Final Report

Flora and Fauna Technical Report: Western Geelong Growth Area

Prepared for

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Dryden Pastoral Pty Ltd

Fyansford Holdings Pty Ltd

Ramsey Property Group Pty Ltd

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- The Victorian Department of Environment, Land, Water and Planning (DELWP) for access to ecological databases.

LIST OF ACRONYMS

Acronym	Definition
AVW	Atlas of Victorian Wildlife
CaLP Act	Victorian *Catchment and Land Protection Act 1994*
CMA	Catchment Management Authority
CoGG	City of Greater Geelong
DELWP	Victorian Department of Environment, Land, Water and Planning
DoEE	Commonwealth Department of the Environment and Energy
EE Act	*Environment Effects Act 1978*
EES	Environment Effects Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESO	Environmental Significance Overlay
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FIA	Further Investigation Area
FIS	Flora Information System
FZ	Farming Zone
IDP	Infrastructure Development Plan
IN1Z	Industrial 1 Zone
LDRZ	Low Density Residential Zone
NES	National Environmental Significance
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
NVIM	Native Vegetation Information Management Tool
NVPP	Native Vegetation Precinct Plan
PMST	Protected Matters Search Tool
PPRZ	Public Park and Recreation Zone
PUZ	Public Use Zone
RCZ	Rural Conservation Zone
RDZ	Road Zone
RLZ	Rural Living Zone
SUZ	Special Use Zone
TZ	Township Zone
VBA	Victorian Biodiversity Atlas
WSUD	Water Sensitive Urban Design

CONTENTS

1 INTRODUCTION

1.1 Background

This Flora and Fauna Technical Report presents a summary of ecological values associated with the Western Geelong Growth Area ('the study area'), which encompasses approximately 3,240 hectares of land within the Moorabool, Batesford, Bell Post Hill, Hamlyn Heights and Fyansford localities (Figure 1).

The study area covers the 'Western Further Investigation Area' (FIA) identified in the G21 Regional Growth Plan (G21 Geelong Region Alliance 2013) as being potentially suitable for development aimed at accommodating the medium and longer term growth of Geelong. In late 2015, the City of Greater Geelong (CoGG) committed to developing an Integrated Infrastructure Development Plan (IIDP) and Framework Plan for the FIA, subsequently named the Western Geelong Growth Area. These plans aim to set the scope for future planning processes, outline infrastructure requirements and confirm the preferred timing of land release.

The IIDP and Framework Plan will be developed through a Project Plan funded by CoGG and a landowner consortium comprising Adelaide Brighton Ltd, Dryden Pastoral Pty Ltd, Fyansford Holdings Pty Ltd and Ramsey Property Group Pty Ltd. Phase 1 of the Project Plan involves the preparation of a draft IIDP, which incorporates the findings of a range of technical studies, including this Flora and Fauna Technical Report.

1.2 Scope and Objectives

The overarching objective of this report is to assess the biodiversity value of the study area and inform preparation of the IIDP and Framework Plan. The information presented in this report is based on a detailed desktop review and inspections of accessible land within the study area undertaken in August and September 2016. This report also incorporates key stakeholder inputs and the findings of concurrent technical studies, including hydrological, transport, geotechnical, heritage and planning assessments.

This report addresses the following required outputs specified by CoGG:

- An overview of the natural environment context within and adjacent to the study area;
- Maps and descriptions of the natural assets within and adjacent to the study area;
- Identification of issues affecting natural assets within the study area that need to be considered in the Framework Plan;
- Identification of opportunities affecting natural assets within the study area which could drive land use outcomes and be included in the Framework Plan;
- Identification of opportunities to integrate and grow natural assets with planning for open space, drainage and broader land use planning; and,
- Recommendations for further detailed analysis in future stages of growth area planning.

1.3 Study Area and Surrounds

The study area covers approximately 3,240 hectares of land extending between the Ballarat-Geelong rail line in Bell Post Hill to the north, the Geelong Ring Road to the east, the Barwon River in Fyansford to the south and Merrawarp Road, Friend in Hand Road, Dogs Rocks Road and the Moorabool River to the west (Figure 1).

According to the Victorian Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management Tool (NVIM) (DELWP 2016a), the study area occurs within the jurisdiction of the Corangamite Catchment Management Authority (CMA) and the CoGG municipality. The study area extends over two Bioregions, namely the Victorian Volcanic Plains Bioregion which encompasses the majority (99%) of the site and the Otway Plain Bioregion located along the southern site boundary.

Under the CoGG Planning Scheme, the following zones and overlays have been applied to the study area:

- Planning Zones: Farming Zone (FZ) (55.6% of the study area), Special Use Zone 7 and 15 (SUZ7, SUZ15) (33%), Rural Conservation Zone (RCZ) (3.5%), Rural Living Zone (RLZ) (3.1%), Public Park and Recreation Zone (PPRZ) (2.4%), Road Zone 1 (RDZ1) (1.5%), Township Zone (TZ) (0.6%), Industrial 1 Zone (INIZ) (0.1%), Low Density Residential Zone (LDRZ) (<0.1%) and Public Use Zone 4 (PUZ4) (<0.1%).
- Planning Overlays (relating to ecological values): Environmental Significance Overlay Schedule 1 (ESO1) (505.3 hectares - 15.6%), ESO3 (1.8 hectares - 0.1%).

The range of zones applied to the study area are reflected by the mixture of existing land uses which include agriculture, recreation reserves, conservation reserves, rural and medium density housing, commercial businesses and educational facilities. The open pit and overburden areas associated with the operational Batesford Quarry dominate the central section of the study area.

The site does not contain any formal conservation reserves managed by Parks Victoria; however a number of Council-managed reserves are present, including the Moorabool River Reserve. The privately owned Dog Rocks Flora and Fauna Sanctuary is also located within the study area and is protected under a Trust for Nature Covenant (Section 4.4).

There are no Ramsar or nationally significant wetlands mapped within the study area although the Barwon River system flows into Lake Connewarre further downstream which is a Ramsar site. A number of waterways are present within the site including the Moorabool River (and deviation channel), Barwon River and Cowies Creek (Section 3.2). Ephemeral farm dams are also present throughout the site.

The study area is subject to the '*Permitted clearing of native vegetation - Biodiversity assessment guidelines*' (the Guidelines) (DEPI 2013). Under the Guidelines, the site is predominately classified as 'Location Risk A', the lowest risk category. Two small areas (~2 hectares) of 'Location Risk B' are mapped on properties located between the Hamilton Highway and Fyansford-Gheringhap Road.

2 METHODS

2.1 Desktop Review

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

- The DELWP NVIM Tool (DELWP 2016a) and Biodiversity Interactive Map (DELWP 2016b) for:
    - Modelled data for location risk, remnant vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DELWP 2016c) for descriptions of EVCs within the Victorian Volcanic Plain and Otway Plain Bioregions;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2016d);
- The Flora Information System (FIS) (Viridans 2014a) and Atlas of Victorian Wildlife (AVW) (Viridans 2014b) for assistance with the distribution of flora and fauna species;
- The Commonwealth Department of the Environment and Energy (DoEE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoEE 2016);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened and Protected Lists (DELWP 2015a; DELWP 2015b);
- The Planning Maps Online (DELWP 2016e) and Planning Schemes Online (DELWP 2016f) to ascertain current zoning and environmental overlays in the study area;
- Other relevant environmental legislation and policies as required;
- Aerial photography of the study area; and,
- Previous ecological or other relevant assessments of the study area, including those listed in Table 1 below.

Table 1. Previous assessments completed within the study area

Assessment	Scope
eBird Database (Sullivan *et al* 2009)	A collection of bird survey results submitted by members of the public, sourced from the following sites within the study area: 1. Batesford (38 sp.), 2. Geelong-Ballan Road b/w Midland Hwy and Evans Road Batesford (23), 3. Myers Reserve (Bell Post Hill) (1), 4. Princes Fwy at Creamery Rd Batesford (2), 5. Dog Rocks Rd at Blackall Rd Batesford (1), 6. Moorabool River Reserve Batesford (91), 7. Dog Rocks Sanctuary (Batesford) (58), 8. Dog Rocks Rd b/w Blackall Rd and Fyansford-Gheringhap Rd Batesford (3), 9. Hamilton Hwy at Friend in Hand Rd Stonehaven (1), 10. Fyansford-Gheringhap Rd b/w Hamilton Hwy and Dog Rocks Rd (6), 11. Hamilton Hwy b/n Ring Road and Merrawarp Rd Fyansford (1), 12. Princes Freeway at Moorabool River Herne Hill (5), 13. Princes Freeway at Barwon River Fyansford (8), 14. Barwon River, Merrawarp Rd Ceres (39) and 15. Merrawarp Rd b/w Barwon River and Hamilton Hwy Stonehaven (21).

Assessment	Scope
Vegetation and Habitat Hectare Assessment, and Vegetation Management Plan for the Moorabool River Reserve, Batesford, Victoria (Ecology Partners Pty Ltd 2010)	The assessment focussed on a 5.2 hectare study area encompassing the Moorabool River Reserve (Figure 2). A detailed desktop review was undertaken and vegetation surveys (including habitat hectare surveys) were completed on 5/6th November 2009.
Ecological Review: Batesford South Flora and Fauna Existing Conditions (Golder Associates Pty Ltd 2010)	The assessment covered all land within the current study area located south of the Midland Highway. A detailed desktop review was undertaken and an inspection of land controlled by Adelaide Brighton Pty and the McCann family was completed on 15th July 2010.
Dog Rocks Flora and Fauna Sanctuary Vegetation Assessment and Vegetation Management Plan (Mark Trengove Ecological Services 2012)	The assessment focussed on a 78 hectare study area encompassing the Dog Rocks Sanctuary (Figure 2). The completed scope included a detailed desktop review and vegetation mapping (excluding habitat hectare surveys) completed on 18th March 2011, 12 November 2011, 8th December 2011, 17th March 2012 and 27th April 2012.
Microbat survey completed by Grant Baverstock at the Moorabool River Reserve, Batesford, Victoria (2013)	There is limited detail regarding the survey timing or effort employed. A summary email of results supplied by CoGG suggests that the survey involved harp trapping.
Fauna Survey - Dog Rocks Flora and Fauna Sanctuary (Geelong Field Naturalists Club 2012)	A fauna survey was completed throughout the sanctuary between 11-18th February 2012. Survey techniques employed included Elliott trapping, pitfall/ funnel trapping, harp trapping and remote camera surveys.
Bell Post Hill Growth Area, Ecological Desktop Assessment (Mark Trengove Ecological Services 2013)	The desktop assessment focussed on a 320 hectare study area west of Bell Post Hill and bound by Cowies Creek to the north, Geelong Ring Road to the east, Midland Highway to the South and Geelong-Ballan Road to the west.
Batesford Quarry Extension, Fyansford, Victoria: Flora and Fauna Assessment (Biosis Pty Ltd 2014)	The assessment focussed on a 60.5 hectare study area located along the original alignment of the Moorabool River, immediately east of the existing quarry pit (Figure 2). A detailed desktop review was undertaken and detailed vegetation surveys (including habitat hectare surveys) were completed on 7/8th May 2014. The subject site was also assessed by Ken Norris in 2013 as part of the quarry extension project.

2.2 Field Assessment

Inspections of the study area were undertaken on 25/26th August and 8th/27th September 2016 to obtain information on flora and fauna values present. Surveys were undertaken in accessible parts of the site which included Council managed land, properties owned or controlled by the consortium group and other private properties where permission was granted. Approximately 2,448 hectares (75%) of the study area was accessed during site inspections (Figure 2).

The inspections focussed on identifying patches of native vegetation, scattered trees, protected ecological communities and potential habitat for significant flora and fauna species at a broad scale. With consideration to the objectives of the Flora and Fauna Assessment, the site inspections did not seek to map all areas of native vegetation in fine detail or define the condition of native vegetation using the habitat hectare methodology.

2.3 Stakeholder Consultation

This technical report incorporates the outcomes of a stakeholder engagement program involving the following consultation events:

- Concept Options Workshops (05/12/17 and 11/01/17) - The workshops were attended by representatives of CoGG, the client consortium, DELWP, Corangamite CMA, Barwon Water and the consultant team (hydrology). The primary aim of the workshops was to receive feedback on the Existing Conditions Report, facilitate an integrated approach to planning for drainage, open space and biodiversity, and identify the underpinning principles for balancing the needs of biodiversity with future growth within the study area.
- Consultant Team Workshops (16/08/16 and 27/09/16) - The meetings were attended by consultants from each technical discipline and facilitated information sharing to ensure consistency in the project outputs.
- Council Meetings (11/11/15, 01/03/17, 06/06/17) - Meetings with representatives of the CoGG planning and environment teams were arranged to provide progress updates and discuss submitted draft outputs, including the Existing Conditions Report and Concept Plan.
- External Consultation- The Existing Conditions Report was distributed to the following environmental groups between 8th-14 February 2017:
    - Geelong Field Naturalists Club;
    - Batesford, Fyansford, Stonehaven Landcare Group;
    - Barrabool Hills Landcare Group;
    - Geelong Landcare Network; and
    - Geelong Environment Council.

  Feedback was sought on the assessment findings and further information regarding the ecological values of the study area was requested.

2.4 Assessment Qualifications and Limitations

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

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

As noted in Section 2.2, the site inspections aimed to collect sufficient information to inform the preparation of concurrent technical studies, the IIDP and Framework Plan. The inspections did not entail detailed vegetation mapping, habitat hectare surveys or targeted surveys for significant species. It is understood that this detailed scope would be completed as part of the future planning process, which does not form part of the current scope of works.

It should also be noted that only 75% of the study area was accessed during field assessments. Further analysis of these areas will be required in the future.

