat for a wide

range of fauna, especially birds, which were the dominant group recorded within the study area.

The site supports five broad habitat types: native grasslands, ephemeral drainage line, planted native and introduced trees, artificial waterbodies and introduced pasture grass and crops.

There were no national or state significant fauna species recorded during the assessment, although targeted surveys were not conducted for Striped Legless Lizard and Golden Sun Moth. These species have a high likelihood of occurrence and it is understood that these species will be considered at the precinct level.

Discussion

A summary of legislative considerations is provided in Section 4. A permit to 'take' native vegetation under the *Flora and Fauna Guarantee Act 1988* will be required for the removal of protected species located on public land.

The potential impacts, mitigation measures and opportunities to enhance the ecological values have been provided below in Section 5. These will be achieved principally through protection and enhancement of native vegetation, allowing the regeneration of native vegetation, revegetation and weed control.

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Taylors Development Strategists to undertake a Flora and Fauna assessment at 440 Ballan Road, Wyndham Vale, Victoria, in the urban fringe of Melbourne.

The purpose of this report is to identify biodiversity values within the study area and to inform the planning process.

A general flora and fauna assessment was completed for the property, together with targeted flora surveys for Austral Toadflax *Thesium australe*, Basalt Peppercress *Lepidium hyssopifolium*, Basalt Podolepis *Podolepis jaceoides*, Basalt Sun Orchid *Thelymitra gregaria*, Button Wrinklewort *Rutidosis leptorhynchoides*, Clover Glycine *Glycine latrobeana*, Large Fruit Fireweed *Senecio macrocarpus*, Matted Flax-lily *Dianella amoena*, Pale Swamp Everlasting *Helichrysum* aff. *Rutidolepis*, Purple Diuris *Diuris punctata*, River Swamp Wallaby Grass *Amphibromus fluitans*, Slender Tick Trefoil *Desmodium varians*, Small Golden Moths *Diuris basaltica*, Sunshine Diuris *Diuris fragrantissima*, Swamp Everlasting *Xerochrysum* palustre, Swamp Fireweed *Senecio psilocarpus*, Swollen Swamp Wallaby Grass *Amphibromus pithogastrus* and Tough Scurf Pea *Cullen tenax.*

1.2 Objectives

The objectives of the flora, fauna and targeted significant flora surveys were to:

- Identify, assess and map significant flora, fauna and habitat within the precinct and the level of conservation significance for any species or habitat recorded;
- Collect data at a sufficient detail and standard to enable the development of a Precinct Structure Plan (PSP) and Native Vegetation Precinct Structure Plan (NVPP);
- Provide advice on any works or management measures that may reduce adverse impacts of the development on species known or likely to occur in the precinct; and,
- Ensure that development of the precinct complies with legislative requirements regarding the protection of indigenous flora and fauna species and communities.

1.3 Study Area

The study area is located at 440 Ballan Road (Lot 11), Wyndham Vale, Victoria, within the Wyndham Vale Precinct Structure Plan Area (PSP #40). The area covers 12.2 hectares is bounded by private property, Ballan Road and Wollahra Rise. This study area is located approximately 40 kilometres west of the Melbourne CBD and contains private land that is used for pasture.

According to the Department of Sustainability and Environment's (DSE's) Biodiversity Interactive Map (DSE 2012a) the study area falls within the Victorian Volcanic Plain bioregion. The Victorian Volcanic Plain bioregion extends from Port Phillip Bay in the east to Dartmoor in the west, extending north to the southern slopes of the Great Dividing Range.

The study area lies within the boundaries of the Port Phillip and Westernport Catchment Management Authority (CMA).

2 METHODS

2.1 Nomenclature

Common and scientific names of vascular plants follow the Flora Information System (FIS) (FIS 2011) and the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow the DSE EVC Benchmarks (DSE 2012b).

Terrestrial and vertebrate fauna (mammals, birds, reptiles, amphibians and fish) follow the Victorian Biodiversity Atlas (DSE 2011a) and the Atlas of Victorian Wildlife (AVW) (AVW 2009).

2.2 Literature and Database Review

The following resources and databases were reviewed over the duration of the project:

- The VBA (DSE 2011a), AVW (2011) and FIS (2011) databases.
- The DSE's Biodiversity Interactive Maps showing historic and current EVCs and Time Stamped vegetation quality (DSE 2012a);
- Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Protected Matters Search Tool which identifies matters of national environmental significance (e.g. listed flora and fauna species and ecological communities, Ramsar wetlands) protected under the EPBC Act (DSEWPC 2012);
- Planning Schemes Online providing the current zone and overlays (DPCD 2012); and,
- Relevant legislation and policies.

2.3 Field Surveys

2.3.1 General flora survey

Flora surveys were assessed on foot and undertaken on 5 December 2011, 19 December 2011 and 27 February 2012. Records of all vascular plants were recorded within each property. All remnant Ecological Vegetation Classes (EVCs), scattered remnant trees and significant flora species were recorded and mapped on aerial photographs.

2.3.2 Targeted flora surveys

Targeted flora surveys were undertaken at all properties which were accessed (Figure 2), and were required to be undertaken in spring and summer.

The following species were targeted in spring (5 and 19 December 2011):

- Austral Toadflax;
- Basalt Peppercress;
- Basalt Podolepis;
- Basalt Sun Orchid;
- Button Wrinklewort;
- Clover Glycine;
- Large Fruit Fireweed;
- Pale Swamp Everlasting;
- Purple Diuris;
- River Swamp Wallaby Grass;
- Slender Tick Trefoil;
- Small Golden Moths;
- Sunshine Diuris;
- Swamp Fireweed;
- Swollen Swamp Wallaby Grass;
- Tough Scurf Pea;

Species targeted during summer surveys (27 February 2012), included:

- Matted Flax Lily;
- Basalt Peppercress;
- Basalt Podolepis;
- Swamp Everlasting; and
- Matted Flax-lily.

Targeted summer surveys were undertaken in areas of suitable habitat for significant flora.

2.3.3 General fauna survey

A general fauna assessment, including a habitat assessment was undertaken throughout the flora assessment period, on 19 December 2011. Weather conditions over this period were warm and sunny. All fauna observed and/or heard were recorded, while the presence of a particular species within the study area was also confirmed through indirect evidence such as feathers, scats, scratchings and/or nests. Assessors used binoculars to scan for birds, mammals in hollows, and basking reptiles. Hard rubbish, woody debris and rocks were lifted to locate small ground-dwelling fauna including reptiles and frogs. An assessment of different habitat types throughout the study area included native grasslands, planted trees, artificial waterbodies and introduced pasture grasses.

2.3.4 Incidental flora and fauna surveys

Several site assessments were undertaken over the duration of the project. Throughout this period, flora and fauna records were maintained by all assessors. A consolidated list of all flora and fauna species recorded during the project area provided below (Appendices 2 and 3).

2.4 Assessment Qualifications and Limitations

The objectives of the assessment were to document flora and fauna species and communities that occur, or may occur, within the property. Targeted surveys were undertaken for several significant flora species.

As with any assessment, a greater amount of time on the site would increase the likelihood of recording additional flora and fauna species. The short duration of the survey meant that migratory, transitory or uncommon fauna species may have been absent from habitats at the time of the present field assessments.

Vegetation assessments were undertaken in December and February, at a time considered appropriate to undertake targeted surveys for the majority of plant species. However, some flora species (e.g. orchids), may not have been visible at the time of the assessment.

On ground habitat hectare assessments were not undertaken as part of the current project as DSE's time stamped data have been assigned habitat scores.

3 RESULTS

3.1 Flora

3.1.1 Flora species

Fifty-five flora species (16 indigenous, 39 exotic) were recorded within the study area (Appendix 2.1). The study area contains remnant patches of vegetation scattered throughout the property, although these patches were modified through historical grazing and slashing. No remnant trees were recorded within the study area.

Remnant patches were dominated by Kneed Spear-grass *Austrostipa bigeniculata* and Quizzical Spear-grass *Austrostipa stuposa*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Austrodanthonia caespitosa* and Brown-back Wallaby-grass *Austrodanthonia duttoniana*. The following species were also present, Cotton Fireweed *Senecio quadridentatus*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*, Grassland Wood-sorrel *Oxalis perennans*, Annual Cudweed *Euchiton sphaericus* and Common Blown-grass *Lachnagrostis filiformis*.

Exotic species recorded include Galenia *Galenia pubescens* var. *pubescens*, Barley Grass *Hordeum vulgare*, Spear Thistle *Cirsium vulgare*, Perennial Rye-grass *Lolium perenne*, Toowoomba Canary-grass *Phalaris aquatica*, Patterson's Curse *Echium plantagineum* and Serrated Tussock *Nassella trichotoma*. Woody weeds such as African Boxthorn *Lycium ferocissimum* were also present.

3.1.2 Significant flora species and communities

National

No nationally significant flora species were recorded during field surveys.

Eight additional nationally significant flora species have previously been recorded from within the local area (10 kilometres) (Figure 4) (DSE 2011a). Two additional nationally significant flora species are listed as potentially occurring within a 10 kilometre radius of the study area (DSEWPC 2012) (Appendix 2.2) (Figure 4).

There is a low likelihood that any nationally significant flora species occur within the study area (Appendix 2.2).

State

One state significant species were recorded within the study area (Slender Bindweed). This species is listed as poorly known in Victoria, was recorded within the study area (Figure 4).

Twenty-nine additional state significant flora species have been previously recorded from within the local area (DSE 2011a) (Appendix 2.2.). There is a low likelihood that any state significant flora species occur within the study area (Appendix 2.2).

Significant Communities

One vegetation community listed as threatened under the EPBC Act was recorded within the precinct; Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP). The majority of the native vegetation patches mapped as Plains Grassland (EVC 132_61) meet the condition threshold to constitute NTGVVP. Plains Grassland (EVC 132) is also listed as Endangered within the Victorian Volcanic Plain bioregion.

3.1.3 Best or remaining 50% habitat for rare and threatened flora species

No nationally significant flora species were recorded within the precinct. Based on the current surveys and literature review, there is potential habitat for two state significant flora species; Small Scurf-pea and Large-headed Fireweed. The habitat assessment for threatened species is provided below (Table 1) (DSE 2007a). Information on whether the study area provides either the 'best 50%' or 'remaining 50%' habitat for threatened species is provided (Table 1).

The habitat assessment in accordance with the *Native Vegetation Guide for assessment of referred planning permit applications* (DSE 2007a) is summarised below (Table 2).