3 EXISTING ENVIRONMENT

3.1 Vegetation

Modelling undertaken by DELWP provides an indication of the likely extent and type of native vegetation (remnant patches) present within the study area prior to European settlement and in 2005 (Table 2). The modelling suggests that only 15% of native vegetation has been retained within the study area since 1750, with small fragmented patches predicted to occur across the site and larger contiguous remnants mapped along the Moorabool and Barwon Rivers, Cowies Creek and within Dog Rocks Sanctuary.

Table 2. Modelled EVC extents within the study area

EVC	Modelled Extent (ha)	
	Pre-1750	2005
Plains Grassland (EVC 132)	2254.3	223.3
Plains Grassy Woodland (EVC 55)	503.2	39.8
Stream Bank Shrubland (EVC 851)	183.0	66.8
Grassy Woodland (EVC 175)	162.0	98.4
Floodplain Riparian Woodland (EVC 56)	137.5	52.3
Total	3,240.0	480.6

Vegetation mapping completed as part of this assessment and previous studies (Table 1) largely confirm the modelled paucity of native vegetation within the study area. Broad-scale vegetation mapping completed across 2,448 hectares (75%) of the study area as part of this assessment recorded the following (Plates 1-4; Figure 2):

- 175.5 hectares of remnant patches, including Plains Grassland (EVC 132 - 65.0ha), Hills Herb-rich Woodland (EVC 71 - 43.0ha), Stream Bank Shrubland (EVC 851 - 31.4ha), Floodplain Riparian Woodland (EVC 56 - 22.8ha), Creekline Tussock Grassland (EVC 654 - 8.1ha), Plains Grassy Woodland (EVC 55 - 2.0ha), Plains Sedgy Wetland (EVC 647 - 1.5ha), Grassy Woodland (EVC 175 - 0.7ha), Escarpment Shrubland (EVC 895 - 0.5ha) and Tall Marsh (EVC 821 - 0.5ha); and,
- 107 Scattered Trees.

The remaining assessed portions of the study area were identified as being either developed or supporting non-remnant vegetation (i.e. planted indigenous and non-indigenous species, grassland/ pasture dominated by introduced species or crops) (Plates 1-4). The native vegetation extents listed above were recorded as part of a broad scale survey, it is expected that detailed vegetation surveys would increase these figures.

Taking into account vegetation previously mapped within the Dog Rocks Sanctuary (Mark Trengove Ecological Services 2012), Moorabool River Reserve (Ecology Partners Pty Ltd 2010), the area immediately east of the existing quarry (Biosis Pty Ltd 2014) and the CoGG mapped BioSites (Section 4.4), the total extent of native vegetation recorded within 2,531 hectares (78%) of the study area comprises (Figure 2):

- 267.7 hectares of remnant patches, including additional areas of Escarpment Shrubland (2.3ha), Grassy Woodland (78.9ha), Plains Grassland (0.9ha), Plains Grassy Woodland (0.5ha), Riparian Woodland (9.6ha); and,
- 137 Scattered Trees.

Plate 1. Plains Grassland within the study area

Plate 2. Stream Bank Shrubland within the study area (Moorabool River)

Plate 3. Escarpment Shrubland within the study area

Plate 4. Planted vegetation within the study area

In addition to remnant patches and scattered trees, the study area contains six 'Current Wetland' sites mapped by DELWP. Under the Guidelines (DEPI 2013), these areas are classified as native vegetation and must be accounted for when applying for a permit to remove, destroy or lop native vegetation and calculating offset obligations. Mapped 'Current Wetlands' within the study area include a very large (31.9 hectare) area located west of the existing Batesford Quarry pit on overburden, and a smaller (3.9 hectare) area located at the base of the quarry pit (Figure 2). Given that these areas are inconsistent with the definition of the Current Wetland layer, clarification is required from DELWP to confirm that the encompassed land would not be classified as native vegetation under the Guidelines (DEPI 2013).

3.2 Water Bodies

The study area includes three significant watercourses, including the Moorabool River (and deviation channel), Barwon River and Cowies Creek. Ephemeral tributaries of these waterways and farm dams occur across the site. Each key waterway is described in further detail below:

- Moorabool River: An approximate 11 kilometre stretch of the Moorabool River (diverted) immediately adjoins and dissects the study area (Figure 2). The river is formed by two branches (east and west), which originate approximately 60 kilometres north-west of the study area.

The branches merge south of the Morrisons locality, approximately 28 kilometres upstream of the site. The river leaves the study area at the Lewis Bandt Bridge in Herne Hill and flows for approximately 2.3 kilometres before joining the Barwon River.

The lower reach of the Moorabool River is recognised as being in poor ecological health, with key pressures including a lack of environmental flows (from Lang Lang Reservoir), water extraction and instream barriers (including nine private diversion weirs between She Oaks Weir and Batesford) (VEWH 2016).

Within the study area, the Moorabool River has been diverted twice up to one kilometre from its natural alignment to enable limestone extraction at the Batesford Quarry. The first diversion was completed in the 1920s and the second in 1990 (Plates 5 and 6; Inset 1). A section of the original alignment to the east of the quarry has been retained to protect cultural heritage values and stands of eucalypts which have since died due to inundation.

The riparian corridor is relatively well vegetated, with remnant patches of Stream Bank Shrubland, Tall Marsh and Riparian Woodland mapped along much of the waterway (Section 3.1; Figure 2). The diverted sections, particularly the stretch completed in the 1920s, support established plantings and regrowth, most of which comprise indigenous species. Permitting exemptions relating to planted vegetation under the CoGG Planning Scheme are unlikely to apply to this vegetation, as the objectives of planting were focussed on environmental management rather than animal husbandry, aesthetic or amenity purposes.

A detailed account of ecological values associated with the Moorabool River system is provided in the Moorabool River Environmental Water Management Plan (Corangamite CMA 2016).

Plate 5. Moorabool River - 1920s diversion

Plate 6. Moorabool River 1990 diversion

Inset 1 Moorabool River diversions (west - 1920s, east - 1990)

- Barwon River: An approximate 4.8 kilometre stretch of the Barwon River (Murgheboluc Reach) is located along the southern boundary of the study area (Figure 2). The river is formed by two branches (east and west), which originate approximately 65 kilometres south-west of the site near Barwon Downs.

  The branches merge approximately 3.7 kilometres south-east of Yeodene, approximately 55 kilometres south-west of the study area. The Barwon River leaves the study area at the Geoff Thom Bridge in Highton and flows for approximately 18 kilometres before entering Reedy Lake in Armstrong Creek. The river then flows through Lake Connewarre and the Connewarre Swamp system before entering Bass Strait at Barwon Heads, approximately 23 kilometres south-east of the study area.

  The lower reaches of the Barwon River are recognised as being in poor ecological health, with key pressures including pollution, over-extraction of water and land clearing (Environment Victoria 2016). In recent years significant outbreaks of blue-green algae have occurred within the subject section of the river and further downstream.

  The riparian corridor is relatively well vegetated, with remnant patches of Floodplain Riparian Woodland mapped along much of the surveyed sections of the waterway (Section 3.1; Figure 2).

- Cowies Creek - An approximate 2.6 kilometre stretch of Cowies Creek is located along the northern boundary of the study area (Figure 2). The creek originates from a series of wetlands in Moorabool, located approximately three kilometres north of the site. The creek leaves the study area at the Cowies Creek Rail Bridge Number 1 and enters Port Phillip Bay approximately 3.4 kilometres downstream of the site in North Shore.

  The riparian corridor is relatively well vegetated, with remnant patches of Creekline Tussock Grassland mapped along much of the surveyed sections of the waterway (Section 3.1; Figure 2).

In addition to the significant watercourses noted above, the study area contains a number of ephemeral minor tributaries, farm dams and wetland areas (Figure 2). Following decommissioning of the Batesford Quarry in approximately 2028, it is understood that dewatering of groundwater from the quarry pit will cease and a large inland lake will be formed (G21 Geelong Region Alliance 2013).

3.3 Flora and Fauna Species

According to the VBA, 158 flora species have been recorded within the study area (DELWP 2016d) (Figure 3; Appendices A). Of the flora species recorded, 68 (43%) are introduced; with the majority of records sourced from survey sites located within the vicinity of Dog Rocks Sanctuary and the Moorabool River Reserve.

A review of records sourced from the VBA and previous surveys noted in Table 1 indicate that 174 fauna species (136 birds, 19 mammals, two reptiles, one frog, 15 fish and one crustacean) have been recorded within the study area (Figure 4, Appendix B). The recorded species are predominately native (89%), with birds contributing to the majority of records. The fauna records are concentrated at survey sites located in the Dog Rocks Sanctuary and the Moorabool River Reserve.

It is noted that the VBA only contains submitted records and that the information sourced from the database and previous surveys does not represent all flora and fauna species likely to inhabit or use habitats within the study area.

Significant species recorded or predicted to occur within the study area are described in Sections 4.1 and 4.2.

4 SIGNIFICANT AND PROTECTED VALUES

4.1 Flora

The VBA and FIS contain previous records of eight nationally significant and an additional 35 State significant flora species within 10 kilometres of the study area (DELWP 2016d; Viridians 2014a) (Appendix C; Figure 3). The PMST nominated an additional six nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2016).

Of the 43 significant flora species recorded within the project locality (10km radius of the site), seven have been recorded within the study area (discounting one record of Naked Sun-orchid *Thelymitra circumsepta* from 1770) (Figure 3):

- Adamson's Blown-grass *Lachnagrostis adamsonii* - This species is listed as Endangered under the EPBC Act and was recorded approximately 200 metres south of the Ballarat-Geelong rail line (parcel 1\TP240293), adjacent to Cowies Creek, in 1995. Three additional records of this species (1995, 2001 and 2002) are located adjacent to the study area, north of the rail line.
- Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* - This species is listed as Critically Endangered under the EPBC Act and has been recorded within CoGG BioSite 1000259, within the Ballarat-Geelong rail line reserve west of Geelong-Ballan Road.
- Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata* - This species is listed as Vulnerable on the Victorian Advisory List (DEPI 2014) and was recorded by Ecology and Heritage Partners Pty Ltd within the Moorabool River Reserve in 2009. Surveys undertaken as part of this project in August and September 2016 recorded an additional 23 trees along minor roads south of the quarry (Figure 3).
- Snowy Mint-bush *Prostanthera nivea var. nivea* - This species is listed as Rare on the Victorian Advisory List (DEPI 2014) and was recorded approximately 300 metres south of the Midland Highway, adjacent to the Moorabool River, in 2006. This species has also been recorded within CoGG BioSite 1000145 (Dog Rocks Reserve).
- Coast Hollyhock *Malva preissiana s.s*. (white-flowered coastal form) - This species is listed as Vulnerable on the Victorian Advisory List (DEPI 2014) and has been recorded within CoGG BioSite 1000364, along the Barwon River corridor.
- Austral Crane's-bill *Geranium solanderi var. solanderi s.s*. - This species is listed as Vulnerable on the Victorian Advisory List (DEPI 2014) and has been recorded within CoGG BioSite 1000364, along the Barwon River corridor.
- Fragrant Saltbush *Rhagodia parabolica* - This species is listed as Rare on the Victorian Advisory List (DEPI 2014) and has been recorded within CoGG BioSites 1002484 and 1002485, along the Moorabool River corridor.

The findings of ecological studies previously completed within the study area (Table 1) suggest that few additional records of significant flora species occur within the site. A survey of Dog Rocks Sanctuary completed over 2011/12 indicates that Melbourne Yellow-gum and Snowy Mint Bush have been recorded in this area (Mark Trengove Ecological Services 2012).

A preliminary likelihood of occurrence assessment identified that the following significant flora species have a moderate or higher likelihood of occurring within the study area (Appendix C) (in addition to the seven species known to occur on site):

- Nationally significant:
    - Matted Flax-lily *Dianella amoena*
    - Clover Glycine *Glycine latrobeana*
    - Button Wrinklewort *Rutidosis leptorhynchoides*
    - Large-headed Fireweed *Senecio macrocarpus*
- State significant:
    - Marsh Saltbush *Atriplex paludosa* subsp*. paludosa*
    - Grey Mangrove *Avicennia marina* subsp*. australasica*
    - Slender Bitter-cress *Cardamine tenuifolia*
    - Slender Bindweed *Convolvulus angustissimus* subsp*. omnigracilis*
    - Yarra Gum *Eucalyptus yarraensis*
    - Rosemary Grevillea *Grevillea rosmarinifolia*
    - Salt Blown-grass *Lachnagrostis robusta*
    - Hoary Rapier-sedge *Lepidosperma canescens*
    - Leafless Bluebush *Maireana aphylla*
    - Rye Beetle-grass *Tripogon loliiformis.*

4.2 Fauna

The VBA and AVW contain previous records of 15 nationally significant, 30 State significant and 12 regionally significant fauna species within 10 kilometres of the study area (DELWP 2016d; Viridians 2014b) (Appendix D; Figure 4). The PMST nominated an additional six nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2016). Due to the inclusion of Corio Bay in the 10 kilometre database search area, a large proportion of the returned records comprise species which are restricted to coastal and marine environments. Owing to the lack of suitable habitat for these species within the study area, they are not considered further and have been excluded from Appendix D.

Of the 57 significant fauna species recorded within the project locality, seven have been recorded within the study area, including (Figure 4):

- Swift Parrot *Lathamus discolor* - This species is listed as Critically Endangered under the EPBC Act and has been recorded at eBird Site 6 (Moorabool River Reserve, Batesford).
- Macquarie Perch *Macquaria australasica* - This species is listed as Endangered under the EPBC Act and was recorded in the Moorabool River, immediately south of the Midland Highway, in 1970. This record is indicative of historic failed translocation events and the species is not considered likely to persist within the waterway.