Table 1. Habitat assessment for threatened species.

Step	Description	Outcome
A	Is the species, or has the species been recorded as resident on site> OR if the species is not 'resident' has it been recorded regularly (e.g. annually) n-site?	Yes – go to B No – go to D
B	Is it possible to discriminate between the importance of different populations of the species? For example, can numbers be reasonably estimated and is there available knowledge on what are typical population sizes?	Yes – go to C No – go to E
C	Does the site contain a population that is above average size or importance for the bioregion?	Yes – Best 50% of habitat No – remaining 50% of habitat
D	Does the habitat on site clearly meet one or more of the habitat requirements of the species? Is it reasonable to expect that the species is present or would make significant use of the site in the medium term (i.e. within the next 10 years)?	Yes to both – go to F No to either – no further consideration required for that species
E	Has some form of habitat modelling been undertaken for the species in the bioregion?	Yes – use this information to determine Best 50% of habitat or Remaining 50% of habitat No – go to F
F	Does the site represent above-average condition and landscape context for the relevant EVC or habitat type in the bioregion?	Yes – best 50% of habitat No – Remaining 50% of habitat

Table 2 Habitat assessment for threatened species within the study area.

Threatened Species or Species' with the Highest Likelihood of Occurrence[1]	Potential Habitat (Remnant Patch No)	Steps Followed	Best or Remaining 50% of Habitat for the Species?	Notes	Conservation Significance Rating Prior to Evaluation	Conservation Significance Rating after Evaluation
Small Scurf-pea	14310	A - No, D - No	No further consideration	Potential habitat in low lying areas, but these areas were highly degraded due to historical grazing.	Very High	n/a
	All other vegetation patches	A - No, D - No	No further consideration	No potential habitat	High/Very High	n/a
Large-headed Fireweed	All vegetation patches	A - No, D - No	No further consideration	Potential habitat, but habitat modified through historical grazing and slashing.	High/Very High	n/a

Note: The assessment is undertaken on the species with the highest likelihood of occurrence.

3.2 Ecological Vegetation Classes

The DSE bioregional pre-1750 EVC mapping shows that the study area was once covered by Plains Grassland. However, current EVC mapping (DSE 2012a) shows only isolated occurrences of Plains Grassland. The DSE Time Stamping Data 2011 (Native Vegetation – Growth Areas) (DSE 2012) also displays isolated occurrences of Plains Grassland coinciding with vegetation patches within the current EVC mapping. The Time Stamping Data was used as the basis for determining EVC types and boundaries within the study area.

Plains Grassland is listed as Endangered within the Victorian Volcanic Plain bioregion (DSE 2012b). The Plains Grassland EVC also corresponds with the EPBC Act-listed NTGVVP.

3.2.1 *Lighter soils* Plains Grassland (EVC 132_62)

Lighter soils Plains Grassland occurs on a freely draining soil types and lighter sedimentary soils (DSE 2012b), and is treeless vegetation with a diverse understorey of grasses and herbs. (DSE 2012b).

Modified patches of Plains Grassland are present within the study area, with most patches being species-poor.

Spear grasses *Austrostipa* spp. and wallaby grasses *Austrodanthonia* spp. are the dominant understorey species. Most grassland patches have a low diversity of native herbs, largely comprising Slender Bindweed, Cotton Fireweed and Grassland Wood-sorrel.

3.3 Habitat Hectare Assessment

3.3.1 Remnant patches of native vegetation

Sixteen patches of remnant vegetation are mapped within the study area (Appendix 4.1) (Figure 2). The majority of vegetation is of Very High conservation significance, with a few small patches of High conservation significance.

Overall approximately **2.68 habitat hectares** (6.11 hectares) of remnant vegetation is present within the study area, including:

- **2.34 habitat hectares** of Very High conservation significance Plains Grassland; and,
- **0.34 habitat hectares** of High conservation significance Plains Grassland.

3.3.2 Trees within remnant vegetation

There were no remnant trees within remnant patches of vegetation in the study area.

3.3.3 Scattered trees

The study area does not contain any scattered trees.

3.4 Fauna

3.4.1 Fauna species

Twenty-six terrestrial fauna species were recorded within the precinct. This comprises 24 birds (17 native and seven exotic) and two mammals (all exotic) (Appendix 3.1).

The various landform types in the study area range from low to high quality and provide important habitat for a wide range of fauna, especially birds, which were the dominant group recorded within the study area.

No national, state or regionally significant fauna species were recorded within the study area during the assessment.

3.4.2 Fauna habitats

The study area supports four broad habitat types: native grasslands, planted trees, artificial waterbodies and introduced pasture grasses (Figure 2).

Native Grasslands (Corresponding EVC: Plains Grassland)

Approximately 6.11 hectares of vegetation were mapped as Plains Grassland (EVC 132) within the precinct.

Overall habitat value – This habitat is of **high** habitat value for fauna (Appendix 1.5). Indigenous vegetation diversity was the highest in these areas, and some areas contained

surface and embedded rocks. These areas provide a higher diversity of micro-habitats and are expected to provide refuge and foraging areas for native reptiles, invertebrates and frogs.

Description – This habitat occurs in areas where secondary grassland has recolonised following disturbances. It typically contains a high cover abundance of native tussock grasses such as wallaby grass *Austrodanthonia* spp. and spear grass *Austrostipa* spp. These areas contained both surface and embedded rock, as well as cracking soils. Shrubs and trees were generally absent from these areas.

Fauna – Patches of remnant Plains Grassland within the study area may provide suitable habitat for two EPBC Act-listed species Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar*.

Common open country species (primarily birds) are also likely to use this habitat. Larger patches are likely to support a suite of grassland birds such as Australian Magpie *Gymnorhina tibicen*, Little Raven *Corvus mellori*, Galah *Eolophus roseicapilla*, Superb Fairy Wren *Malurus cyaneus* and Willie Wagtail *Rhipidura leucophrys*, which have all been recorded within the study area during the present assessment. Introduced species such as Common Starling *Sturnus vulgaris*, House Sparrow *Passer domesticus* which also prevalent in this habitat during the survey.

Black-shouldered Kite *Elanus axillaris* were detected during the assessment and Brown Falcon *Falco berigora* and Nankeen Kestrel *Falco cenchroides* are likely to search for prey items over these areas. Grassland areas are also likely to provide refuge for native reptiles and frogs, although no indigenous ground-dwelling mammals are expected to occur in these isolated and degraded areas.

Planted vegetation

Overall habitat value – Habitat value for planted vegetation from **low** for immature plantings, to **moderate** for mature plantings (Appendix 1.5). No mature trees within the study area contained hollows, large amounts of shredding bark, or nests which are evidence of higher quality habitat for fauna.

Description – No indigenous trees are present within the precinct. All trees of the trees present across the study area are planted Australian natives (i.e. Sugar Gums *Eucalyptus cladocalyx*) and exotics and are located throughout the perimeter of the study area.

Terrestrial fauna – Planted trees provide roosting habitat for a low diversity of birds and bats. When in flower, they provide food resources for nectivorous birds while low growing shrubs would be used by smaller passerine species such as wrens, thornbills, and fantails for nesting and foraging purposes. Whilst no nests or dreys were observed, these trees may provide such opportunities in the future for birds, common arboreal mammals and bats.

Artificial waterbodies (farm dams) (Corresponding EVC: None)

Overall habitat value – Artificial waterbodies are of **low** habitat value for fauna (Appendix 1.5).

Description – Two artificial waterbodies (i.e. dams) exist within the study area (Figure 2). They currently support low levels of emergent and submergent aquatic vegetation, with few refuge sites such as logs or rocks present. The surrounding vegetation comprises introduced pasture grasses and weeds.

Fauna – Waterbirds such as Australian Wood Duck *Chenonetta jubata* and Pacific Black Duck *Anas superciliosa*, and frog species such as Common Froglet *Crinia signifera* and Spotted Marsh Frog *Limnodynastes tasmaniensis* are expected to use this habitat occasionally. Growling Grass Frog *Litoria raniformis* are unlikely to use this habitat for breeding, foraging or dispersal purposes.

Introduced pasture grass and crops (Corresponding EVC: None)

Overall habitat value – This habitat is of **low** habitat value for fauna (Appendix 1.5). Ungrazed pasture grasses, which in some areas was up to one metre high, provides habitat for several birds adapted to agricultural landscapes, reptiles and frogs.

This habitat may also act as 'stepping stone' habitats for mobile species (principally birds) adapted to modified environments. Patches of native grassland habitat are also likely to facilitate fauna movement between sites of higher value throughout the landscape.

Description – This habitat occurs throughout the study area where native vegetation has been removed. It comprises almost exclusively perennial pasture grasses and environmental weeds.

Fauna – Few native species are known to use this habitat, and these include birds adapted to modified habitats such as Australian Magpie, Little Raven, Australian White Ibis *Threskiornis molucca*, Australasian Pipit *Anthus novaeseelandiae* and Magpie-lark *Grallina cyanoleuca*.

Although introduced grasses do not provide optimal habitat for fauna, they do provide dispersal opportunities (cover) for reptiles, frogs and other species into more optimal habitats throughout the local area.

3.4.3 Significant fauna species

National

No national significant fauna species were recorded within the study area during the assessment. Nineteen nationally listed fauna species have previously been recorded within the local area (within ten kilometres of the study area) (DSE 2011a), or have habitat that either

occurs or is predicted to occur throughout the local area (DSEWPC 2012) (Figure 4) (Appendix 3.2). The likelihood of occurrence of nationally significant fauna species within the study area is outlined in Appendix 3.2.

These species include:

- Four terrestrial mammals: Southern Brown Bandicoot *Isoodon obesulus obesulus*, Brush-tailed Rock-wallaby *Petrogale penicillatai*, Spot-tailed Quoll *Dasyurus maculatus* and New Holland Mouse *Pseudomys novaehollandiae*;
- One bat species: Grey-headed Flying-fox *Pteropus poliocephalus*;
- Two coastal-associated birds: Fairy Tern *Sternula nereis* and Orange bellied Parrot *Neophema chrysogaster*;
- Three woodland dependent birds: Helmeted Honeyeater *Lichenostomus melanops cassidix*, Regent Honeyeater *Xanthomyza phrygia* and Swift Parrot *Lathamus discolor*;
- One shrubland/low woodland dependent bird: Malleefowl *Leipoa ocellata*;
- Two wetland dependent birds: Australasian Bittern *Botaurus poiciloptilus* and Australian Painted Snipe *Rostratula australis*;
- Two reptiles: Striped Legless Lizard and Grassland Earless Dragon *Tympanocryptis pinguicolla*;
- One frog: Growling Grass Frog *Litoria raniformis*;
- Two fish: Australian Grayling *Prototroctes maraena* and Dwarf Galaxias *Galaxiella pusilla*; and,
- One invertebrate: Golden Sun Moth.