- Baillon's Crake *Porzana pusilla palustris* - This species is listed under the FFG Act and is classified as Vulnerable under the Victorian Advisory List (DSE 2013). The species was recorded within the Moorabool River, approximately 650 metres west of the Geelong Ring Road, in 1985.
- Grey Goshawk *Accipiter novaehollandiae novaehollandiae* - This species is listed under the FFG Act and is classified as Vulnerable under the Victorian Advisory List (DSE 2013). The species has been recorded three times within the study area (1997, 1999 and 2004), with two of these records sourced from within the vicinity of the Barwon and Moorabool River corridors.
- Eastern Great Egret *Ardea modesta* - This species is listed under the FFG Act and is classified as Vulnerable under the Victorian Advisory List (DSE 2013). The species has been recorded at eBird Site 7 (Dog Rocks Sanctuary).
- Nankeen Night Heron *Nycticorax caledonicus* - This species is listed as Near Threatened under the Victorian Advisory List (DSE 2013). The species has been recorded at eBird Site 6 (Moorabool River Reserve, Batesford).
- Spotted Harrier *Circus assimilis* - This species is listed as Near Threatened under the Victorian Advisory List (DSE 2013). The species has been recorded at eBird Site 13 (Princes Freeway at Barwon River Fyansford).

A preliminary likelihood of occurrence assessment identified that a number of additional significant fauna species have a moderate or higher likelihood of occurring within the study area (Appendix D). Detailed vegetation/ habitat surveys are required to increase the accuracy of these predictions.

Of significance, the EPBC Act listed Growling Grass Frog *Litoria raniformis* and Australian Grayling *Prototroctes maraena* are considered to have a High likelihood of occurring within the study area. The Growling Grass Frog is listed as Vulnerable under the EPBC Act and has been recorded extensively within the sections of Cowies Creek downstream of the study area, and within 180 metres of the site boundary (Beacon Ecological Pty Ltd 2010). The species is also considered likely to inhabit the natural and diverted sections of the Moorabool River and associated tributaries (Golder Associates Pty Ltd 2010).

The Australian Grayling is listed as Vulnerable under the EPBC Act and has been historically recorded throughout the Barwon River system, including within 800 metres downstream of the study area. The DELWP Angling website notes that Australian Grayling is present between Winchelsea and Buckleys Falls, and also states that the 18 kilometre stretch between Buckleys Falls and Lake Connewarre (outside the study area) contains one of the best populations of Australian Grayling of any water in Victoria (DELWP 2016g). The species is also known to occur within the lower reaches (Reach 4 - Sharps Road, She Oaks to the Barwon River) of the Moorabool River (Corangamite CMA 2016).

Plains Grassland mapped throughout the study area also provides suitable habitat for the nationally significant Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar*.

4.3 Ecological Communities

According to the EPBC Act PMST (DoEE 2016), five nationally listed ecological communities are predicted to occur within 10 kilometres of the study area:

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain;
- Natural Damp Grassland of the Victorian Coastal Plains;
- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP);
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (SHW); and,
- Subtropical and Temperate Coastal Saltmarsh White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Inspections undertaken in August and September 2016 as part of this project identified several patches of Plains Grassland which correspond with the NTGVVP ecological community and one small area of potential SHW (assessed from an adjoining property boundary) (Figure 2). It is considered likely that additional areas of these communities would be identified through detailed vegetation surveys.

All Plains Grassland present within the study area corresponds with the FFG Act listed ecological community Western (Basalt) Plains Grasslands. Unlike most EPBC Act-listed ecological communities, FFG Act-listed communities have no condition thresholds.

Plate 7. NTGVVP recorded within the study area

4.4 Significant Sites and Corridors

Sites of Biological Significance (BioSites) are areas containing biological assets that contribute to the conservation of Victoria's indigenous flora and fauna. The identification of BioSites allows for the prioritisation of conservation management and reservation, and incorporation of these assets into regional and local planning procedures. The following BioSites are mapped by DELWP within the study area:

- State Significant: Dog Rocks (#1405)
- Unclassified: Easts Road - west side and Moorabool (along Cowies Creek) (#8268)

In addition to these sites, CoGG maintains a database of BioSites across the municipality. Significant sites identified by CoGG within the study area include the Dog Rocks Sanctuary and surrounding native vegetation, river/ creek corridors and road site remnants mapped by Ecology and Heritage Partners in 2015. Where available, native vegetation mapping associated with these BioSites has been incorporated (Figure 2). Appendix E provides details of all Council-mapped BioSites within the study area.

Bio-links (areas of habitat connecting wildlife populations) within the study area are formed predominately by the riparian corridors of the three significant watercourses present - Moorabool River, Barwon River and Cowies Creek. A significant bio-link extending between the Golden Plains and CoGG municipalities is also formed by connections between the Moorabool River Reserve, Dog Rocks Sanctuary, the vegetated area south of Dog Rocks Sanctuary (known as Honey Woodland), Dog Rocks Reserve and Red Gum Reserve.

The planning of future development activity within the study area at a precinct scale will provide the opportunity to identity and improve existing bio-links, and potentially create new habitat corridors through revegetation and habitat management activities (Section 8).

5 SUMMARY OF ECOLOGICAL VALUES

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

- Three significant watercourses, including the Moorabool River (and deviation channel), Barwon River and Cowies Creek;
- Dog Rocks Sanctuary and the Moorabool River Reserve;
- The known occurrence of two nationally significant (Adamson's Blown-grass, Spiny Rice-flower) and five State significant (Melbourne Yellow-gum, Snowy Mint-bush, Coast Hollyhock, Austral Crane's-bill, Fragrant Saltbush) flora species;
- Known and potential habitat for a range of significant fauna species, including
    - Nationally Significant: Australasian Bittern B*otaurus poiciloptilus*, Plains-wanderer *Pedionomus torquatus*, Swift Parrot *Lathamus discolor*, Painted Honeyeater *Grantiella picta*, Grey-headed Flying-fox *Pteropus poliocephalus*, Striped Legless Lizard *Delma impar*, Growling Grass Frog *Litoria raniformis*, Australian Grayling *Prototroctes maraena*, Yarra Pygmy Perch *Nannoperca obscura*, Golden Sun Moth *Synemon plana.*
    - State Significant: Hardhead *Aythya australis*, Blue-billed Duck *Oxyura australis*, White-throated Needletail *Hirundapus caudacutus*, Eastern Great Egret *Ardea modesta*, Intermediate Egret *Ardea intermedia*, Little Egret *Egretta garzetta nigripes*, Grey Goshawk *Accipiter novaehollandiae novaehollandiae*, Black Falcon *Falco subniger*, Lewin's Rail *Lewinia pectoralis pectoralis*, Baillon's Crake *Porzana pusilla palustris*, Powerful Owl, *Ninox strenua*, Barking Owl *Ninox connivens connivens*, Brown Treecreeper (south-eastern ssp.) *Climacteris picumnus victoriae*, Speckled Warbler *Chthonicola sagittatus*, Hooded Robin *Melanodryas cucullata cucullata*, Diamond Firetail *Stagonopleura guttata*, Common Dunnart *Sminthopsis murina murina*, Western Burrowing Crayfish *Engaeus merosetosus.*
    - Regionally Significant: Nankeen Night Heron *Nycticorax caledonicus hillii*, Royal Spoonbill *Platalea regia*, Spotted Harrier *Circus assimilis*, Latham's Snipe *Gallinago hardwickii*, Azure Kingfisher *Alcedo azurea*, Fat-tailed Dunnart *Sminthopsis crassicaudata*.
- Remnant patches of native vegetation and native scattered trees. Based on the findings of previous ecological studies and recent broad-scale surveys completed as part of this assessment, approximately 267.7 hectares of remnant patches and 137 scattered trees have been recorded within 2,531 hectares (78%) of the study area;
- Ecological communities protected under the Commonwealth EPBC Act (NTGVVP and SHW) and Victorian FFG Act (Western [Basalt]) Plains Grasslands);
- DELWP mapped 'Current Wetlands', some of which may be classified incorrectly (to be confirmed with DELWP [Section 3.1]); and,
- A diversity of flora and fauna species not classified as being threatened or rare. The study area is largely undeveloped, with large tracts of undisturbed and agricultural land providing habitat for a range of locally common species, such as Kangaroos, Echidnas, Platypus etc.

6 IMPLICATIONS FOR FUTURE DEVELOPMENT WITHIN THE STUDY AREA

A summary of biodiversity legislation and policy relevant to future development within the study area is provided in Table 3.

Table 3. Summary of legislative implications

Legislation/ Policy	Notes
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on matters of NES, or those that are undertaken on Commonwealth Land. An action, unless otherwise exempt, requires approval from the Commonwealth Minister for the Environment if it is likely to have an impact on any of the following matters of NES: World Heritage properties, National Heritage places, Ramsar wetlands of international significance, nationally listed threatened species and ecological communities, Migratory species protected under international agreements, Commonwealth marine areas, the Great Barrier Reef Marine Park, nuclear actions and water resources (for coal seam gas and large coal mining projects). Key ecological constraints associated with the EPBC Act may include threatened ecological communities and species of flora and fauna (e.g. NTGVVP, SHW, Adamson's Blown-grass, Growling Grass Frog, Australian Grayling, Striped Legless Lizard and Golden Sun Moth). Any action that is likely to significantly impact upon these values or any other matter of NES would need to be referred to DoEE for assessment and approval. Referrals are assessed over a period of 20 working days, including a ten day public comment period. A referred action will subsequently be classed as one of the following: • *Not a controlled action* – approval is not required if the action is undertaken in accordance with the referral • *Not a controlled Action 'particular manner'* – approval is not required if the action is undertaken in accordance with the manner specified. • *Controlled action* – the action is subject to the assessment and approval process under the EPBC Act. Prior to any future development within the study area, detailed flora and fauna surveys are required to confirm the extent of the NTGVVP and SHW ecological communities, and identify the presence of any other ecological communities or species of flora or fauna listed under the EPBC Act.
Environment Effects Act 1978	The *Environment Effects Act 1978* (EE Act) provides for an assessment of proposed activities that are capable of having a significant impact on the environment at a State level. The Act allows the Victorian Minister for planning to decide whether an Environment Effects Statement (EES) is required to be completed. The "*Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978*" provides triggers for which an EES is required, such as the removal of 10 or more hectares of native vegetation or potential impacts on remaining habitat or populations of threatened species. Any action that is likely to have a significant impact on State matters, as defined under the relevant guidelines, would need to be referred under the EE Act. Actions undertaken in accordance with a prescribed Precinct Structure Plan (PSP) are exempt from the requirements of the EE Act.

Legislation/ Policy	Notes
Flora and Fauna Guarantee Act 1988	The FFG Act is the primary legislation dealing with biodiversity conservation and the sustainable use of native flora and fauna in Victoria. The provisions of the FFG Act bind all public agencies, public landowners and land managers. The Act contains lists of threatened flora and fauna species, 'protected flora species' and threatened vegetation communities, as well as action statements to protect the long-term viability of these values. The Act applies to the removal of listed threatened species and communities, as well as protected flora species. Protected flora species include any of the Asteraceae (Daisies) family, all orchids, ferns (excluding Pteridium esculentum) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*); in addition to any taxa that forms a component of a listed FFG Act vegetation community. A species may be both listed and protected. Proponents are required to apply for an FFG Act permit to 'take' listed and/or protected flora species and listed vegetation communities in areas of public land (i.e. within road reserves). An FFG Act permit is generally not required for removal of listed and/or protected flora species and communities on private land. There are currently no requirements for proponents to apply for a permit under the FFG Act where a proposed activity requires the removal of habitat for a listed terrestrial fauna species. The Act does however regulate the removal, salvage, temporary holding, translocation, taking, trading and keeping of FFG Act-listed fish species, and as such, an FFG Act permit is required if listed fish species are likely to be affected by a proposed activity. Key ecological constraints within the study area associated with the FFG Act are likely to include threatened ecological communities and species of flora and fauna. The majority of land within the study area is privately owned and therefore exempt from most provisions under the FFG Act including the requirement to obtain a permit for the removal or disturbance of listed/ protected plants, ecological communities and fish species. Any such action on public land affecting these values would require a permit from DELWP. Prior to any future development within the study area, detailed flora and fauna surveys of the are required to confirm the extent of the Western (Basalt) Plains Grasslands ecological community and identify the presence of any other ecological communities or species of flora or fauna listed under the FFG Act.
Planning and Environment Act 1987	The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. Clause 12 of the State Planning Policy Framework requires planning to protect ecological systems and biodiversity and conserve areas with environmental and landscape values. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption clause under 52.17-6 of the Victorian Planning Schemes applies, or if the proposed clearing is in accordance with a Native Vegetation Precinct Plan (NVPP) (Clause 52.16) that has been incorporated into the Planning Scheme. Permitting requirements associated with the removal of native vegetation will be dependant on the future planning process and will draw upon the findings of detailed assessments.
Permitted clearing of native vegetation Biodiversity Assessment Guidelines' (the Guidelines)	The Victorian Planning Provisions relating to biodiversity protection and native vegetation management was amended in December 2013 to reflect the new permitted clearing of native vegetation and biodiversity policy encapsulated in the Guidelines (DEPI 2013). Any permitted clearing of native vegetation within the study area would be offset in accordance with the Guidelines.