Golden Sun Moth

Golden Sun Moth was once widespread in south-eastern Australia corresponding with the distribution of native temperate grasslands. Clearing for agriculture and urban development, and degradation by weed invasion and grazing means that the remaining moth habitat persists only in small parcels and is highly fragmented. Recent surveys have found that it is more widespread than previously thought within grasslands surrounding Melbourne, as well as interstate.

The biology of the Golden Sun Moth is poorly known, as is the case for the majority of invertebrate species. Their preferred habitat is reportedly within areas with few or no trees and a grass-layer where the cover of wallaby-grass *Austrodanthonia* spp. normally exceeds 40%. Male flight is low, to about a metre above the ground, fast and can be prolonged, but

they are generally not recorded flying more than 100 metres from suitable habitat (Clarke and O'Dwyer 2000). Females are poor fliers, apparently walking between tussocks to lay eggs. Small, disjunct populations are vulnerable as there is little likelihood of recolonisation in the event of a local extinction.

The VBA contains 54 records for Golden Sun Moth within a 10 kilometre radius of the study area, a number of which are in proximity to the study area boundary (Figure 4) (DSE 2011a). Suitable habitat (Plains Grassland) for Golden Sun Moth occurs in areas of Plains Grassland within the study area (Figure 2). Sub-regional surveys for this species have been conducted and the results of these surveys will dictate further management and offsets associated with the removal of any known habitat for the species within the precinct.

Striped Legless Lizard

Striped Legless Lizard is listed as Vulnerable under the EPBC Act, listed as threatened under the FFG Act and is considered to be endangered in Victoria (DSE 2007b). This reptile was once widely distributed across the native grassland areas of Victoria and before European settlement was most likely quite a common species across the Victorian Volcanic Plains. Subsequent loss and modification of native grassland areas through agricultural practices and other development have reduced the available habitat for this species substantially.

Most of its known Victorian sites have a scattering of lightly embedded rocks (Haddon 1995). As many as half of the known locations of this lizard are within areas that are grazed by introduced herbivores, although the intensity of grazing they can withstand is unknown (Haddon 1995). It is not recorded from ploughed pastoral lands or forest areas, but is occasionally recorded from grassy woodlands (Haddon 1995).

While there are no previous Striped Legless Lizard records within the local area (DSE 2011a), remnant patches of Plains Grassland containing embedded surface rock and areas of cracked soil provide potentially suitable habitat for this species. While targeted surveys have not been undertaken for this species within the study area, there is a high likelihood of the species persisting in Plains Grassland and other areas supporting tussock grasses within the study area.

Grey-headed Flying-fox

Grey-headed Flying-fox *Pteropus poliocephalus* may fly over the study area on an occasional basis where eucalypt species may provide a potential foraging resource for this species. However, it is unlikely that Grey-headed Flying-fox would reside within the study area for extended periods or on annual regular basis.

State

No state significant fauna species were recorded during the assessment. Twenty three state significant fauna have previously been documented within the local area (within ten kilometres of the study area) (DSE 2011a) (Figure 4) (Appendix 3.2). The likelihood of occurrence of state significant fauna species within the study area is outlined in Appendix 3.2.

- Three nocturnal raptors: Barking Owl *Ninox connivens*, Sooty Owl *Tyto tenebricosa tenebricosa* and Powerful Owl *Ninox strenua*;
- Two diurnal raptors: Black Falcon *Falco subniger* and Grey Goshawk *Accipiter novaehollandiae*;
- Twelve five wetland associated birds: Australian Shoveler *Anas rhynchotis*, Baillon's Crake *Porzana pusilla*, Common Sandpiper *Actitis hypoleucos*, Blue-billed Duck *Oxyura australis*, Caspian Tern *Sterna caspia*, Eastern Great Egret *Ardea modesta*, Hardhead *Aythya australis*, Little Bittern *Ixobrychus minutus dubius*, Little Egret *Egretta garzetta nigripes*, Freckled Duck *Stictonetta naevosa*, Musk Duck *Biziura lobata* and Royal Spoonbill *Platalea regia*;
- Three woodland associated birds: Brown Treecreeper (south-eastern spp.) *Climacteris picumnus victoriae*, Hooded Robin *Melanodryas cucullata* and Speckled Warbler *Chthonicola sagittata*;
- One heathland/grassland associated birds: Chestnut-rumped *Calamanthus pyrrhopygius*;
- One frog species: Southern Toadlet *Pseudophryne semimarmorata*; and,
- One Crustacean species: Foothill Burrowing Crayfish *Engaeus victoriensis*.

Black Falcon may occasionally visit the study area for foraging purposes; however, none of these species are likely to breed within the study area and none are likely to occur on a regular basis.

Regional and local

Eleven regionally significant fauna species have been previously recorded within the local area (DSE 2011a; Appendix 3.2). While there are remnant patches of Plains Grassland within the study area, it is considered unlikely for regionally significant fauna species to use habitat within the study area on a permanent basis for breeding purposes. All other native fauna

(primarily common open country birds) are of local significance, as they are not listed as rare or threatened on a national, state and regional level.

3.4.4 Best or remaining 50% habitat for rare and threatened fauna species

A habitat assessment in accordance with the *Native Vegetation Guide for assessment of referred planning permit applications* and The Framework has been undertaken below (NRE 2002; DSE 2007a).

The threatened fauna species and remnant patches which may contain habitat for these species as well as the determination on the best or remaining habitat for these species is provided below (Table 3).

Table 3. Habitat assessment for threatened species within properties accessed for the precinct.

Potential Habitat (Remnant Patch No)	Threatened Species or Species' with the Highest Likelihood of Occurrence[1]	Steps Followed	Best or Remaining 50% of Habitat for the Species?	Notes	Conservation Significance Rating Prior to this Evaluation	Conservation Significance Rating after this Evaluation
14308; 14310; 14307; 14309; 14312; 14313; 14311	Golden Sun Moth and Striped Legless Lizard	A - no, D - yes, F - no	Remaining 50%	Potential to occur	Very High	Very High
14297; 14302; 14305; 14299; 14300; 14301; 14298; 14304; 14303	Golden Sun Moth and Striped Legless Lizard	A - no, D - yes, F - no	Remaining 50%	Potential to occur	High	High

1 The assessment is undertaken on the species or species' with at least a low likelihood of occurrence as a resident, or most regular occurrence if it is a mobile fauna species. Ecology and Heritage Partners Pty Ltd has not assessed species' that are unlikely to occur, as they will not alter the outcome of the assessment.

Therefore, following steps A, D and F within Table 2 in *Native Vegetation Guide for assessment of referred planning permit applications* (DSE 2006), Plains Grassland within the study area is considered to be Remaining 50% habitat for threatened fauna species.

4 RELEVANT LEGISLATION AND POLICY

This section discusses the implications of relevant environmental legislation and policies within the three tiers of government; Commonwealth, State and Local.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act establishes a Commonwealth process for assessment of proposed actions that are likely to have a significant impact on matters of National Environmental Significance (NES), or on Commonwealth land. An action (i.e. project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Commonwealth Environment Minister if they are likely to have an impact on any matters of NES. A referral under the EPBC Act is required if a proposed action is likely to have a 'significant impact' on any of the following matters of NES (unless otherwise covered by the Strategic Impact Assessment Report (DSE 2010a) as discussed below:

- World Heritage properties
- National heritage places
- Ramsar wetlands of international significance
- Threatened species and ecological communities
- Migratory and marine species
- Commonwealth marine area
- Great Barrier Reef
- Nuclear actions (including uranium mining)

Ramsar Wetlands of International Significance

There are no Ramsar listed wetlands within the precinct. One Ramsar wetland occurs over 20 kilometres downstream of the study area, Port Phillip Bay (Western Shoreline) and Bellarine. However, it is unlikely that any future development within the study area will impact on this Ramsar wetland.

Listed Flora and Fauna Species and Ecological Communities

An action requires approval from the Commonwealth Environment Minister if it will, or if it is likely to, have a significant impact on an endangered or critically endangered species, or on an 'important population' or critical habitat of a listed threatened species.

Flora – No flora species listed under the EPBC Act were recorded during the assessment. Eight additional species have been recorded within a ten kilometre radius of the study area and two additional nationally significant flora species are listed as having potential habitat within a ten kilometre radius of the study area (DSEWPC 2012).

Due to the level of modification of vegetation within the study area, it is unlikely that any additional nationally significant flora species occur within the study area.

Fauna – No fauna species listed under the EPBC Act were recorded during the assessment, although targeted surveys were not conducted for Striped Legless Lizard and Golden Sun Moth. These species have a high likelihood of occurrence and it is understood that these species will be considered at the precinct level.

Grey-headed Flying-fox and Swift Parrot may occur within the study area on an infrequent basis for foraging purposes only. Further assessment for these two species is not recommended and it is unlikely that future development of the study area will have a significant impact on either of these species.

Communities – The majority of the Plains Grassland vegetation within the study area is part of the EPBC Act listed community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP).

Listed Migratory and Marine Species

Forty two listed migratory or marine species were recorded. However, there is no important wetland or marine habitats within the study area, and therefore the study area is unlikely to support an ecologically significant population of any migratory and/or marine species.

Commonwealth Marine Area and Nuclear Actions

The study area is not within a marine area, nor are the proposed works related to nuclear actions.

Implications and Recommendations

EPBC Act and Melbourne's Strategic Impact Assessment

Melbourne's Strategic Impact Assessment (the SIA) process implements the State-Commonwealth Agreement to undertake broad scale strategic assessments with respect to any matters of National Environmental Significance (NES) listed under the EPBC Act (Section 146(1) Agreement, Part 10 Strategic Assessment).

Subsequent to this agreement, on 8 July 2010, the Commonwealth Minister for the Environment approved the actions associated with urban development surrounding Melbourne, provided that they are undertaken in accordance with the endorsed program report: Delivering Melbourne's Newest Sustainable Communities, in the precincts within the current Urban Growth Boundary (DPCD 2012). One of the conditions of the approval is that actions must be in accordance with approved prescriptions for the protection of matters of NES.

The SIA process employs a precinct-wide approach to matters of NES. As a result, measures to protect and enhance habitat for nationally-significant flora and fauna are being implemented for the Wyndham Vale PSP. This requires a coordinated, precinct-wide approach to habitat protection, as well as management, monitoring and maintenance of threatened species.

Implications under the SIA

No EPBC Act-listed flora or fauna species were recorded during the current surveys. It is understood that surveys for Golden Sun Moth are being conducted at a sub-regional scale, and the consideration of these surveys along with the results from this assessment will be included as part of the future treatment of the study area within the Wyndham Vale PSP.

The study area supports approximately 2.68 habitat hectares of remnant native vegetation and 6.09 hectares of non-native vegetation. Based on the assumption that the study area supports Golden Sun Moth, the losses of 'High Contribution' Golden Sun Moth habitat (DSE 2011b) are required to be offset in accordance with the species prescription. This equates to an offset of $137,500.00 per habitat hectare of native vegetation removed, which incorporates the losses of Golden Sun Moth. For any areas of non-native vegetation considered 'Medium Contribution' habitat, the offset for the loss of this habitat is calculated at a rate of $44,000.00 per hectare.

Suitable habitat for Striped Legless Lizard occurs within the study area. Prior to removal of suitable habitat, a habitat assessment and preparation of a Salvage and Translocation Plan in accordance with the Strategic Approach (DSE 2011c) is required. Once approved, clearing of the site can commence in accordance with the Operational Plan (DSE 2011c) under the supervision of appropriately qualified zoologists.

Implications under the Biodiversity Conservation Strategy (BCS)

However, the Draft Biodiversity Conservation Strategy (DSE 2011d) and Sub-regional Species Strategy for Golden Sun Moth (DSE 2011c) recently released by DSE (likely to be approved mid 2012) recommends that a levy be applied to all areas of non-native grassland vegetation (including cropped) as contribution to the protection of Golden Sun Moth offsets in the bioregion. The levy is currently stated to be between $6,000.00 and $8,000.00 per hectare of grassland vegetation removed.

Under this strategy, the removal of remnant native vegetation would result in an offset obligation of $137,500.00 per habitat hectare, and $6,000.00 and $8,000.00 per hectare of non-native habitat removal.

Summary

Overall, the treatment of GSM will follow the SIA until the BSC prescriptions are approved. Given the survey season for GSM is closed and will not commence again until November 2012, it is likely the BCS will be approved by this time and will therefore supersede the prescriptions (Merryn Kelly, DSE, pers comm.). Due to the difficultly and costs associated with surveying SLL and the cryptic nature of the species, a decision was made by DSE to assume presence (Merryn Kelly, DSE, pers comm.). Therefore, the Strategic Approach will be followed in all areas of suitable SLL habitat within the study area.

4.2 State

4.2.1 Planning and Environment Act 1987

All planning schemes contain native vegetation provisions at Clause 52.17. A planning permit is required under the *Planning and Environment Act 1987* to remove, destroy or lop native vegetation, unless:

- The application is exempt under the schedule to Clause 52.17; or
- A NVPP applies.

Planning schemes may contain other provisions in relation to the removal of native vegetation.

Clause 52.16 applies to land where a NVPP, corresponding to that land, is incorporated into this scheme. Where an NVPP applies, a permit is required to remove destroy or lop native vegetation, except where it is in accordance with that NVPP and Clause 52.16. Though an NVPP can stand alone, it may form part of a more general strategic or precinct structure plan. The purpose of an NVPP is to protect and conserve native vegetation to reduce the impact of land and water degradation and provide habitat for plants and animals, and to enable other areas of native vegetation to be removed in accordance with the NVPP.

The NVPP may require specified works to be provided or specified payments to be made to offset the removal, destruction or lopping of native vegetation. No permit is required under clause 52.17 where an NVPP is incorporated and listed in the schedule to clause 52.16 NVPP.

Implications and Recommendations

A planning permit is required from Wyndham Shire Council to remove, destroy or lop native vegetation within the precinct. However, consistent with above, once the NVPP is an incorporated document in the local planning scheme, Clause 52.16 applies to the protection and removal of native vegetation.

4.2.2 Flora and Fauna Guarantee Act 1988

The primary legislation for the protection of flora and fauna in Victoria is the FFG Act. The Act builds on broader national and international policy in the conservation of biodiversity.

The broad objectives of the FFG Act are to; 1) ensure native flora and fauna survive, flourish and maintain in situ evolutionary potential, 2) manage threatening processes, 3) encourage the conserving of flora and fauna through cooperative community endeavours, and 4) establish a regulatory structure for the conservation of flora and fauna in Victoria.

The Act contains protection procedures such as the listing of threatened species and/or communities of flora and fauna, and the preparation of action statements to protect the long-term viability of these values.

Flora – A FFG Act permit is required for the removal of protected species located on areas of public land (i.e. within road reserves), including any of the Asteraceae (Daisies), all orchids, ferns (excluding Bracken) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*). A Protected Flora Licence or Permit to disturb protected native plants is generally not required on private property. Several Asteraceae species were recorded within the study area; however, an FFG permit is generally not required for the removal of listed species within private land.

Vegetation Communities – One FFG Act listed vegetation community, Western (Basalt) Plains Grassland Community, was recorded within the study area. However, as the study area is within private land an FFG permit is generally not required for the removal of listed communities.

Fauna – Thirty three fauna species listed as threatened under the FFG Act have previously been recorded from within the local area (i.e. within a ten kilometre radius of the study area) (Appendix 3.2). The habitat quality for these species is low, and there is only a low likelihood of occurrence for ground-dwelling fauna (with the exception of Golden Sun Moth and Striped Legless Lizard), and birds are only expected to visit the study area on an infrequent or occasional basis.

Threatening processes – Future development of the study area should consider FFG Act-listed threatening process such as invasion of native vegetation by environmental weeds.

Implications and Recommendations

Several FFG listed flora species and one listed community was recorded within the study area. An FFG Act permit is required for the removal of protected species and communities under the Act on public land. However, as the study area is within private land, an FFG permit is generally not required.

4.2.3 Environment Effects Act 1978

Environmental impacts or effects of a proposed development can be assessed according to the *Environment Effects Act 1978*. It is not an approval process itself, but a way of enabling Ministers, local government and statutory authorities to make informed decisions about whether a project with potentially significant environmental effects should proceed.

The central part of the process is the preparation of an Environmental Effects Statement (EES). The proponent is responsible for preparing an EES if the Minister for Planning decides that one is required. After the EES is completed and released for public comment, the Minister provides an assessment to the relevant decision-makers. There are also opportunities for community involvement at certain stages of the process. The Department of Planning and Community Development coordinates the process, implementing Ministerial Guidelines that set out the details under the Act.

Implications and Recommendations

An EES is unlikely be required for major developments within the precinct.

4.2.4 Catchment and Land Protection Act 1994

The CALP Act contains provisions relating to catchment planning, land management, noxious weeds and pest animals. This 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.

Essentially the Act establishes a framework for the integrated management and protection of catchments, and provides a framework for the integrated and coordinated management, which aims to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.

Implications and Recommendations

Based on the recent flora surveys a total of nine noxious weed species were recorded within the study area (Table A2.1.2). Landowners are responsible to control any infestation of noxious weeds that may become established within the precinct.

4.2.5 Wildlife Act 1975

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The *Wildlife Act 1975* has the following objectives:

- To establish procedures for the promotion of protection and conservation of wildlife, the prevention of species extinctions, and the sustainable use and access to wildlife; and
- To prohibit and regulate the conduct of those involved in wildlife related activities.

Implications and Recommendations

While a permit will be required for removal of habitat within the precinct, this could be in the form of a permit to remove native vegetation under the *Planning and Environment Act 1987*.

4.2.6 Port Phillip and Westernport Native Vegetation Plan

The *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006) is a guide for local government in assessing planning applications for vegetation removal and determining permit conditions (Net Gain requirements) to ensure that ecological values across the region are not compromised.

The Plan provides information on biodiversity values across the Region and gives guidance to local municipalities on how clearing applications should be assessed. The document also outlines actions to ensure there is a more strategic and coordinated approach to address ongoing degradation in quantity and quality of native vegetation throughout Victoria.

The recommendations made in the *Native Vegetation Plan*, should be taken into consideration in the planning phase of any proposed future works.

Implications and Recommendations

The *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006) has been referred to when preparing this report as required.

4.2.7 Victoria's Biodiversity Strategy

The Victorian Government endorses this strategy titled '*Victoria's Biodiversity – Directions in Management*' (NRE 1997) and represents a benchmark for biodiversity conservation and management throughout the state.

The Biodiversity Strategy encourages Victorians to better understand and appreciate flora and fauna and ecosystems throughout the state, and to take an active part in conservation and management to ensure biodiversity is managed in an ecologically sound and sustainable manner. The Strategy should be taken into account for any proposed developments.

4.3 Local

4.3.1 Wyndham Shire Council

Under the Wyndham Shire Council planning scheme the study area is Urban Growth Zone (UGZ). There are no environmental significance overlays present within the study area. The study area lies within the Urban Growth Boundary (UGB).

Implications and Recommendations

Once the NVPP has been prepared, this will guide future development from the time they become incorporated in the Wyndham Shire Council Planning Scheme.

5 POTENTIAL IMPACTS AND MITIGATION MEASURES

Potential impacts caused by future development of the study area include:

- The loss of:
    - **5.14 habitat hectares** of Very High conservation significance Plains Grassland; and,
    - **0.97 habitat hectares** of High conservation significance Plains Grassland.
- The majority of which will also be classified as Natural Temperate Grassland of the Victorian Volcanic Plain, a community listed under the EPBC Act.
- The removal of potential habitat for nationally significant species including Golden Sun Moth and Striped Legless Lizard;
- The removal of the remaining grasslands which are expected to provide habitat for native reptiles and frogs;
- The removal of planted vegetation and artificial waterbodies within the study area which are likely provide habitat for locally abundant frog species and other locally common fauna species (principally birds); and,
- The removal of pastures which provide low quality habitat for native birds and reptiles.