Legislation/ Policy	Notes
Wildlife Act 1975 and Wildlife Regulations 2002	The *Wildlife Act 1975* (and associated Wildlife Regulations 2002) 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. A permit would be required for the removal of habitat and/ or native fauna within the study area. A separate permit under the Wildlife Act may not be required where the removal of habitat is covered by a permit to remove native vegetation under the *Planning and Environment Act 1987*. A Wildlife Act permit would be required to undertake any action that is likely to result in the death of wildlife, or require the translocation of wildlife.
Catchment and Land Protection Act 1994	The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to: • Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner; • Protect water resources; • Conserve soil; • Eradicate regionally prohibited weeds; • Prevent the growth and spread of regionally controlled weeds; and, • Prevent the spread of, and as far as possible eradicate, established pest animals. A number of weeds listed as noxious under the CaLP Act are likely to occur throughout the study area. Similarly, it is likely that the region is occupied by several pest fauna species listed under the Act. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements listed noxious weeds and pests should be appropriately controlled during any development activity to minimise their spread and impact on ecological values within the study area.

7 OUTCOMES OF STAKEHOLDER WORKSHOPS

The stakeholder engagement program (Section 2.3) identified the following key visions for future development of the study area:

- Provide a variety of flora and fauna habitats to promote and retain biodiversity;
- Create multi-use spaces for the public (i.e. incorporate natural values with residential and public open space);
- Undertake habitat creation (i.e. waterways, drainage lines and designated revegetation areas);
- Promote active lifestyles and recreation through the provision of linear corridors of vegetation along walking/cycling tracks;
- Increase community knowledge of ecological values through interpretative signage;
- Appropriately manage weeds and feral animals;
- Retain areas of high conservation value;
- Incorporate drainage lines into habitat corridors and open public spaces;
- Retain remnant trees in urban/park designs and promote growth and recruitment;
- Integrate trails and reserves with water (i.e. provision of channels and wetlands);
- Create linear habitat corridors along waterways/drainage lines/tributaries whilst implementing the principles of Water Sensitive Urban Design (WSUD) and ensuring no off-site impacts,
- Establish large areas of vegetation in nodes throughout development;
- Interconnect spaces through Biolinks to create a more complete habitat;
- Ensure natural assets and areas of public open space are close and accessible to residents;
- Restore and protect significant native vegetation;
- Ensure a significant amount of land is set aside for reserves and parks, and that these areas are revegetated appropriately;
- Provide representation of multiple vegetation types, noting that interactions may be different between types of vegetation/ habitat;
- Ensure stormwater treatment is designed to provide habitat(s) for significant flora and fauna species (i.e. Growling Grass Frog); and,
- Connect biodiversity sites with parks/ open spaces so they are separated from development.

Community engagement with external environmental groups resulted in the following responses:

- Geelong Field Naturalist Club - Rod Lowther (Secretary) responded on 1st March 2017 stating that representatives of the group had reviewed the Existing Conditions Report and had no significant comments. The group requested to be included in ongoing consultations.

- Batesford, Fyansford, Stonehaven Landcare Group - Felicity Spear (Secretary) responded and provided the following additional documentation between 9th -15th February 2017:
    - A statement of 'Current Projects and Future Visions for Batesford and Landcare';
    - The Moorabool River Environmental Water Management Plan (Corangamite CMA 2016) and supporting technical studies/ presentations; and
    - The Lower Moorabool River Recovery Strategy, prepared by the Lower Moorabool River Catchment Alliance.

The above noted information and outcomes of all workshops and meetings held as part of the stakeholder engagement program have been incorporated into this technical report and accompanying Concept Plan (Figure 5).

8 PRINCIPLES FOR FUTURE DEVELOPMENT

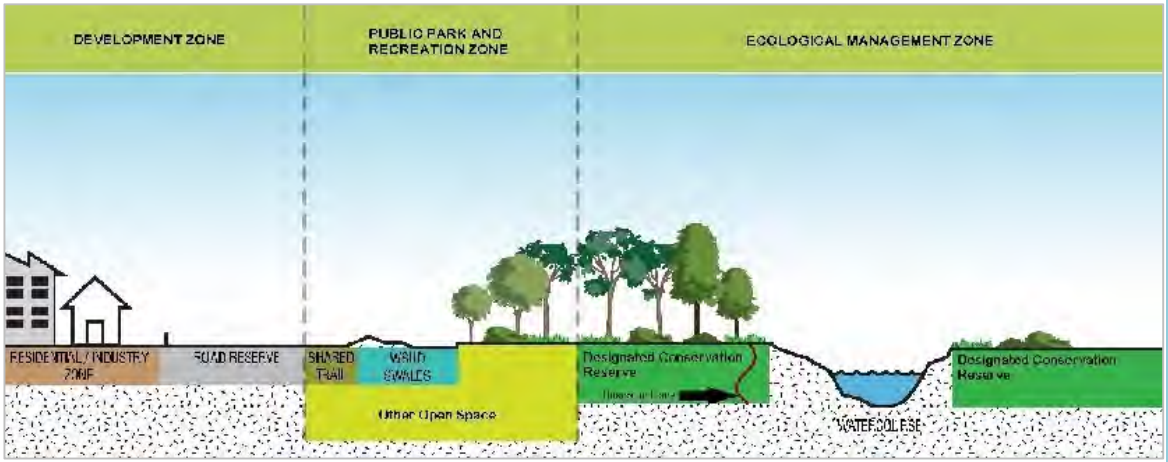
The study area provides a significant contribution to the biodiversity value of the Geelong region and as such, the planning of future development to address population growth must be implemented on a precinct-wide scale to facilitate a consistent and informed approach to ensuring the future protection and enhancement of ecological values present.

Detailed desk-based assessments, field surveys and stakeholder consultations have been undertaken to establish a Concept Plan (Figure 5) and set of recommended principles aimed at balancing the needs for future development and biodiversity. The following table outlines the key principles and provides a set off recommended planning and design principles developed to inform the IIDP and Framework Plan.

These principles were developed to guide the recommendations of the Flora and Fauna Report. Principles for the overall precinct planning project will be prepared at a later stage.

Table 4. Principles for future development

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
Integrated and Accessible	Future development integrates biodiversity into the urban landscape and ensures all neighbourhoods have access to nature.	In its current form, the study area supports large tracts of undeveloped (farm/rural land) land under private ownership. Key areas of publically accessible open space include the Moorabool River Reserve, Myers Reserve (recreation area) and sections of the Barwon and Moorabool River corridors.	• Establish conservation reserves dedicated to the protection and enhancement of biodiversity features within the study area. Land reserved for this purpose should include the corridors of significant watercourses (i.e. Moorabool River, Barwon River and Cowies Creek), large areas of existing native vegetation (particularly those adjacent to existing features such as Dog Rocks Sanctuary), and linear corridors established as primary and secondary Biolinks throughout the study area (indicative locations are provided within the Concept Plan). • Ensure areas set aside for biodiversity protection achieve biodiversity outcomes in the long term in terms of their size and their connection to other natural areas. A site responsive approach is necessary and should be negotiated with the land manager. • Design other areas of open space (informal parks, recreation reserves, landscape and amenity areas, heritage sites and land encumbered by service infrastructure [e.g. retention basins]) where possible to grow conservation reserves and promote the integration of biodiversity features. Opportunities to meet this objective include the application of environmentally sensitive design, environmentally conscious revegetation, and the provision of connectivity with designated conservation reserves.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			The establishment of 'pocket parks', which provide limited connectivity and opportunities for fauna movement, should be avoided unless the biodiversity values are sufficiently significant to warrant an alternative approach. • Focus the design of designated conservation reserves on the protection and enhancement of biodiversity values. These areas should exclude hard infrastructure (including stormwater treatment) and public access should be managed to avoid the potential for incompatible land use (e.g. high-speed cycling in areas supporting significant fauna species). • Maintenance regimes should also be consistent with the intended purpose of the reserve, with activities such as grass slashing minimised or avoided if possible. • Establish primary and secondary bio links across the study area including linear corridors, greenways, vegetated roadways and escarpments. • Utilise the *City of Greater Geelong Sustainable Communities Infrastructure Development Guidelines* to inform the use, design and management of primary and secondary bio links. • Consider significant view lines between urbanised and natural areas to promote connections with nature and the use of these assets. The diagram below provides an indicative view of how open space reserves can be established within the vicinity of the significant watercourses. This will vary in response to specific site characteristics. 

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
Connected	Future development maintains, improves and creates Biolinks, allowing the dispersal of flora species and passive movement of fauna species across the landscape.	Bio-links within the study area are formed predominately by the riparian corridors of the three significant watercourses present (Moorabool River, Barwon River and Cowies Creek). A significant bio-link extending between the Golden Plains and CoGG municipalities is also formed by connections between the Moorabool River Reserve, Dog Rocks Sanctuary, the vegetated area south of Dog Rocks Sanctuary (known as Honey Woodland), Dog Rocks Reserve and Red Gum Reserve. The existing rural landscape with open grassland, paddocks, dams and areas on intact native vegetation acts as a Biolink in the Western Growth Area.	• Establish designated conservation reserves either side of the significant watercourses and ensure the vegetation and landscape character of these areas are maintained and enhanced. The Concept Plan includes an indicative reserve area of 100 metres either side of the Moorabool and Barwon Rivers (from the top of the bank) and 50 metres either side of Cowies Creek consistent with the *Geelong Waterway Corridor Guidelines for NWGGA*. The prescribed buffers should be achieved and extended where possible to utilise the full extent of the floodplain. The width of buffers should reflect local topography and this should be determined on a site-by-site basis. Buffer widths may decrease from the prescribed figures in instances where a 100 or 50 metre buffer is unlikely to provide improved environmental outcomes (e.g. where steep escarpments adjoin waterways and agricultural or developed land on the plateau provides limited opportunity for rehabilitation). As noted above, the design and management of the designated conservation reserves should be focussed on the protection and enhancement of biodiversity values. • Promote passive fauna movement by designating additional conservation reserves where large areas of remnant vegetation persist (remnant patches and scattered trees), and through the establishment and rehabilitation of primary and secondary Biolinks across the study area (indicative locations are illustrated in the Concept Plan - Figure 5). Appropriate development setbacks should be applied either side of primary and secondary Biolinks, noting that these may include linear road reserves. • Enhance adjoining Biolinks (e.g. Red Gum Reserve) through the conscious siting of primary and secondary Biolinks within the study area. • Drainage infrastructure, such as wetlands, channels or detention basins, should be strategically located to integrate biodiversity features. An opportunity to achieve this outcome is the establishment of appropriately designed wetlands within the vicinity of Cowies Creek, which is known to support the nationally significant Growling Grass Frog. • Prioritise the retention and enhancement of native vegetation within road reserves during any future road upgrade proposals. • Ensure that future planning processes reference the future lake proposed to be established following rehabilitation of Batesford Quarry. The rehabilitated landform should be incorporated into the design of future Biolinks and promote the enhancement of biodiversity values where possible (i.e. native plantings).

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
Extent	Future development increases the extent of land managed for biodiversity within the study area.	Key areas within the study area managed for conservation include the Moorabool River Reserve and sections of the significant watercourses.	• Ensure that any offset requirements generated by future development activity within the study area are met through the securement of offsets within this locality. Offsetting arrangements may lead to the establishment of dedicated conservation reserves through active management and subsequent land transfers. Clearing proposals should result in a no net loss outcome for biodiversity. • Offset requirements should be met in the Western Growth Area by securing connected remnant native vegetation or strategically large-scale revegetation (to create primary or secondary Biolinks). Offsets should strengthen existing biodiversity values.
Quality	Future development ensures that the quality of biodiversity assets within the study area is enhanced.	Native vegetation and habitat within the study area ranges in quality, with features of higher quality concentrated around the waterway corridors.	• Monitor the protection of land subject to conservation covenants (refer to the Concept Plan) and reference these features when establishing conservation reserves and Biolinks within the study area. • Ensure that conservation covenants are automatically applied to designated offset sites (remnant native vegetation) and any managed offsets transferred to Council ownership. The existing quality of the offset, management requirements and capacity of Council resources must be considered as part of any transfer proposal. • Apply appropriate planning controls, zones and overlays (PCRZ, ESOs, VPOs) to significant environmental values within the study area, including the waterway corridors, remnant native vegetation (including individual scattered trees) and known populations of significant flora. Investigate the feasibility of applying new overlays to achieve specific environmental outcomes. A recent example of this is provided within the Yarra Ranges municipality, where an ESO (ESO2) is being trialled to improve the health of Little Stringybark Creek. The overlay requires developers that expand hard surfaces (such as roads or footpaths) by more than 10m^2 to treat run-off on site using rainwater tanks, rain gardens or passive drainage. • Any future development within the study area must adopt the principles of WSUD. This should include an integrated approach to stormwater and flood management that meets the objectives for hydraulic capacity, flood management and water cycle management. The quality of the three significant watercourses must be maintained and enhanced through design where possible. WSUD features and major stormwater infrastructure should not be located in areas of environmental significance (i.e. designated conservation reserves). • Prioritise the siting of infrastructure within areas which have already been disturbed or support existing infrastructure, thereby limiting the requirement for further environmental rehabilitation. • Design of the open space network should consider potential issues associated with climate change, including the requirement to build resilience by increasing connectivity, changes to the abundance and distribution of invasive species and the potential for increased fire events.