5.1 Opportunities to Reduce Potential Impacts

Future development of the Wyndham Vale precinct has the potential to impact (direct and indirect) native flora and fauna species within the precinct, and habitat for threatened fauna species. Measures to mitigate/ameliorate impacts of the future development upon the ecological values in the study area include:

- Any future development should address the first two principles of three-step approach of the Framework to ‘avoid’ and ‘minimise’ impacts to remnant native vegetation, which reduces the requirement for vegetation removal, and can reduce the Net Gain targets;
- Where development is identified adjacent to areas of ecological value, these sites should be fenced and identified as ‘no go’ areas to avoid disturbance during the construction phase of the project;
- A Weed Management Plan should be developed to control weeds (particularly noxious species such as African Boxthorn and Serrated Tussock), targeting areas adjacent to native vegetation;
- Use indigenous plants associated with the relevant EVC as part of any landscaping works to increased habitat for native fauna; and,

- Incorporate Water Sensitive Urban Design into future housing developments in the precinct.

5.2 Opportunities to Protect and Enhance Regional and Local Biodiversity Values

Habitat within the study area, and Wyndham Vale precinct, are highly fragmented, and patches of remnant native vegetation are small and degraded. Opportunities to enhance local biodiversity values include:

- The control of noxious weeds and environmental weeds within the study area such as Scotch Thistle, Artichoke Thistle, African Boxthorn, Sweet Briar, Blackberry and Gorse which will spread beyond the precinct. This should be undertaken in accordance with a Revegetation Plan to avoid removing weeds which may currently provide habitat to native fauna (e.g. Blackberry which may provide habitat to Southern Brown Bandicoot or trees which provide habitat to arboreal mammals including bats);

- The preparation of a NVPP which identifies areas to be retained and areas to be removed;

- Offset the losses of habitats in accordance with the prescriptions detailed under the SIAR (DSE 2010a).

6 CONCLUSION

The study area is modified as a result of historical grazing and slashing. Remnant native vegetation within the study area comprises one EVC, Plains Grassland (EVC 132_62).

There are approximately **2.68 habitat hectares** (6.11 hectares) of remnant vegetation present within the precinct. This includes **2.34 habitat hectares** of Very High conservation significance Plains Grassland and **0.34 habitat hectares** of High conservation significance Plains Grassland. There are no trees within remnant patches, or scattered trees within the study area.

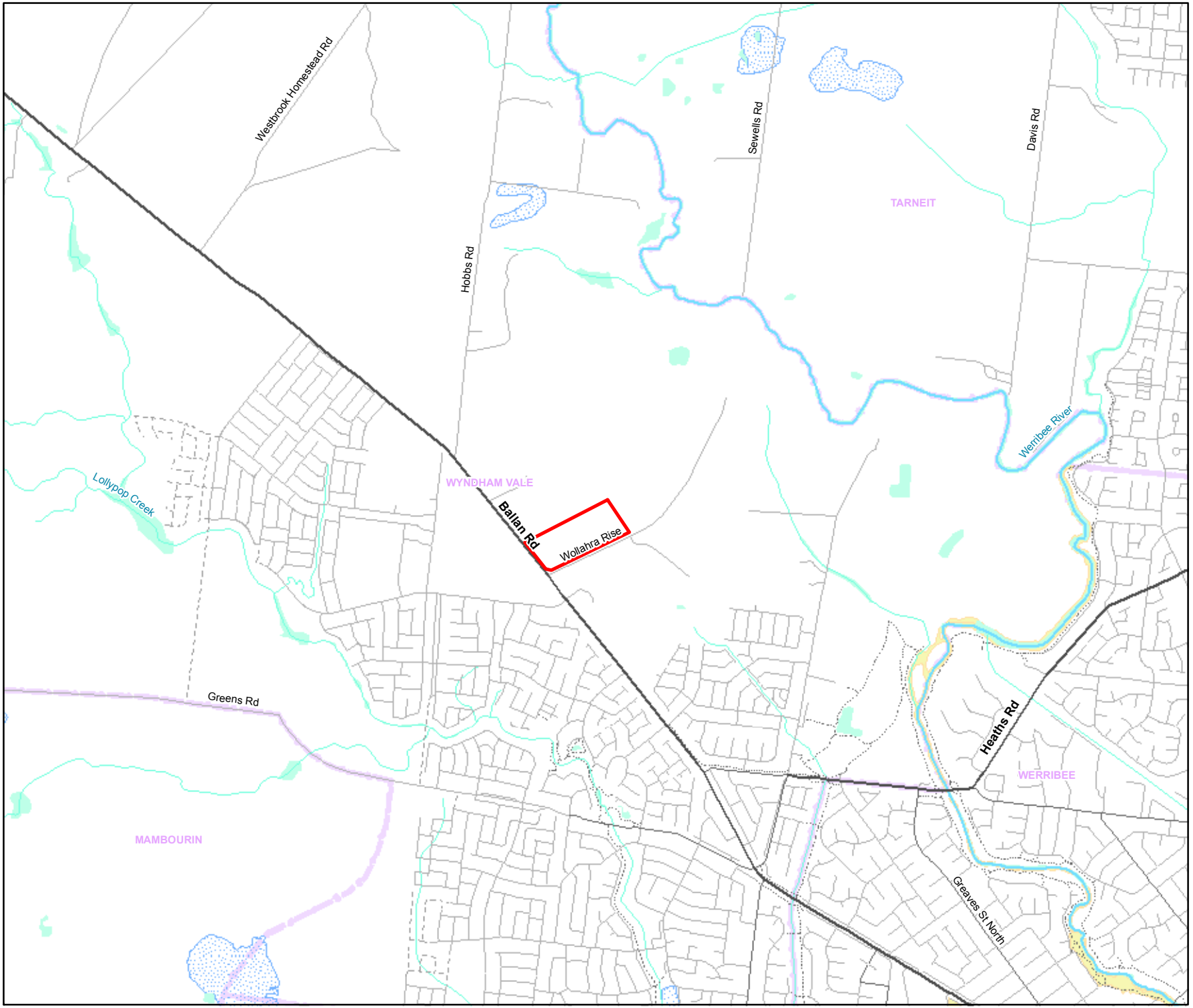
Eight nationally significant and 29 state significant flora species have been previously recorded within the local area. No significant flora species were recorded during the current assessment, while one state-listed species (Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*) was recorded within areas mapped as remnant vegetation. This species is listed as poorly known in the DSE advisory list. The likelihood of significant populations of national and state significant flora species occurring within the study area is considered low.

The site supports four broad habitat types: native grasslands, planted trees, artificial waterbodies and introduced pasture grasses (Figure 2).

There were no national or state significant fauna species recorded during the assessment, although targeted surveys were not conducted for Striped Legless Lizard and Golden Sun Moth. These species have a high likelihood of occurrence and it is understood that these species will be considered at the precinct level.

There are opportunities to enhance ecological values within the precinct, principally through protection of native vegetation and areas of fauna habitat, and allowing the regeneration of native vegetation, as well as undertaking revegetation and weed control. Such activities should be undertaken in accordance with relevant Management Plans.

FIGURES



Legend

- Freeway
- 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
- Study Area

Figure 1

Location of the study area

440 Ballan Rd (Lot 11), Wyndham Vale

N

0 300 600

Metres

ecology & heritage partners

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Legend

- Plains Grassland (EVC 132)
- Minor Watercourse
- Major Watercourse
- Localities
- Study Area

Figure 2

Native Vegetation - Timestamp

440 Ballan Rd (Lot 11), Wyndham Vale

N

0 30 60

Metres

ecology & heritage partners

Legend

Plains Grassland (EVC 132)

- High
- Very High
- Minor Watercourse
- Major Watercourse
- Localities
- Study Area

Figure 3

Native Vegetation - Conservation Significance

440 Ballan Rd (Lot 11), Wyndham Vale

0 30 60
Metres

ecology & heritage partners

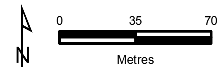
Legend

- Slender Bindweed
- Minor Watercourse
- Major Watercourse
- Localities
- Study Area

Figure 4

Significant flora and fauna recorded during field surveys

440 Ballan Rd (Lot 11), Wyndham Vale



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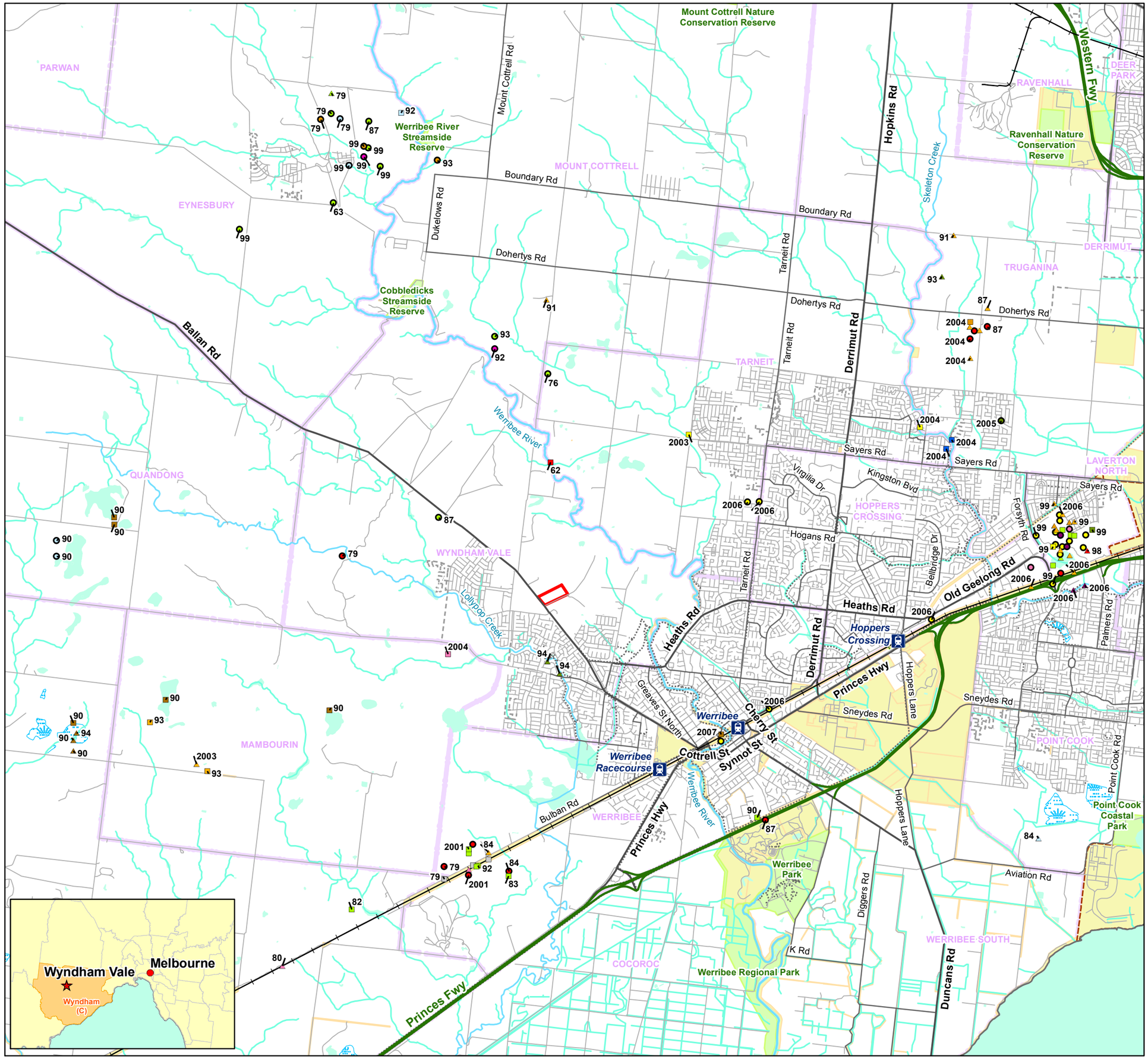