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			• Develop policy and guidelines to require understorey and ground cover vegetation within primary and secondary Biolinks.
Remnant	Future development protects and promotes the enhancement of key remnant features, including vegetation, habitat and species.	Broad-scale vegetation mapping completed across 2,448 hectares (75%) of the study area as part of this assessment recorded 175.5 hectares of remnant patches and 107 Scattered Trees.	• The hierarchy of environmental management should be applied to all future development within the study area. In order of priority, environmental impacts should be avoided, minimised and offset. A range of age classes should be protected (vegetation, old trees and woodland). • Utilise existing road networks to limit the crossing of waterways and significant vegetation in road reserves. • Promote passive regeneration in designated conservation reserves and primary/secondary Biolinks. Active revegetation within these areas and other open space reserves should be undertaken using appropriate indigenous species. Revegetation should attempt to reproduce the EVC that would have occurred naturally in the area. All revegetation activities in open space reserves and Biolinks should: o Represent at least 30% of the original communities EVC diversity; o Be based on the EVC benchmark tree densities; and, o Ensure all plants are indigenous and of local providence. • Establish design and siting standards for future development within the study area, including recommended planting lists. • When not in conservation reserves/Biolinks, protect structurally sound old remnant trees within pocket parks or incorporate into road design to also maintain landscape and amenity values.
Representative	Future development maintains and promotes biodiversity through the retention and re-establishment of features representative of the natural landscape.	The study area supports a diversity of vegetation communities, habitats and species of flora and fauna.	• Ensure that the siting and design of open space areas considers the diversity of vegetation and habitat types being protected. • Adopt appropriate planting standards for all revegetation activities within conservation reserves, Biolinks and other areas of open space to ensure that all created habitats are representative of the natural environment and that vegetation and habitat diversity is increased.
Significance	Future development retains and facilitates the long-term resilience of key significant species and ecological communities recorded or potentially present within the landscape.	The study area is known to support the nationally significant NTGVVP ecological community and a number of significant flora and fauna species are known or predicted to occur.	• As part of the future planning process, undertake targeted surveys and detailed mapping to determine the presence and distribution of significant flora, fauna and ecological communities within the study area. An appropriate management response should consider the following for each species or ecological community present: o Ecological requirements; o Extent and condition; o Legislative requirements; o Threats (existing and those predicted to arise through future development of the study area); o Demonstrated approaches to conservation and enhancement; and,

Principle	Objective	Existing Conditions	Recommended Planning and Design Principles
			○ Appropriate management responses to direct the avoidance, minimisation and offsetting of future impacts. • Formalise the management of significant species and ecological communities through the preparation of Conservation Management Plans. • Prioritise the establishment of designated conservation reserves and Biolinks based on known information regarding significant ecological features to protect listed/significant ecological communities (Plains Grassland).

9 CONCLUSION

The Western Geelong Growth Area ('study area') has been identified as being potentially suitable for development accommodating the medium and longer term growth of Geelong. In assessing the feasibility of this scenario, CoGG have committed to the development of an IIDP and Framework Plan, which will be informed by the findings of this Flora and Fauna Technical Report.

Detailed desk-based assessments, broad-scale field surveys and stakeholder consultations were undertaken to assess the biodiversity value of the study area and inform future planning processes. The findings of the assessment confirmed that the study area supports a diversity of significant natural assets (Section 5), which are subject to the natural and anthropogenic pressures commonly associated with developed and fringing landscapes. Given the potential for future development within the study area to intensify existing pressures and threaten the overall viability of retained ecological values, a precinct-wide approach is required to ensure all known values are accounted for and that management responses are consistent and implemented on a landscape-scale.

Knowledge gathered from this assessment has been used to develop a Concept Plan (Figure 5), which provides an interpretation of the following set of principles aimed at balancing the needs of population growth and biodiversity:

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

For each key principle, recommended design and planning principles have been developed to inform preparation of the IIDP and Framework Plan (Table 4). It is recommended that these principles are reassessed and built upon as future planning of the growth area progresses and as knowledge of ecological values increases through succeeding ecological studies.

Based on the findings of this Flora and Fauna Technical Report, it is considered that the study area can accommodate the medium and longer term growth of Geelong whilst maintaining and enhancing the key ecological values present.

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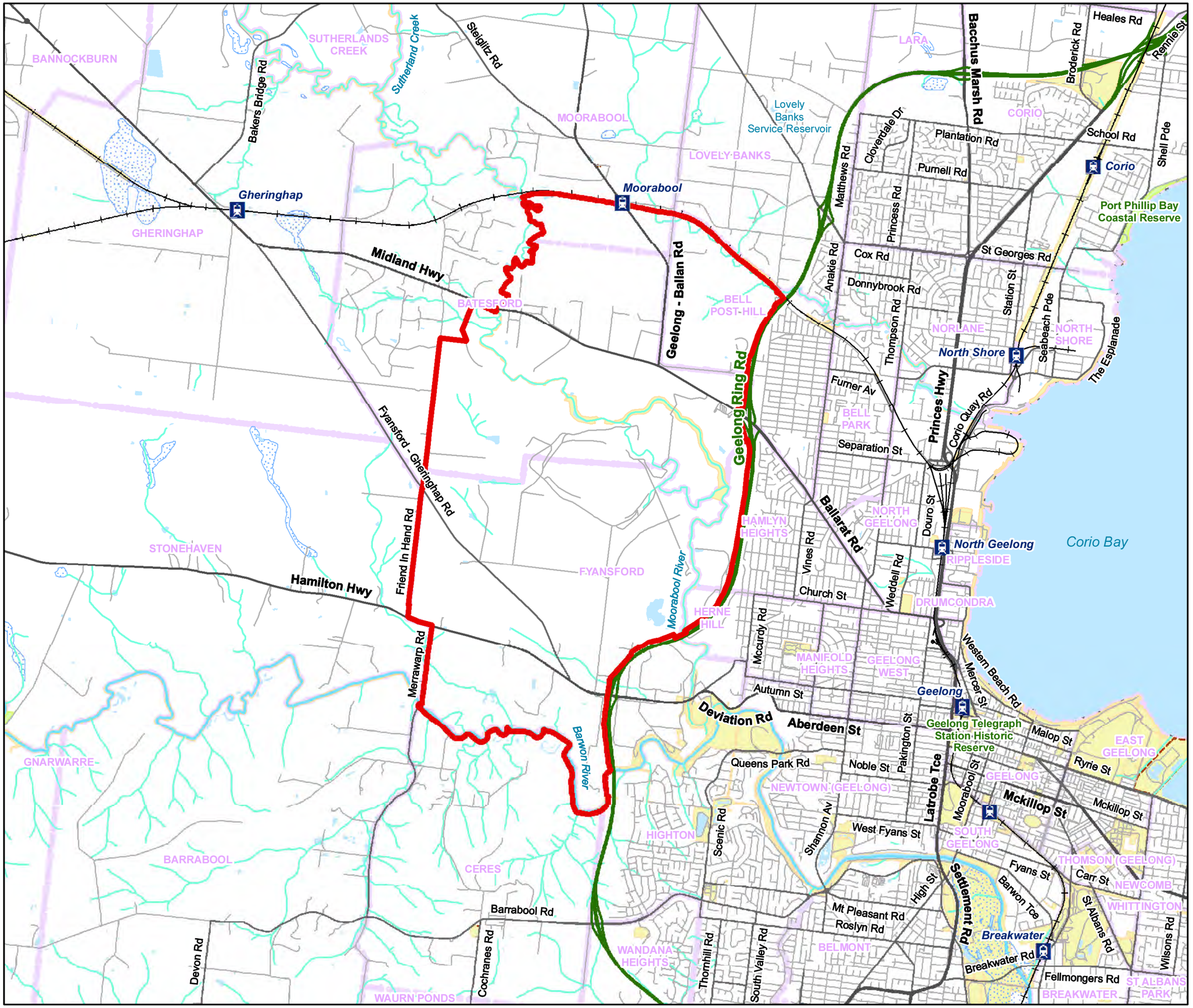
FIGURES



Legend

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

Figure 1

Location of the study area

Western Geelong Growth Area - Flora and Fauna Assessment

N

0 750 1,500

Metres

ecology & heritage partners

8348_Fig01_StudyArea 21/09/2016 melsley

Figure 2

Overview of Ecological Features

Western Geelong Growth Area - Flora and Fauna Assessment

ecology & heritage partners

Legend

- Study Area
- Land not inspected
- Significant Flora Records
- Significant Fauna Records
- DELWP BioSite (Point)
- CoGG BioSites
- Environmental Significance Overlay (ESO1)
- DELWP Mapped Wetland
- Scattered Tree
- Scattered Tree - Melbourne Yellow-gum
- Remnant native vegetation
- NTGVVP Ecological Community
- SHW Ecological Community (potential)
- Planted native vegetation
- Modelled Native Vegetation (in areas not surveyed)

0 0.5 1
Kilometres

N

8348_Fig02_EcoFeatures_OV 14/11/2016 cbrowning

Figure 3

Flora species within the study area and surrounds

Western Geelong Growth Area - Flora and Fauna Assessment

Legend

- Study Area
- Significant Flora Record
- VBA Records
- Melbourne Yellow Gum (Current Study)

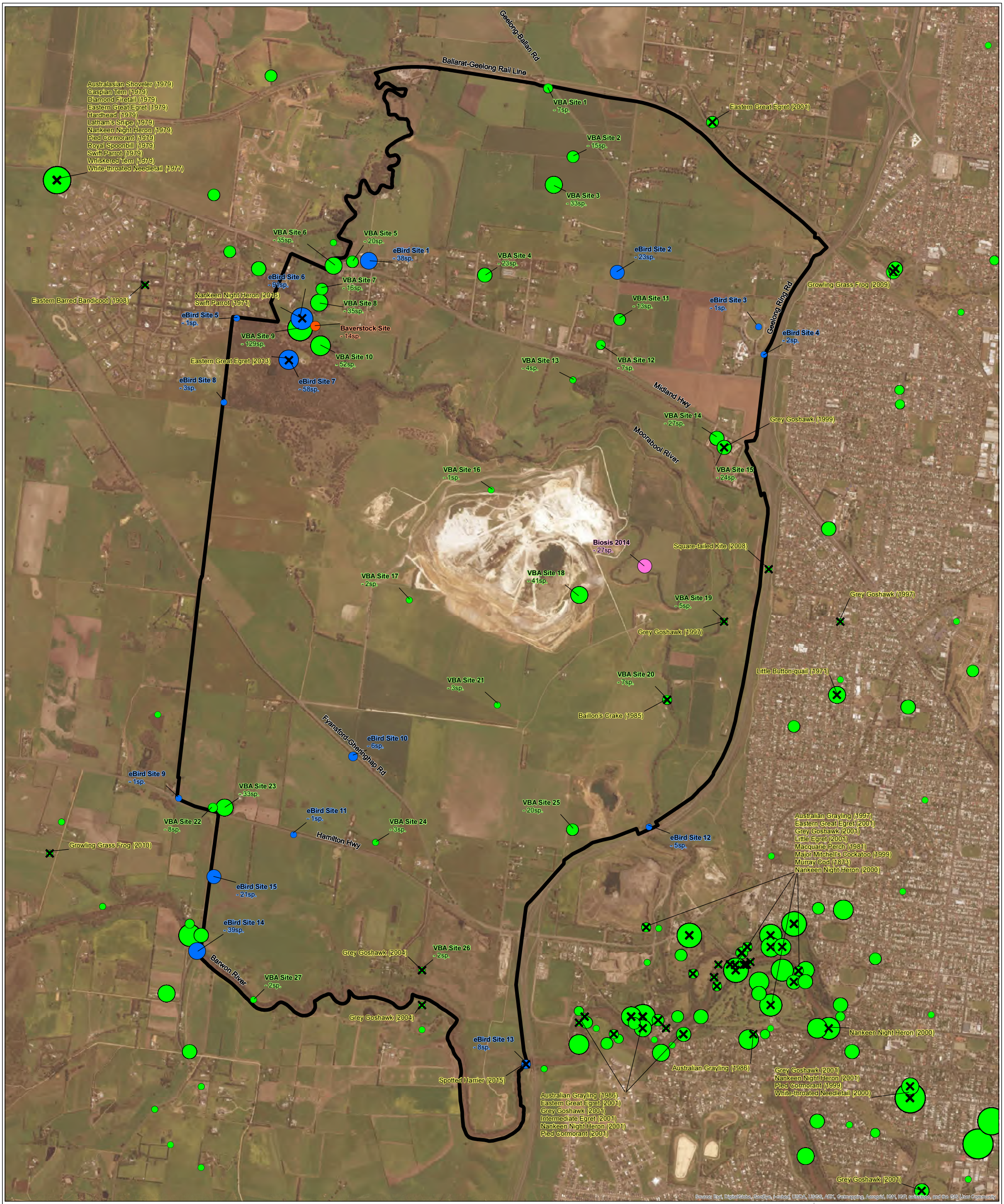
ecology & heritage partners

8348_Fig03_Flora 11/11/2016 cbrowning

Figure 4

Fauna species within the study area and surrounds

Western Geelong Growth Area - Flora and Fauna Assessment



Legend

- Study Area
- Significant Fauna Record
- VBA Records
- eBird Database Records
- Baverstock Records
- Biosis 2014 Records

0 0.5 1

Kilometres

ecology & heritage partners

8348_Fig04_Fauna 11/11/2016 cbrowning

Ballarat-Geelong Rail Line
Cowies Creek
Geelong-Ballan Rd
Midland Hwy
Incorporation into drainage easement
Moorabool River
Fyansford-Cheringhap Rd
500 kV Power Line Easement
Hamilton Hwy
Barwon River
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 5

Concept Plan - Ecological Opportunities

Western Geelong Growth Area - Flora and Fauna Assessment

ecology & heritage partners

Legend

- Study area
- 500 kV power line easement (future use subject to further investigation)
- Conservation covenant

Long term opportunity lake investigation area
- Lake Edge
- Waterbody

Native Vegetation (refer to the Existing Conditions Report (Ecology and Heritage Partners Pty Ltd 2016)
- Scattered native trees
- Native vegetation patches (planted and remnant)
- Opportunities to enhance waterways and land in accordance with the NWGGA Geelong Waterway Corridor Guidelines
- Opportunities to connect with established biodiversity corridors in the surrounding landscape
- Opportunity to integrate existing vegetation
- Opportunity to develop primary biolink
- Opportunity to develop secondary biolink