Significant Flora

- Arching Flax-lily
- Austral Crane's-bill
- Austral Tobacco
- Basalt Podolepis
- Buloke
- Buloke Mistletoe
- Button Wrinklewort
- Clover Glycine
- Curved Rice-flower
- Fragrant Leek-orchid
- Fragrant Saltbush
- Giant Honey-myrtle
- Grey Spike-sedge
- Heath Spear-grass
- Hornwort
- Large-headed Fireweed
- Marsh Saltbush
- Matted Flax-lily
- Melbourne Yellow-gum
- Pale Swamp Everlasting
- Perennial Blown-grass
- Plains Joyweed
- Plump Swamp Wallaby-grass
- Rough-grain Love-grass
- Rye Beetle-grass
- Salt Lawrencia
- Sand Brome
- Slender Bindweed
- Slender Tick-trefoil
- Small Golden Moths
- Small Milkwort
- Small Scurf-pea
- Smooth Nardoo
- Southern Shepherd's Purse
- Southern Swainson-pea
- Spiny Rice-flower
- Tough Scurf-pea

Study Area

Figure 5

Previously documented significant flora within 10km of the study area

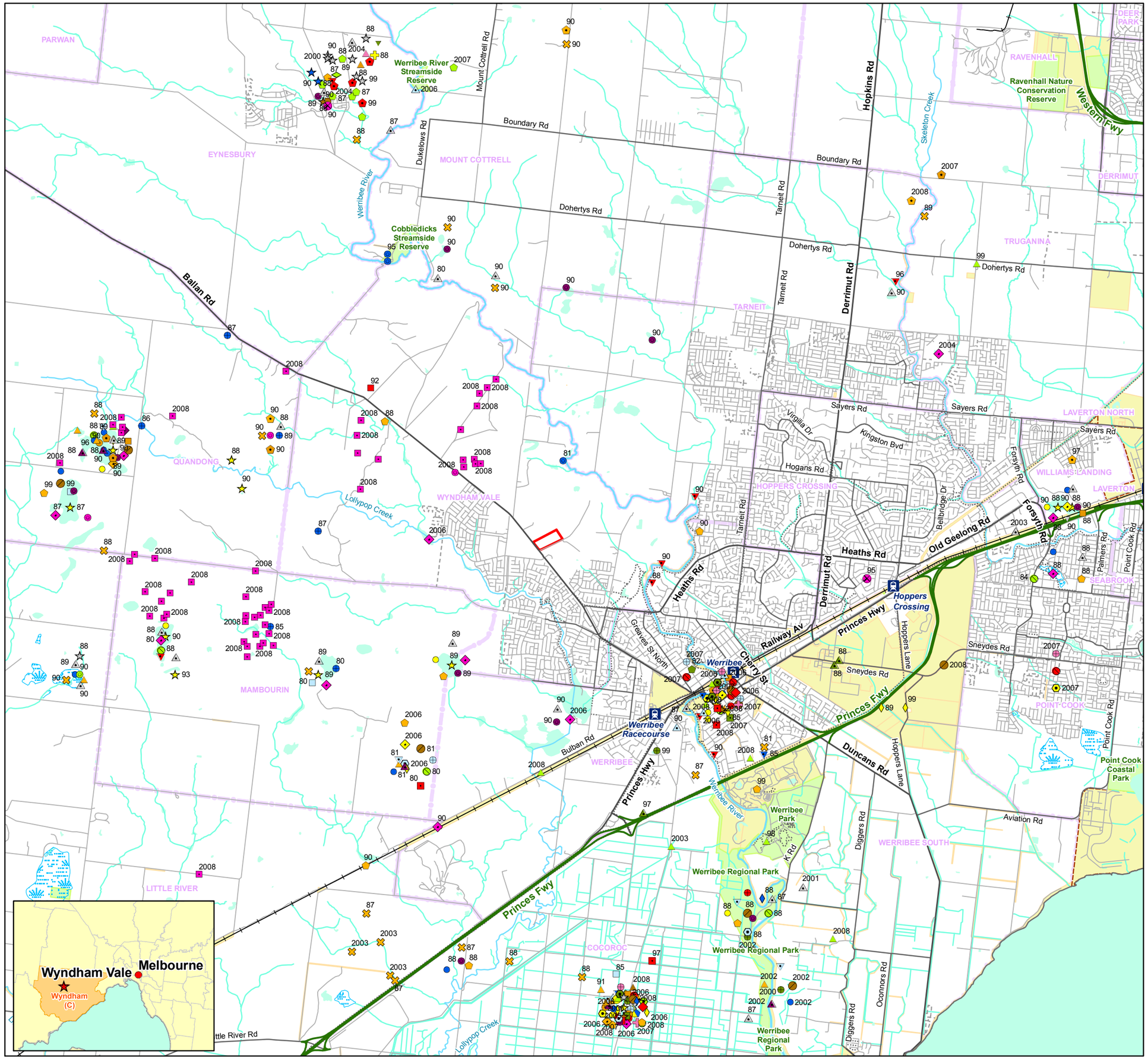
440 Ballan Rd (Lot 11), Wyndham Vale

N

0 1.5 3

Kilometres

ecology & heritage partners



Significant Fauna

- Australasian Bittern
- Australasian Shoveler
- Australian Painted Snipe
- Australian Pratincole
- Baillon's Crake
- Barking Owl
- Black Falcon
- Black-chinned Honeyeater
- Black-eared Cuckoo
- Black-faced Cormorant
- Black-tailed Godwit
- Blue-billed Duck
- Brolga
- Brown Quail
- Brown Toadlet
- Brown Treecreeper (south-eastern ssp.)
- Cape Barren Goose
- Caspian Tern
- Common Sandpiper
- Crested Bellbird
- Diamond Firetail
- Eastern Barred Bandicoot
- Eastern Curlew
- Eastern Great Egret
- Fairy Tern
- Fat-tailed Dunnart
- Freckled Duck
- Glossy Ibis
- Golden Sun Moth
- Grassland Earless Dragon
- Great Knot
- Greater Sand Plover
- Grey Goshawk
- Grey Plover
- Grey-headed Flying-fox
- Growling Grass Frog
- Gull-billed Tern
- Hardhead
- Hooded Robin
- Intermediate Egret
- Latham's Snipe
- Lesser Sand Plover
- Lewin's Rail
- Little Bittern
- Little Button-quail
- Little Egret
- Little Tern
- Long-toed Stint
- Magpie Goose
- Masked Owl
- Musk Duck
- Nankeen Night Heron
- Orange-bellied Parrot
- Pacific Golden Plover
- Pacific Gull
- Pectoral Sandpiper
- Pied Cormorant
- Plains-wanderer
- Red Knot
- Red-backed Kingfisher
- Red-chested Button-quail
- River Blackfish
- Royal Spoonbill
- Sooty Oystercatcher
- Southern Brown Bandicoot
- Speckled Warbler
- Spotted Harrier
- Striped Legless Lizard
- Swift Parrot
- Terek Sandpiper
- Whiskered Tern
- White-bellied Sea-Eagle
- White-winged Black Tern
- Wood Sandpiper

Study Area

Figure 6

Previously documented significant fauna within 10km of the study area

440 Ballan Rd (Lot 11), Wyndham Vale

N

0 1.5 3

Kilometres

ecology & heritage partners

APPENDICES

Appendix 1 – Significance Assessment

Criteria used by Ecology and Heritage Partners Pty Ltd to define conservation significance, vegetation condition and habitat quality is provided below.

A1.1. Rare or Threatened Categories for listed Victorian taxa

Table A1.1. *Rare or Threatened categories for listed Victorian taxa.*

Rare or Threatened Categories
CONSERVATION STATUS IN AUSTRALIA (Based on the EPBC Act 1999, Briggs and Leigh 1996)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
CONSERVATION STATUS IN VICTORIA (Based on DSE 2005, DSE 2007a DSE 2009)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

A1.2. Defining Ecological Significance

Table A1.2. Defining Ecological Significance.

Criteria for defining Ecological Significance	
NATIONAL SIGNIFICANCE	
Flora	National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
	Flora listed as rare in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
Fauna	National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. Extinct, Critically Endangered, Endangered, Vulnerable).
	Fauna listed as Extinct, Critically Endangered, Endangered, Vulnerable, or Rare under National Action Plans for terrestrial taxon prepared for the DSEWPC: threatened marsupials and monotremes (Maxwell *et al.* 1996), bats (Duncan *et al.* 1999), birds (Garnett and Crowley 2000), reptiles (Cogger *et al.* 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
	Species that have not been included on the EBPC Act but listed as significance according to the *IUCN 2009 Red List of Threatened Species* (IUCN 2009).
Communities	Vegetation communities considered critically endangered, endangered or vulnerable under the EPBC Act and considering vegetation condition.
STATE SIGNIFICANCE	
Flora	Threatened taxa listed under the provisions of the FFG Act.
	Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System (most recent Version).
	Flora listed in the State Government's *Advisory List of Rare or Threatened Plants in Victoria*, 2005 (DSE 2005).
	Flora listed as poorly known in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
Fauna	Threatened taxon listed under Schedule 2 of the FFG Act.
	Fauna listed as Extinct, Critically Endangered, Endangered and Vulnerable on the State Government's *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007b).
	Listed as Lower Risk (Near Threatened, Conservation Dependent or Least concern) or Data Deficient under National Action Plans for terrestrial species prepared for the DSEWPC: threatened marsupials and monotremes (Maxwell *et al.* 1996), bats (Duncan *et al.* 1999), birds (Garnett and Crowley 2000), reptiles (Cogger *et al.* 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).