N

0 0.5 1
Kilometres

APPENDICES

APPENDIX A - FLORA SPECIES RECORDED WITHIN THE STUDY AREA

Table A1. Flora species recorded within the study area (VBA - DELWP 2016d)

Scientific Name	Common Name	Conservation Status[1]	Source[2]
INDIGENOUS SPECIES			
Acacia dealbata	Silver Wattle	-	VBA (Site 27)
Acacia implexa	Lightwood	-	VBA (Site 10)
Acacia longifolia subsp. longifolia	Sallow Wattle	-	VBA (Site 9)
Acacia mearnsii	Black Wattle	-	VBA (Sites 9,10)
Acacia melanoxylon	Blackwood	-	VBA (Sites 9,10)
Acacia paradoxa	Hedge Wattle	-	VBA (Site 9)
Acacia pycnantha	Golden Wattle	-	VBA (Site 9)
Acaena ovina	Australian Sheep's Burr	-	VBA (Site 10)
Allocasuarina verticillata	Drooping Sheoak	-	VBA (Sites 9,10)
Astroloma humifusum	Cranberry Heath	-	VBA (Site 9)
Atriplex suberecta	Sprawling Saltbush	-	VBA (Site 19)
Austrostipa spp.	Spear Grass	-	VBA (Sites 9,10)
Austrostipa stuposa	Quizzical Spear-grass	-	VBA (Site 11)
Azolla pinnata	Ferny Azolla	-	VBA (Site 9)
Beyeria lechenaultii var. ledifolia	Pale Turpentine-bush	-	VBA (Site 13)
Calandrinia calyptrata	Pink Purslane	-	VBA (Site 10)
Caladenia carnea sensu Willis (1970)	Pink Fingers	-	VBA (Site 24)
Caleana major	Large Duck-orchid	-	VBA (Site 24)
Callistemon sieberi	River Bottlebrush	-	VBA (Site 9)
Caladenia pusilla	Tiny Pink-fingers	-	VBA (Site 24)
Campylopus introflexus	Heath Star Moss	-	VBA (Site 9)
Carex appressa	Tall Sedge	-	VBA (Site 9)
Carpobrotus modestus	Inland Pigface	-	VBA (Site 9)
Carpobrotus rossii	Karkalla	-	VBA (Site 10)
Cassytha melantha	Coarse Dodder-laurel	-	VBA (Site 9)
Centrolepis strigosa subsp. strigosa	Hairy Centrolepis	-	VBA (Site 9)
Cheilanthes austrotenuifolia	Green Rock-fern	-	VBA (Site 9)
Chloris truncata	Windmill Grass	-	VBA (Site 11)
Clematis microphylla s.l.	Small-leaved Clematis	-	VBA (Sites 9,10)
Coprosma quadrifida	Prickly Currant-bush	-	VBA (Site 9)
Correa glabra var. glabra	Rock Correa	-	VBA (Site 11)
Crassula decumbens var. decumbens	Spreading Crassula	-	VBA (Site 9)
Crassula sieberiana s.l.	Sieber Crassula	-	VBA (Sites 9,10)
Cycnogeton procerum s.s.	Common Water-ribbons	-	VBA (Site 9)
Cycnogeton spp.	Water Ribbons	-	VBA (Site 10)

Scientific Name	Common Name	Conservation Status[1]	Source[2]
Cyperus spp.	Flat Sedge	-	VBA (Site 9)
Dichondra repens	Kidney-weed	-	VBA (Site 10)
Dodonaea viscosa	Sticky Hop-bush	-	VBA (Site 10)
Dodonaea viscosa subsp. cuneata	Wedge-leaf Hop-bush	-	VBA (Site 9)
Drosera auriculata	Tall Sundew	-	VBA (Site 24)
Drosera binata	Forked Sundew	-	VBA (Site 24)
Einadia nutans	Nodding Saltbush	-	VBA (Sites 9,10)
Enchylaena tomentosa var. tomentosa	Ruby Saltbush	-	VBA (Site 9)
Eucalyptus camaldulensis	River Red-gum	-	VBA (Sites 9,10,27)
Eucalyptus leucoxylon	Yellow Gum	-	VBA (Site 9)
Eucalyptus leucoxylon subsp. connata	Melbourne Yellow-gum	**v**	VBA (Site 10) and additional records from current study (Figure 2)
Eucalyptus melliodora	Yellow Box	-	VBA (Site 9)
Eucalyptus viminalis	Manna Gum	-	VBA (Site 7)
Exocarpos cupressiformis	Cherry Ballart	-	VBA (Site 9)
Exocarpos strictus	Pale-fruit Ballart	-	VBA (Site 9)
Ficinia nodosa	Knobby Club-sedge	-	VBA (Site 9)
Gahnia radula	Thatch Saw-sedge	-	VBA (Site 9)
Glyphothecium sciuroides	Arc Moss	-	VBA (Site 9)
Gonocarpus tetragynus	Common Raspwort	-	VBA (Site 9)
Hydrocotyle spp.	Pennywort	-	VBA (Site 9)
Kunzea ericoides s.l.	Burgan	-	VBA (Site 9)
Lachnagrostis adamsonii	Adamson's Blown-grass	**EN, L, v**	VBA (Site 1)
Lepidosperma laterale var. laterale	Variable Sword-sedge	-	VBA (Site 9)
Leptospermum lanigerum	Woolly Tea-tree	-	VBA (Site 9)
Lobelia anceps	Angled Lobelia	-	VBA (Site 9)
Lomandra filiformis subsp. coriacea	Wattle Mat-rush	-	VBA (Site 9)
Lomandra longifolia	Spiny-headed Mat-rush	-	VBA (Site 10)
Lomandra nana	Dwarf Mat-rush	-	VBA (Site 9)
Melicytus dentatus s.l.	Tree Violet	-	VBA (Site 10)
Microlaena stipoides var. stipoides	Weeping Grass	-	VBA (Site 10)
Muellerina eucalyptoides	Creeping Mistletoe	-	VBA (Site 9)
Myoporum insulare	Common Boobialla	-	VBA (Site 10)
Myriophyllum verrucosum	Red Water-milfoil	-	VBA (Site 11)
Olearia phlogopappa	Dusty Daisy-bush	-	VBA (Site 24)
Oxalis spp.	Wood Sorrel	-	VBA (Site 9)
Phragmites australis	Common Reed	-	VBA (Sites 9,10)
Poa labillardierei	Common Tussock-grass	-	VBA (Sites 9,27)
Prostanthera nivea var. nivea	Snowy Mint-bush	**r**	VBA (Site 9)
Pteridium esculentum	Austral Bracken	-	VBA (Sites 9,10)
Puccinellia perlaxa	Plains Saltmarsh-grass	-	VBA (Site 2)

Scientific Name	Common Name	Conservation Status[1]	Source[2]
Rumex brownii	Slender Dock	-	VBA (Site 27)
Rytidosperma auriculatum	Lobed Wallaby-grass	-	VBA (Site 11)
Rytidosperma caespitosum	Common Wallaby-grass	-	VBA (Site 10)
Rytidosperma fulvum	Copper-awned Wallaby-grass	-	VBA (Site 9)
Rytidosperma racemosum var. racemosum	Slender Wallaby-grass	-	VBA (Site 9)
Rytidosperma setaceum	Bristly Wallaby-grass	-	VBA (Site 10)
Sclerodontium pallidum	Knitting Nancy	-	VBA (Site 9)
Sphaerolobium vimineum s.l.	Leafless Globe-pea	-	VBA (Site 24)
Solanum laciniatum	Large Kangaroo Apple	-	VBA (Site 9,10)
Tetrarrhena distichophylla	Hairy Rice-grass	-	VBA (Site 24)
Thelymitra circumsepta	Naked Sun-orchid	v	VBA (Site 24)
Themeda triandra	Kangaroo Grass	-	VBA (Sites 9,10)
Urtica incisa	Scrub Nettle	-	VBA (Site 27)
Utricularia australis	Yellow Bladderwort	-	VBA (Site 24)
Xyris operculata	Tall Yellow-eye	-	VBA (Site 24)
INTRODUCED SPECIES			
Acacia baileyana	Cootamundra Wattle	-	VBA (Sites 9,11)
Agapanthus praecox subsp. orientalis	Agapanthus	-	VBA (Site 9)
Aira caryophyllea subsp. caryophyllea	Silvery Hair-grass	-	VBA (Sites 9,10)
Allium vineale	Crow Garlic	-	VBA (Sites 4,5,18,21,22,23,25)
Arctotheca calendula	Cape weed	-	VBA (Sites 10,27)
Asparagus asparagoides	Bridal Creeper	-	VBA (Sites 9,10)
Asparagus officinalis	Asparagus	-	VBA (Site 27)
Briza maxima	Large Quaking-grass	-	VBA (Site 10)
Briza minor	Lesser Quaking-grass	-	VBA (Sites 9,10)
Bromus hordeaceus subsp. hordeaceus	Soft Brome	-	VBA (Site 10)
Carduus tenuiflorus	Winged Slender-thistle	-	VBA (Site 10)
Centaurium erythraea	Common Centaury	-	VBA (Site 9)
Cerastium glomeratum s.l.	Common Mouse-ear Chickweed	-	VBA (Site 27)
Chrysanthemoides monilifera	Boneseed	-	VBA (Sites 9,10)
Cirsium vulgare	Spear Thistle	-	VBA (Sites 9,27)
Conyza sumatrensis var. sumatrensis	Tall Fleabane	-	VBA (Site 27)
Cupressus sempervirens	Italian Cypress	-	VBA (Site 15)
Dactylis glomerata	Cocksfoot	-	VBA (Site 10)
Echium plantagineum	Paterson's Curse	-	VBA (Sites 3,4,16)
Ehrharta longiflora	Annual Veldt-grass	-	VBA (Sites 9,10)
Fumaria muralis subsp. muralis	Wall Fumitory	-	VBA (Site 27)
Galenia pubescens var. pubescens	Galenia	-	VBA (Sites 9,10,13,15)
Galium aparine	Cleavers	-	VBA (Site 27)
Genista monspessulana	Montpellier Broom	-	VBA (Site 9)

Scientific Name	Common Name	Conservation Status[1]	Source[2]
Hedera helix	English Ivy	-	VBA (Sites 9,10)
Holcus lanatus	Yorkshire Fog	-	VBA (Site 27)
Hypochaeris radicata	Flatweed	-	VBA (Site 9)
Juncus capitatus	Capitate Rush	-	VBA (Site 9)
Lactuca serriola	Prickly Lettuce	-	VBA (Site 9)
Lagurus ovatus	Hare's-tail Grass	-	VBA (Site 10)
Lavandula stoechas	Topped Lavender	-	VBA (Site 11)
Lepidium africanum	Common Peppercress	-	VBA (Site 10)
Ligustrum lucidum	Large-leaf Privet	-	VBA (Site 9)
Lolium perenne	Perennial Rye-grass	-	VBA (Site 10)
Lycium ferocissimum	African Box-thorn	-	VBA (Sites 9,10)
Lysimachia arvensis (Blue-flowered variant)	Blue Pimpernel	-	VBA (Site 9)
Lysimachia arvensis (Red-flowered variant)	Scarlet Pimpernel	-	VBA (Site 9)
Malva nicaeensis	Mallow of Nice	-	VBA (Site 15)
Malva parviflora	Small-flower Mallow	-	VBA (Site 15)
Matricaria matricarioides	Rounded Chamomile	-	VBA (Site 15)
Medicago polymorpha	Burr Medic	-	VBA (Site 10)
Myagrum perfoliatum	Musk Weed	-	VBA (Site 9)
Nassella neesiana	Chilean Needle-grass	-	VBA (Sites 3,5,6,10,16,25)
Nassella trichotoma	Serrated Tussock	-	VBA (Sites 5,8,10,12,14,18,20,21,25,26)
Olea europaea	Olive	-	VBA (Site 9)
Olea europaea subsp. europaea	Common Olive	-	VBA (Site 10)
Oxalis pes-caprae	Soursob	-	VBA (Sites 10,27)
Phalaris aquatica	Toowoomba Canary-grass	-	VBA (Sites 9,10,17)
Pinus pinaster	Cluster Pine	-	VBA (Site 9)
Pinus radiata	Radiata Pine	-	VBA (Site 9)
Plantago bellardii	Silky Plantain	-	VBA (Site 7)
Plantago lanceolata	Ribwort	-	VBA (Site 10)
Polygonum aviculare s.l.	Prostrate Knotweed	-	VBA (Site 15)
Puccinellia fasciculata	Borrer's Saltmarsh-grass	-	VBA (Site 2)
Quercus spp.	Oak	-	VBA (Site 9)
Rapistrum rugosum	Giant Mustard	-	VBA (Site 27)
Rosa rubiginosa	Sweet Briar	-	VBA (Site 27)
Rubus fruticosus spp. agg.	Blackberry	-	VBA (Site 9)
Salix X rubens	Basket Willow	-	VBA (Site 9)
Silene spp.	Catchfly	-	VBA (Site 10)
Sonchus asper s.l.	Rough Sow-thistle	-	VBA (Site 27)
Sonchus oleraceus	Common Sow-thistle	-	VBA (Site 10,27)
Stellaria media	Chickweed	-	VBA (Site 27)
Vinca major	Blue Periwinkle	-	VBA (Site 9)

Scientific Name	Common Name	Conservation Status[1]	Source[2]
Vulpia bromoides	Squirrel-tail Fescue	-	VBA (Site 9)
Vulpia muralis	Wall Fescue	-	VBA (Site 27)
Vulpia myuros f. myuros	Rat's-tail Fescue	-	VBA (Site 10)
Watsonia spp.	Watsonia	-	VBA (Site 9)

Notes:

1) EN - Endangered under the EPBC Act, L - Listed under the FFG Act, v/r - Listed as Vulnerable or Rare on the Victorian Advisory List (DEPI 2014)

2) Refer to Figure 3

APPENDIX B - FAUNA SPECIES RECORDED WITHIN THE STUDY AREA

Table B1. Fauna species recorded within the study area.