Criteria for defining Ecological Significance	
Communities	Ecological communities listed as threatened under the FFG Act.
	Ecological Vegetation Class listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (www.dse.vic.gov.au) and considering vegetation condition.
REGIONAL SIGNIFICANCE	
Flora	Flora considered rare in any regional native vegetation plan for a particular bioregion.
	Flora considered rare by the author for a particular bioregion.
Fauna	Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the particular Bioregion in which the study area is located.
	A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government's *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007b).
Communities	EVC listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (www.dse.vic.gov.au) and considering vegetation condition.
	EVC considered rare by the author for a particular bioregion.
LOCAL SIGNIFICANCE	
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.	

A1.3 Defining Site Significance

The following geographical areas apply to the overall level of significance with respect to the current survey.

National: Australia

State: Victoria

Regional: Victorian Volcanic bioregion

Local: Within 10 kilometres surrounding the precinct

Table A1.3. *Defining Site Significance.*

Criteria for defining Site Significance
NATIONAL SIGNIFICANCE
A site is of National significance if: - It regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the DSEWPC. - It regularly supports, or has a high probability of supporting, an 'important population' as defined under the EPBC Act of one or more nationally 'vulnerable' flora and fauna taxon. - It is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. - It is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. - It contains an area, or part thereof designated as 'critical habitat' under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. - It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
STATE SIGNIFICANCE
A site is of State significance if: - It occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans. - It regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (DSE 2005, 2007b), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. - It contains an area, or part thereof designated as 'critical habitat' under the FFG Act. - It supports, or likely to support a high proportion of any Victorian flora and fauna taxa. - It contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. - It is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.

Criteria for defining Site Significance
REGIONAL SIGNIFICANCE
A site is of Regional significance if: - It regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. - Is contains a large population (i.e. greater than 1% or 5%) of flora considered rare in any regional native vegetation plan for a particular bioregion. - It supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. - It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
LOCAL SIGNIFICANCE
Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as: - An area which supports indigenous flora species and/or a remnant EVC, and habitats used by locally significant fauna species. - An area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

A1.4. Defining Vegetation Condition

Table A1.4. Defining Vegetation Condition.

Criteria for defining Vegetation Condition
Good condition - Vegetation dominated by a diversity of indigenous species, with defined structures (where appropriate), such as canopy layer, shrub layer, and ground cover, with little or few introduced species present.
Moderate condition - Vegetation dominated by a diversity of indigenous species, but is lacking some structures, such as canopy layer, shrub layer or ground cover, and/or there is a greater level of introduced flora species present.
Poor condition - Vegetation dominated by introduced species, but supports low levels of indigenous species present, in the canopy, shrub layer or ground cover.

A1.5. Defining Habitat Quality

Several factors are taken into account when determining the value of habitat. Habitat quality varies on both spatial and temporal scales, with the habitat value varying depending upon a particular fauna species.

Table A1.5. *Defining Habitat Quality.*

Criteria for defining Habitat Quality
HIGH QUALITY
High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups).
High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity).
High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat.
Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2005.
MODERATE QUALITY
Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups.
Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes.
Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat.
Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2005.
LOW QUALITY
Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups).
Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes.
Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat.
Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2005.

Appendix 2.1 – Flora survey results

Table A2.1.1. Indigenous Flora recorded during the present survey from the precinct.

Life Form	Scientific Name	Common Name	EPBC	DSE	FFG
Shrub	**Chenopodiaceae**				
	Einadia nutans	Nodding Saltbush			
	Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush			
Herb/Forb	**Asteraceae**				
	Euchiton sphaericus	Annual Cudweed			L
	Pseudognaphalium luteoalbum	Jersey Cudweed			L
	Senecio quadridentatus	Cotton Fireweed			L
	Convolvulaceae				
	Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed		k	
	Dennstaedtiaceae				
	Pteridium esculentum	Austral Bracken			
	Onagraceae				
	Epilobium billardierianum	Variable Willow-herb			
	Oxalidaceae				
	Oxalis perennans	Grassland Wood-sorrel			
Graminoid (Grass-like plant)	**Poaceae**				
	Austrodanthonia caespitosa	Common Wallaby-grass			
	Austrodanthonia duttoniana	Brown-back Wallaby-grass			
	Austrodanthonia setacea	Bristly Wallaby-grass			
	Austrostipa bigeniculata	Kneed Spear-grass			
	Austrostipa stuposa	Quizzical Spear-grass			
	Chloris truncata	Windmill Grass			
	Lachnagrostis filiformis s.s.	Common Blown-grass			

Table A2.1.2. Exotic flora recorded during the present survey from the precinct.

Life Form	Scientific Name	Common Name	CALP Act listed weed
Tree	**Myrtaceae**		
	Eucalyptus cladocalyx	Sugar Gum	
Shrub	**Aizoaceae**		
	Galenia pubescens var. *pubescens*	Galenia	
	Solanaceae		
	Lycium ferocissimum	African Box-thorn	✓
Herb/Forb	**Asteraceae**		
	Carthamus lanatus	Saffron Thistle	✓
	Cirsium arvense	Perennial Thistle	✓
	Cirsium vulgare	Spear Thistle	✓
	Conyza bonariensis	Flaxleaf Fleabane	
	Cynara cardunculus	Artichoke Thistle	✓
	Gamochaeta americana	Spiked Cudweed	
	Helminthotheca echioides	Ox-tongue	
	Hypochaeris radicata	Flatweed	
	Sonchus oleraceus	Common Sow-thistle	
	Tragopogon dubius	Goat's Beard	
	Boraginaceae		
	Echium plantagineum	Paterson's Curse	✓
	Brassicaceae		
	Brassica fruticulosa	Twiggy Turnip	
	Lepidium africanum	Common Peppercress	
	Fabaceae		
	Medicago polymorpha	Burr Medic	
	Trifolium angustifolium var. angustifolium	Narrow-leaf Clover	
	Trifolium spp.	Clover	
	Trifolium subterraneum	Subterranean Clover	
	Vicia sativa	Common Vetch	
	Gentianaceae		
	Centaurium erythraea	Common Centaury	
	Iridaceae		
	Romulea rosea	Onion Grass	
	Lamiaceae		
	Marrubium vulgare	Horehound	✓
	Malvaceae		
	Malva nicaeensis	Mallow of Nice	
	Oxalidaceae		
	Oxalis pes-caprae	Soursob	✓
	Veronicaceae		

Life Form	Scientific Name	Common Name	CALP Act listed weed
	Plantago coronopus subsp. *coronopus*	Buck's-horn Plantain	
	Plantago lanceolata	Ribwort	
	Poaceae		
Graminoid (Grass-like plant)	*Aira elegantissima*	Delicate Hair-grass	
	Avena barbata	Bearded Oat	
	Bromus catharticus	Prairie Grass	
	Bromus hordeaceus subsp. hordeaceus	Soft Brome	
	Ehrharta longiflora	Annual Veldt-grass	
	Hordeum leporinum	Barley-grass	
	Hordeum vulgare s.l.	Barley	
	Lolium perenne	Perennial Rye-grass	
	Nassella trichotoma	Serrated Tussock	
	Phalaris aquatica	Toowoomba Canary-grass	✓
	Vulpia myuros	Rats-tail Fescue	

Appendix 2.2 – Flora database results

Table A2.2. Significant flora recorded within 10 kilometres of the study area.

EPBC	*Environment Protection and biodiversity Conservation Act 1999* (EPBC Act)
FFG	*Flora and Fauna Guarantee Act 1988* (FFG Act)
DSE	Advisory List of Threatened Flora in Victoria (DSE 2005); VROTS

X	Extinct
CR	Critically endangered
EN	Endangered
VU	Vulnerable
e	Endangered
v	Vulnerable
r	Rare
k	Poorly Known
L	Listed as threatened under FFG Act
D	De-listed from the FFG Act
#	Records identified from EPBC Act Protected Matters Search Tool.
*	Additional information from the Flora Information System
@	Native non-indigenous species

1	Known occurrence
2	Habitat present
3	Habitat present, but low likelihood
4	Unlikely
5	No suitable habitat

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DSE	Likely occurrence in study area
NATIONAL SIGNIFICANCE							
#*Carex tasmanica*	Curly Sedge	-	-	VU	L	v	4
Dianella amoena	Matted Flax-lily	1	2004	EN	L	e	4
Diuris basaltica	Small Golden Moths	2	2000	EN	L	v	4
#**Glycine latrobeana*	Clover Glycine	2	2008	VU	L	v	5
**Goodenia macbarronii*	Narrow Goodenia	3	2009	VU	L	v	4
#*Pimelea spinescens* subsp. *spinescens*	Spiny Rice-flower	21	2006	CR	L	e	3
#*Prasophyllum frenchii*	Maroon Leek-orchid	-	-	EN	L	e	4
#*Rutidosis leptorhynchoides*	Button Wrinklewort	18	2004	EN	L	e	3
#*Senecio macrocarpus*	Large-headed Fireweed	18	2006	VU	L	e	3
STATE SIGNIFICANCE							
Allocasuarina luehmannii	Buloke	18	1999	-	L	-	5
**Alternanthera* sp. 1 (Plains)	Plains Joyweed	11	2009	-	-	k	4
Amphibromus pithogastrus	Plump Swamp Wallaby-grass	2	2004	-	L	e	4
Amyema linophylla subsp. *orientale*	Buloke Mistletoe	8	1999	-	-	v	5
Austrostipa exilis	Heath Spear-grass	6	1995	-	-	r	5
Austrostipa hemipogon	Half-bearded Spear-grass	1	2006	-	-	r	3
**Ceratophyllum demersum*	Hornwort	1	1962	-	-	k	5
**Clematis decipiens*	Slender Clematis	1	2010	-	-	k	4
Comesperma polygaloides	Small Milkwort	4	2000	-	L	v	4
**Convolvulus angustissimus* ssp. *omnigracilis*	Slender Bindweed	9	2009	-	-	k	1
Cullen parvum	Small Scurf-pea	3	1994	-	L	e	3
Cullen tenax	Tough Scurf-pea	2	2006	-	L	e	4
**Desmodium varians*	Slender Tick-trefoil	2	2010	-	-	k	5
Dianella sp. aff. *longifolia* (Benambra)	Arching Flax-lily	3	2006	-	-	v	4
**Eleocharis pallens*	Pale Spike-sedge	5	2009	-	-	k	5

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DSE	Likely occurrence in study area
Eragrostis trachycarpa	Rough-grain Love-grass	3	1984	-	-	r	4
Eucalyptus leucoxylon ssp. *connata*	Melbourne Yellow-gum	1	2004	-	-	v	5
Geranium solanderi var. *solanderi* s.s.	Austral Crane's-bill	1	2005	-	-	v	3
Helichrysum aff. *rutidolepis* (Lowland Swamps)	Pale Swamp Everlasting	1	1999	-	-	v	4
**Lepidium pseudohyssopifolium*	Native Peppercress	1	2008	-	-	k	4
Nicotiana suaveolens	Austral Tobacco	3	1999	-	-	r	5
Podolepis sp. 1	Basalt Podolepis	14	2006	-	-	e	4
**Prostanther nivea* var. *nivea*	Snowy Mint-bush	1	2009	-	-	r	4
Rhagodia parabolica	Fragrant Saltbush	5	2006	-	-	r	4
**Sclerolaena muricata* var. *muricata*	Black Roly-poly	1	2007	-	-	k	4
Tripogon loliiformis	Rye Beetle-grass	2	1993	-	-	r	5

Data source: Victorian Biodiversity Atlas (DSE 2011a); Protected Matters Search Tool (DSEWPC 2012).