Common Name	Scientific Name	Conservation Status[1]	Source[2]
NATIVE SPECIES			
Birds			
Australasian Darter	*Anhinga novaehollandiae*	-	eBird (Site 13,14)
Australasian Grebe	*Tachybaptus novaehollandiae*	-	VBA (Site 20), eBird (Site 1,3,6,7)
Australasian Pipit	*Anthus novaeseelandiae*	-	VBA (Site 3,11)
Australian Hobby	*Falco longipennis*	-	VBA (Site 2), eBird (Site 6)
Australian Magpie	*Cracticus tibicen*	-	VBA (Site 1,3,4,8,9,10,11,12,14,15,22,23,24,25), eBird (Site 2,6,7,8,10,14,15), Biosis 2014
Australian Raven	*Corvus coronoides*	-	VBA (Site 9,14,15)
Australian White Ibis	*Threskiornis molucca*	-	VBA (Site 3,8,22,25), eBird (Site 6)
Australian Wood Duck	*Chenonetta jubata*	-	VBA (Site 8,9), eBird (Site 6)
Azure Kingfisher	*Alcedo azurea*	-	eBird (Site 1)
Baillon's Crake	*Porzana pusilla palustris*	**L, v**	VBA (Site 20)
Banded Lapwing	*Vanellus tricolor*	-	eBird (Site 1,6)
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	-	VBA (Site 4,8,9,15,23), eBird (Site 1,6,7,8,14)
Black-fronted Dotterel	*Elseyornis melanops*	-	eBird (Site 1)
Black Kite	*Milvus migrans*	-	eBird (Site 6,7,9,11,12,13,14,15), Biosis 2014
Black-shouldered Kite	*Elanus axillaris*	-	VBA (Site 2), eBird (Site 2,4,13,14)
Black Swan	*Cygnus atratus*	-	Biosis 2014
Black-winged stilt	*Himantopus himantopus*	-	eBird (Site 1)
Brown Falcon	*Falco berigora*	-	VBA (Site 1,3,10,23), eBird (Site 1,6,13,15), Biosis 2014
Brown Goshawk	*Accipiter fasciatus*	-	VBA (Site 9,10,19), eBird (Site 6,7)
Brown Thornbill	*Acanthiza pusilla*	-	VBA (Site 8,18), eBird (Site 6,7,14)
Brown-headed Honeyeater	*Melithreptus brevirostris*	-	VBA (Site 10), eBird (Site 6,7)
Brown Songlark	*Megalurus cruralis*	-	eBird (Site 1), Biosis 2014
Brush Bronzewing	*Phaps elegans*	-	VBA (Site 9)
Budgerigar	*Melopsittacus undulatus*	-	eBird (Site 6)
Cattle Egret	*Ardea ibis*	-	VBA (Site 2), eBird (Site 2,6)
Chestnut Teal	*Anas castanea*	-	VBA (Site 9), eBird (Site 6,7)
Clamorous Reed Warbler	*Acrocephalus stentoreus*	-	VBA (Site 20,25), eBird (Site 14)
Collared Sparrowhawk	*Accipiter cirrhocephalus*	-	VBA (Site 3), eBird (Site 6,7)
Common Bronzewing	*Phaps chalcoptera*	-	VBA (Site 4,9,18), eBird (Site 6,7)
Crested Pigeon	*Ocyphaps lophotes*	-	eBird (Site 5,6,14), Biosis 2014
Crested Shrike-tit	*Falcunculus frontatus*	-	VBA (Site 8,9,18), eBird (Site 6,7)

Common Name	Scientific Name	Conservation Status[1]	Source[2]
Crimson Rosella	*Platycercus elegans*	-	VBA (Site 8,9,10,18), eBird (Site 6,7)
Darter	*Anhinga novaehollandiae*	-	VBA (Site 10)
Dusky Moorhen	*Gallinula tenebrosa*	-	VBA (Site 9,23,25), eBird (Site 6,7,14), Biosis 2014
Dusky Woodswallow	*Artamus cyanopterus*	-	VBA (Site 9), eBird (Site 1,6,7,14)
Eastern Great Egret	*Ardea modesta*	L, v	eBird (Site 7)
Eastern Rosella	*Platycercus eximius*	-	VBA (Site 4,5,8,9,10,18,23), eBird (Site 1,6,7,14), Biosis 2014
Eastern Spinebill	*Acanthorhynchus tenuirostris*	-	VBA (Site 9), eBird (Site 7)
Eastern Yellow Robin	*Eopsaltria australis*	-	VBA (Site 1,3,9,10), eBird (Site 6,7)
Eurasian Coot	*Fulica atra*	-	VBA (Site 25), eBird (Site 6,7), Biosis 2014
Fairy Martin	*Petrochelidon ariel*	-	VBA (Site 23), eBird (Site 14)
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	-	VBA (Site 5,11,18), eBird (Site 1,6,7,8)
Flame Robin	*Petroica phoenicea*	-	eBird (Site 1)
Galah	*Eolophus roseicapillus*	-	VBA (Site 8,9,10,18,23), eBird (Site 2,6,7), Biosis 2014
Gang Gang Cockatoo	*Callocephalon fimbriatum*	-	eBird (Site 6,7)
Golden-headed Cisticola	*Cisticola exilis*	-	Biosis 2014, eBird (Site 15)
Golden Whistler	*Pachycephala pectoralis*	-	VBA (Site 10), eBird (Site 6,7)
Great Cormorant	*Phalacrocorax carbo*	-	eBird (Site 6)
Grey Butcherbird	*Cracticus torquatus*	-	eBird (Site 2,14)
Grey Currawong	*Strepera versicolor*	-	VBA (Site 8)
Grey Fantail	*Rhipidura albiscapa*	-	VBA (Site 3,9,10,23,25), eBird (Site 1,6,7,14,15)
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	L, v	VBA (Site 15,19,26)
Grey Shrike-thrush	*Colluricincla harmonica*	-	VBA (Site 3,4,8,9,10), eBird (Site 6,7,14)
Grey Teal	*Anas gracilis*	-	VBA (Site 2), eBird (Site 6)
Hoary-headed Grebe	*Poliocephalus poliocephalus*	-	eBird (Site 1)
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*	-	VBA (Site 15), eBird (Site 2,6,7)
Laughing Kookaburra	*Dacelo novaeguineae*	-	VBA (Site 8,9,10), eBird (Site 1,6,7)
Little Corella	*Cacatua sanguinea*	-	VBA (Site 23), eBird (Site 2,6)
Little Eagle	*Hieraaetus morphnoides*	-	VBA (Site 3,9), eBird (Site 7,12,13,14,15)
Little Black Cormorant	*Phalacrocorax sulcirostris*	-	eBird (Site 6)
Little Pied Cormorant	*Microcarbo melanoleucos*	-	VBA (Site 9,25), eBird (Site 6)
Little Raven	*Corvus mellori*	-	VBA (Site 2,3,5,9,10,12,22,23,24,25), eBird (Site 2,6,7,12,14,15)
Long-billed Corella	*Cacatua tenuirostris*	-	VBA (Site 2,3,9), eBird (Site 2,6)
Magpie-lark	*Grallina cyanoleuca*	-	VBA (Site 2,8,10,12,14,15,22,23,25), eBird (Site 2,6,7,10,14,15)
Masked Lapwing	*Vanellus miles*	-	VBA (Site 2,14,15,20,23), eBird (Site 2,6,10), Biosis 2014
Musk Lorikeet	*Glossopsitta concinna*	-	VBA (Site 9,10), eBird (Site 6)
Nankeen Kestrel	*Falco cenchroides*	-	VBA (Site 2,9,24), eBird (Site 6,7,10,12,15)

Common Name	Scientific Name	Conservation Status[1]	Source[2]
Nankeen Night Heron	*Nycticorax caledonicus*	nt	eBird (Site 6)
New Holland Honeyeater	*Phylidonyris novaehollandiae*	-	VBA (Site 4,5,9,10,11,14,15,18,25), eBird (Site 6,7,14,15)
Pacific Black Duck	*Anas superciliosa*	-	VBA (Site 8,9,23), eBird (Site 1,6), Biosis 2014
Painted Button-quail	*Turnix varia*	-	VBA (Site 10)
Pallid Cuckoo	*Cacomantis pallidus*	-	VBA (Site 15,18)
Peaceful Dove	*Geopelia striata*	-	VBA (Site 3)
Peregrine Falcon	*Falco peregrinus*	-	VBA (Site 21), eBird (Site 1,6), Biosis 2014
Pied Currawong	*Strepera graculina*	-	VBA (Site 8,9,10,25), eBird (Site 6,7)
Pink-eared Duck	*Malacorhynchus membranaceus*	-	eBird (Site 6)
Pink Robin	*Petroica rodinogaster*	-	eBird (Site 1)
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*	-	VBA (Site 5,9), eBird (Site 6,7)
Purple Swamphen	*Porphyrio porphyrio*	-	eBird (Site 6)
Rainbow Bee-eater	*Merops ornatus*	-	VBA (Site 4,18), eBird (Site 1,6)
Rainbow Lorikeet	*Trichoglossus haematodus*	-	VBA (Site 8,9,10,14,15), eBird (Site 2,6,7,14)
Red Wattlebird	*Anthochaera carunculata*	-	VBA (Site 3,5,8,9,10,14,15,18,23), eBird (Site 2,4,6,7,10,15)
Red-browed Finch	*Neochmia temporalis*	-	VBA (Site 4,9,10,18,25), eBird (Site 1,6,7,14), Biosis 2014
Red-kneed Dotterel	*Erythrogonys cinctus*	-	eBird (Site 1)
Red-rumped Parrot	*Psephotus haematonotus*	-	VBA (Site 4,8,9,10,25), eBird (Site 2,6,7,15), Biosis 2014
Restless Flycatcher	*Myiagra inquieta*	-	VBA (Site 4), eBird (Site 1,6,7)
Rufous Fantail	*Rhipidura rufifrons*	-	eBird (Site 6)
Rufous Whistler	*Pachycephala rufiventris*	-	VBA (Site 4,18), eBird (Site 6,7,14)
Sacred Kingfisher	*Todiramphus sanctus*	-	VBA (Site 25), eBird (Site 6)
Scarlet Robin	*Petroica boodang*	-	eBird (Site 1)
Sharp-tailed Sandpiper	*Calidris acuminata*	-	eBird (Site 1)
Shining Bronze-Cuckoo	*Chrysococcyx lucidus*	-	VBA (Site 5), eBird (Site 6,7)
Short-tailed Shearwater	*Puffinus tenuirostris*	-	eBird (Site 13)
Silvereye	*Zosterops lateralis*	-	VBA (Site 10), eBird (Site 6,7,14)
Southern Boobook	*Ninox novaeseelandiae*	-	VBA (Site 10,15), eBird (Site 1)
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	-	VBA (Site 1,3,4,9,18), eBird (Site 6,7)
Spotted Harrier	*Circus assimilis*	nt	eBird (Site 13)
Spotted Pardalote	*Pardalotus punctatus punctatus*	-	VBA (Site 9,10,14,15), eBird (Site 1,6,7,14)
Spotless Crake	*Porzana tabuensis*	-	eBird (Site 1)
Straw-necked Ibis	*Threskiornis spinicollis*	-	VBA (Site 2,5,9,22,23), eBird (Site 6,7,14,15)
Striated Pardalote	*Pardalotus striatus*	-	VBA (Site 10), eBird (Site 1,6,7,14)
Striated Thornbill	*Acanthiza lineata*	-	VBA (Site 4)
Stubble Quail	*Coturnix pectoralis*	-	VBA (Site 23), eBird (Site 1)
Sulphur-crested Cockatoo	*Cacatua galerita*	-	VBA (Site 8,9,10), eBird (Site 6,7,14)