Disclaimer: Due to modification of the study area and/or the surrounding landscape over the past 150 years, species records prior to 1950 (and that have not been recorded since) are excluded from this table.

Taxonomic order: Alphabetical.

Appendix 3.1 – Fauna results

Table A3.1.1. Native fauna species recorded during the present surveys.

Type of Record:
H – Heard
S – Seen

Scientific name	Common name	Conservation Status				
		EPBC	DSE	FFG	Regional	Type of Record
BIRDS						
Threskiornis molucca	Australian White Ibis	–	–	–	–	S
Ocyphaps lophotes	Crested Pigeon	–	–	–	–	S
Malurus cyaneus	Superb Fairy-wren	–	–	–	–	S
Cacatua tenuirostris	Long-billed Corella	–	–	–	–	S
Anthus novaeseelandiae	Australasian Pipit	–	–	–	–	S
Cacatua galerita	Sulphur-crested Cockatoo	–	–	–	–	S
Anthochaera carunculata	Red Wattlebird	–	–	–	–	S
Eolophus roseicapilla	Galah	–	–	–	–	S
Corvus mellori	Little Raven	–	–	–	–	S
Elanus axillaris	Black-shouldered Kite	–	–	–	–	S
Hirundo neoxena	Welcome Swallow	–	–	–	–	S
Rhipidura leucophrys	Willie Wagtail	–	–	–	–	S
Grallina cyanoleuca	Magpie-lark	–	–	–	–	S
Acanthiza pusilla	Brown Thornbill	–	–	–	–	S
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	–	–	–	–	S
Lichenostomus penicillatus	White-plumed Honeyeater	–	–	–	–	S
Gymnorhina tibicen	Australian Magpie	–	–	–	–	S

Source: DSE Victorian Biodiversity Atlas (DSE 2011)

Table A3.1.2. Introduced fauna species recorded during the present surveys.

Type of Record:
S – Seen
I – Incidental (identified from feathers, bones or scats, etc)

Scientific name	Common name	Type of Record
BIRDS		
Turdus merula	Common Blackbird	S
Alauda arvensis	European Skylark	S
Turdus philomelos	Song Thrush	S
Carduelis carduelis	European Goldfinch	S
Passer domesticus	House Sparrow	S
Acridotheres tristis	Common Myna	S

Scientific name	Common name	Type of Record
Sturnus vulgaris	Common Starling	S
MAMMALS		
Oryctolagus cuniculus	European Rabbit	S
Vulpes vulpes	Red Fox	I

Source: DSE Victorian Biodiversity Atlas (DSE 2011)

Appendix 3.2 – Significant fauna species

Table A3.2. *Significant fauna within 10 kilometres of the study area.*

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

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 (DSE 2011); 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 (DSE 2011); and/or, • The study area contains some characteristics of the species' preferred habitat.
3	Low Likelihood	• The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or, • There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, • The study area contains few or no characteristics of the species' preferred habitat.
4	Unlikely	• No previous records of the species in the local area; and/or, • The species may fly over the study area when moving between areas of more suitable habitat; and/or, • Out of the species' range; and/or, • No suitable habitat present.

EPBC	*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
FFG	*Flora and Fauna Guarantee Act 1988* (FFG Act)
DSE	Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2007); Advisory List of Threatened Invertebrate Fauna in Victoria (DSE 2009)
NAP	National Action Plan (Cogger *et al* 1993; Duncan et al. 1999; Garnet and Crowley 2000; Lee 1995; Maxwell et al. 1996; Sands and New 2002; Tyler 1997)

EX	Extinct
RX	Regionally extinct
CR	Critically endangered
EN	Endangered
VU	Vulnerable
RA	Rare
NT	Near threatened
CD	Conservation dependent
LC	least concern
DD	Data deficient (insufficiently or poorly known
L	Listed as threatened under FFG Act
I	Invalid or ineligible for listing under the FFG Act
#	Listed on the Protected Matters Search Tool
*	Additional information from the Victorian Fauna Database

Common name	Scientific name	Last documented record	Total # of documented records	EPBC	DSE	FFG	NAP	Likely use of study area
			NATIONAL SIGNIFICANCE					
# Spot-tailed Quoll	*Dasyurus maculatus*	-	-	EN	EN	L	VU	4
# Brush-tailed Rock-wallaby	*Petrogale penicillata*	-	-	VU	CR	L	VU	4
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	2008	12	EN	NT	L	NT	4
# New Holland Mouse	*Pseudomys novaehollandiae*	-	-	VU	VU	L	-	4
#Grey-headed Flying-fox	*Pteropus poliocephalus*	2003	3	VU	VU	L	VU	4
# Australasian Bittern	*Botaurus poiciloptilus*	-	-	EN	EN	L	VU	4
# Australian Painted Snipe	*Rostratula australis*	-	-	VU	CR	L	VU	4
# Fairy Tern	*Sternula nereis*	-	-	VU	EN	L	-	4
#Swift Parrot	*Lathamus discolor*	1989	1	EN	EN	L	EN	4
Helmeted Honeyeater	*Lichenostomus melanops cassidix*	1915	1	EN	CR	L	CR	4
# Regent Honeyeater	*Anthochaera phrygia*	-	-	EN	CR	L	EN	4
# Orange-bellied Parrot	*Neophema chrysogaster*	-	-	CR	CR	L	CR	4
# Malleefowl	*Leipoa ocellata*	-	-	VU	EN	L	VU	4
# Striped Legless Lizard	*Delma impar*	-	-	VU	EN	L	VU	1
# Grassland Earless Dragon	*Tympanocryptis pinguicolla*	-	-	EN	CR	L	VU	4
#Growling Grass Frog	*Litoria raniformis*	2008	217	VU	EN	L	VU	4
#Dwarf Galaxias	*Galaxiella pusilla*	2008	12	VU	VU	L	VU	4
#Australian Grayling	*Prototroctes maraena*	1985	2	VU	VU	L	VU	4
# Golden Sun Moth	*Synemon plana*	2004	54	CR	EN	L	-	1
			STATE SIGNIFICANCE					
Musk Duck	*Biziura lobata*	2006	6	-	VU	-	-	4
Freckled Duck	*Stictonetta naevosa*	2002	3	-	EN	L	-	4
Australasian Shoveler	*Anas rhynchotis*	2002	10	-	VU	-	-	4
Hardhead	*Aythya australis*	2006	11	-	VU	-	-	4
Blue-billed Duck	*Oxyura australis*	2006	9	-	EN	L	-	4
Little Bittern	*Ixobrychus minutus dubius*	2006	4	-	EN	L	-	4
Eastern Great Egret	*Ardea modesta*	1981	12	-	VU	L	-	4
Little Egret	*Egretta garzetta nigripes*	1998	1	-	EN	L	-	4

Common name	Scientific name	Last documented record	Total # of documented records	EPBC	DSE	FFG	NAP	Likely use of study area
Royal Spoonbill	*Platalea regia*	2001	3	-	VU	-	-	4
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	1978	1	-	VU	L	-	4
Black Falcon	*Falco subniger*	1975	1	-	VU	-	-	3
Baillon's Crake	*Porzana pusilla palustris*	2003	3	-	VU	L	-	4
Common Sandpiper	*Actitis hypoleucos*	1998	1	-	VU	-	-	4
Caspian Tern	*Hydroprogne caspia*	1997	1	-	NT	L	-	4
Powerful Owl	*Ninox strenua*	2007	12	-	VU	L	-	4
Barking Owl	*Ninox connivens connivens*	1999	3	-	EN	L	NT	3
Sooty Owl	*Tyto tenebricosa tenebricosa*	1992	3	-	VU	L	-	4
Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	2000	1	-	NT	-	NT	4
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	1971	1	-	VU	L	-	4
Speckled Warbler	*Chthonicola sagittatus*	1914	1	-	VU	L	NT	4
Hooded Robin	*Melanodryas cucullata cucullata*	1980	3	-	NT	L	NT	4
Southern Toadlet	*Pseudophryne semimarmorata*	2006	83	-	VU	-	-	4
Foothill Burrowing Crayfish	*Engaeus victoriensis*	1911	1	-	EN	-	-	4
REGIONAL SIGNIFICANCE								
Eastern Pygmy-possum	*Cercartetus nanus*	1986	2	-	NT	I	-	4
Brown Quail	*Coturnix ypsilophora australis*	1951	1	-	NT	-	-	4
Cape Barren Goose	*Cereopsis novaehollandiae*	1998	1	-	NT	-	-	4
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2008	2	-	NT	-	-	4
Latham's Snipe	*Gallinago hardwickii*	2006	17	-	NT	-	-	4
Pectoral Sandpiper	*Calidris melanotos*	1998	1	-	NT	-	-	4
Whiskered Tern	*Chlidonias hybridus javanicus*	1997	1	-	NT	-	-	4
Azure Kingfisher	*Alcedo azurea*	1981	1	-	NT	-	-	4
Spotted Quail-thrush	*Cinclosoma punctatum*	1979	3	-	NT	-	-	4
River Blackfish	*Gadopsis marmoratus*	2002	7	-	DD	-	-	4

Data source: Victorian Biodiversity Atlas (DSE 2011); Protected Matters Search Tool (DSEWPC 2012).

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