Common Name	Scientific Name	Conservation Status[1]	Source[2]
Superb Fairy-wren	*Malurus cyaneus*	-	VBA (Site 1,3,4,5,8,9,10,11,12,14,15,18,23,25), eBird (Site 6,7,14,15), Biosis 2014
Swamp Harrier	*Circus approximans*	-	VBA (Site 23), eBird (Site 2)
Swift Parrot	*Lathamus discolor*	**E, L, e**	eBird (Site 6)
Tawny Frogmouth	*Podargus strigoides*	-	VBA (Site 9,19), eBird (Site 6)
Tree Martin	*Petrochelidon nigricans*	-	eBird (Site 6,14)
Wedge-tailed Eagle	*Aquila audax*	-	VBA (Site 9,10,23), eBird (Site 1,6,7,12,15)
Weebill	*Smicrornis brevirostris*	-	eBird (Site 1,7)
Welcome Swallow	*Hirundo neoxena*	-	VBA (Site 3,4,5,8,9,11,15,18,22,23,25), eBird (Site 6,7,10,14,15), Biosis 2014
Whistling Kite	*Haliastur sphenurus*	-	VBA (Site 3,4,9,14,18,23), eBird (Site 1,2,6,7,14,16), Biosis 2014
White-browed Scrubwren	*Sericornis frontalis*	-	VBA (Site 5,8,9,10,15), eBird (Site 6,7,14)
White-browed Woodswallow	*Artamus superciliosus*	-	VBA (Site 4)
White-eared Honeyeater	*Lichenostomus leucotis*	-	eBird (Site 1)
White-faced Heron	*Egretta novaehollandiae*	-	VBA (Site 9,10,11,25), eBird (Site 6)
White-naped Honeyeater	*Melithreptus lunatus*	-	VBA (Site 5,9,10,18), eBird (Site 1,6,7)
White-plumed Honeyeater	*Lichenostomus penicillatus*	-	VBA (Site 1,3,4,5,8,9,10,18,23), eBird (Site 6,7,14,15), Biosis 2014
White-throated Needletail	*Hirundapus caudacutus*	-	eBird (Site 6)
White-throated Treecreeper	*Cormobates leucophaeus*	-	VBA (Site 10,18), eBird (Site 1,6)
White-winged Chough	*Corcorax melanorhamphos*	-	eBird (Site 1)
Willie Wagtail	*Rhipidura leucophrys*	-	VBA (Site 1,3,4,5,8,9,10,11,12,13,14,15,18,20,23), eBird (Site 2,6,7,14), Biosis 2014
Yellow-faced Honeyeater	*Lichenostomus chrysops*	-	eBird (Site 1,6,7,15)
Yellow Thornbill	*Acanthiza nana*	-	VBA (Site 9,23), eBird (Site 6,7)
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	-	VBA (Site 2,5,11,12,14,15,23,25), eBird (Site 1,2,6,7,15)
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	-	VBA (Site 23), eBird (Site 6,14)
Mammals			
Chocolate Wattled Bat	*Chalinolobus morio*	-	Baverstock
Common Brushtail Possum	*Trichosurus vulpecula*	-	VBA (Site 21), Baverstock, GFNC 2012
Eastern Freetail Bat	*Mormopterus ridei*	-	Baverstock
Eastern Grey Kangaroo	*Macropus giganteus*	-	Baverstock, GFNC 2012
Echidna	*Tachyglossus aculeatus*	-	Baverstock, GFNC 2012
Gould's Wattled Bat	*Chalinolobus gouldi*	-	Baverstock, GFNC 2012
Koala	*Phascolarctos cinereus*	-	VBA (Site 4,16), Baverstock, GFNC 2012
Large Forest Bat	*Vespadelus darlingtoni*	-	Baverstock, GFNC 2012
Lesser Long-eared Bat	*Nyctophilus geoffroyi*	-	Baverstock, GFNC 2012
Little Forest Bat	*Vespadelus vulturnus*	-	Baverstock, GFNC 2012
Southern Forest Bat	*Vespadelus regulus*	-	Baverstock
Southern Freetail Bat	*Mormopterus sp. 4*	-	Baverstock

Common Name	Scientific Name	Conservation Status[1]	Source[2]
Swamp Wallaby	*Wallabia bicolor*	-	Baverstock, GFNC 2012
White-striped Freetail Bat	*Tadarida australis*	-	Baverstock
Reptiles			
Garden Skink	*Lampropholis guichenoti*	-	GFNC 2012
Large Striped Skink	*Ctenotus robustus*	-	VBA (Site 17)
Frogs			
Banjo Frog	*Limnodynastes dumerilii*	-	GFNC 2012
Fish			
Flathead Gudgeon	*Philypnodon grandiceps*	-	VBA (Site 6,7), Biosis 2014
Common Galaxias	*Galaxias maculatus*	-	VBA (Site 6,7)
Congolli	*Pseudaphritis urvillii*	-	VBA (Site 6,7)
River Blackfish	*Gadopsis marmoratus*	-	VBA (Site 6,7)
Macquarie Perch	*Macquaria australasica*	EN, L, v	VBA (Site 9)
Shorthead Lamprey	*Mordacia mordax*	-	VBA (Site 7)
Southern Pygmy Perch	*Nannoperca australis*	-	VBA (Site 6,7)
Southern Shortfin Eel	*Anguilla australis*	-	VBA (Site 6,7), Biosis 2014
Spotted Galaxias	*Galaxias truttaceus*	-	VBA (Site 7)
Crustaceans			
Southern Victorian Spiny Crayfish	*Euastacus yarraensis*	-	VBA (Site 7)
INTRODUCED SPECIES			
Birds			
Common Blackbird	*Turdus merula*	-	VBA (Site 2,3,5,8,9,10,12,14,15,23,25), eBird (Site 6,7,14)
Common Myna	*Acridotheres tristis*	-	VBA (Site 14,23,25), eBird (Site 2,7)
Common Starling	*Sturnus vulgaris*	-	VBA (Site 2,4,5,9,14,15,23), eBird (Site 2,6,7,14), Biosis 2014
European Goldfinch	*Carduelis carduelis*	-	VBA (Site 2,3,4,5,11,15,1823), eBird (Site 6,7)
European Greenfinch	*Chloris chloris*	-	VBA (Site 5,14, 15,18,23), eBird (Site 2,6)
European Skylark	*Alauda arvensis*	-	VBA (Site 11,15,22,23), eBird (Site 2,7)
House Sparrow	*Passer domesticus*	-	VBA (Site 4,5,10,11,14,15,18,22,23), eBird (Site 2,6,7,13,14,15), Biosis 2014
Spotted Turtle-Dove	*Streptopelia chinensis*	-	VBA (Site 14)
Rock Dove	*Columba livia*	-	eBird (Site 13,14)
Mammals			
Black Rat	*Rattus rattus*	-	GFNC 2012
European Hare	*Lepus europeaus*	-	VBA (Site 21), GFNC 2012
European Rabbit	*Oryctolagus cuniculus*	-	GFNC 2012
House Mouse	*Mus musculus*	-	GFNC 2012
Red Fox	*Vulpes vulpes*	-	GFNC 2012
Fish			
Brown Trout	*Salmo trutta*	-	VBA (Site 27)
Eastern Gambusia	*Gambusia holbrooki*	-	Biosis 2014

Common Name	Scientific Name	Conservation Status[1]	Source[2]
European Carp	*Cyprinus carpio*	-	VBA (Site 6)
Redfin	*Perca fluviatilis*	-	VBA (Site 6,27)
Roach	*Rutilus rutilus*	-	VBA (Site 6)
Tench	*Tinca tinca*	-	VBA (Site 6)

Notes:

1) Listed as:
EN - Endangered under the EPBC Act
Threatened (L) under the FFG Act
Endangered (e), Vulnerable (v) or Near Threatened (nt) on the Victorian Advisory List (DEPI 2014)

2) Data sources (Section 2.1 and Table 1):

VBA Sites: Refer Figure 4

eBird Sites (Figure 4):

Site 1: Batesford
Site 2: Geelong-Ballan Road, b/w Midland Hwy and Evans Road, Batesford
Site 3: Myers Reserve (Bell Post Hill)
Site 4: Princes Fwy at Creamery Rd, Batesford
Site 5: Dog Rocks Rd at Blackall Rd, Batesford
Site 6: Moorabool River Reserve, Batesford
Site 7: Dog Rocks Sanctuary (Batesford)
Site 8: Dog Rocks Rd, b/w Blackall Rd and Fyansford-Gheringhap Rd, Batesford
Site 9: Hamilton Hwy at Friend in Hand Rd, Stonehaven
Site 10: Fyansford-Gheringhap Rd, b/w Hamilton Hwy and Dog Rocks Rd
Site 11: Hamilton Hwy, b/n Ring Road and Merrawarp Rd, Fyansford
Site 12: Princes Freeway at Moorabool River, Herne Hill
Site 13: Princes Freeway at Barwon River, Fyansford
Site 14: Barwon River, Merrawarp Rd, Ceres
Site 15: Merrawarp Rd, b/w Barwon River and Hamilton Hwy, Stonehaven

APPENDIX C – SIGNIFICANT FLORA SPECIES RECORDED WITHIN THE PROJECT LOCALITY

Table C1 Significant flora species recorded within 10 kilometres of the study area

Scientific name	Common name	Total # records[1]	Last documented record	EPBC[2]	FFG[3]	DEPI[4]	Likelihood of Occurrence[5]
NATIONAL SIGNIFICANCE							
Caladenia pumila	Dwarf Spider-orchid	2	1926	CR	L	e	4
Dianella amoena	Matted Flax-lily	1	2012	EN	L	e	**3**
Diuris basaltica	Small Golden Moths	1	1998	EN	L	e	4
Glycine latrobeana	Clover Glycine	1	1881	VU	L	v	**3**
Lachnagrostis adamsonii	Adamson's Blown-grass	8	2002	EN	L	v	**1**
Leucochrysum albicans var. *tricolor*	Hoary Sunray	-	#	EN	-	e	5
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	2	2013	CR	L	e	**1**
Prasophyllum frenchii	Maroon Leek-orchid	-	#	EN	L	e	5
Pterostylis cucullata	Leafy Greenhood	-	#	VU	L	v	5
Rutidosis leptorhynchoides	Button Wrinklewort	6	2010	EN	L	e	**3**
Senecio macrocarpus	Large-headed Fireweed	25	2016	VU	L	e	**2**
Thelymitra epipactoides	Metallic Sun-orchid	-	#	EN	L	e	5
Thelymitra matthewsii	Spiral Sun-orchid	-	#	VU	L	v	5
Xerochrysum palustre	Swamp Everlasting	-	#	VU	L	v	5
STATE SIGNIFICANCE							
Acacia cupularis	Cup Wattle	1	1983	-	-	r	4
Acacia uncifolia	Coast Wirilda	4	1884	-	-	r	5
Adriana quadripartita	Coast Bitter-bush	2	1885	-	-	v	5

Scientific name	Common name	Total # records[1]	Last documented record	EPBC[2]	FFG[3]	DEPI[4]	Likelihood of Occurrence[5]
Atriplex paludosa subsp. *paludosa*	Marsh Saltbush	4	1994	-	-	r	**3**
Avicennia marina subsp. *australasica*	Grey Mangrove	3	2003	-	-	r	**3**
Callitriche palustris var. *palustris*	Swamp Water-starwort	1	1986	-	-	k	5
Callitriche umbonata	Winged Water-starwort	1	1770	-	-	r	5
Cardamine tenuifolia	Slender Bitter-cress	1	1986	-	-	k	**3**
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed	1	2012	-	-	k	**2**
Corymbia maculata	Spotted Gum	1	2012	-	-	v	5
Cullen parvum	Small Scurf-pea	4	2001	-	L	e	4
Eucalyptus leucoxylon subsp. *bellarinensis*	Bellarine Yellow-gum	8	2012	-	L	e	5
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum	150	2014	-	-	v	**1**
Eucalyptus yarraensis	Yarra Gum	1	2008	-	-	r	**3**
Euphrasia scabra	Rough Eyebright	1	1770	-	L	e	5
Galium compactum	Compact Bedstraw	1	1885	-	-	r	5
Geranium solanderi var. solanderi s.s.	Austral Crane's-bill	-	Sourced from CoGG BioSite 1000364	-	-	v	**1**
Grevillea rosmarinifolia	Rosemary Grevillea	1	2008	-	-	r	**3**
Heterozostera tasmanica	Tasman Grass-wrack	1	1992	-	-	r	4
Lachnagrostis robusta	Salt Blown-grass	2	1997	-	-	r	**2**
Lepidosperma canescens	Hoary Rapier-sedge	1	2007	-	-	r	**3**
Maireana aphylla	Leafless Bluebush	2	1992	-	-	k	**3**

Scientific name	Common name	Total # records[1]	Last documented record	EPBC[2]	FFG[3]	DEPI[4]	Likelihood of Occurrence[5]
Malva preissiana s.s. (white-flowered coastal form)	Coast Hollyhock	-	Sourced from CoGG BioSite 1000364	-	-	v	**1**
Melaleuca armillaris subsp. *armillaris*	Giant Honey-myrtle	14	2012	-	-	r	5
Nicotiana maritima	Coast Tobacco	1	1986	-	-	e	5
Pleurosorus subglandulosus	Glandular Blanket-fern	1	1770	-	-	k	5
Poa billardierei	Coast Fescue	1	1885	-	-	r	5
Pomaderris halmaturina subsp. *continentis*	Glenelg Pomaderris	1	1883	-	-	r	5
Prasophyllum lindleyanum	Green Leek-orchid	1	1893	-	-	v	5
Prostanthera nivea var. *nivea*	Snowy Mint-bush	1	2006	-	-	r	**1**
Rhagodia parabolica	Fragrant Saltbush	12	2006	-	-	r	**1**
Rytidosperma richardsonii	Straw Wallaby-grass	1	1961	-	-	v	4
Salsola tragus subsp. *pontica*	Coast Saltwort	3	1992	-	-	r	5
Senecio cunninghamii var. *cunninghamii*	Branching Groundsel	1	1770	-	-	r	5
Thelymitra circumsepta	Naked Sun-orchid	1	1770	-	-	v	5
Triodia bunicola	Southern Porcupine Grass	1	1770	-	-	k	5
Tripogon loliiformis	Rye Beetle-grass	2	1998	-	-	r	**2**

Notes:

1) # - Species only nominated by the EPBC Act PMST (not previously recorded within 10 kilometres of the study area)
2) Listed as Critically Endangered (CR), Endangered (E) or Vulnerable (V) under the EPBC Act

3) Listed (L) under the FFG Act.

4) Listed as Endangered (e), Vulnerable (v), Rare (r) or Status Poorly Known (k) on the Victoria Advisory List (DEPI 2014)

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

APPENDIX D – SIGNIFICANT FAUNA SPECIES RECORDED WITHIN THE PROJECT LOCALITY

Table D1 Significant fauna species recorded within 10 kilometres of the study area

Common name	Scientific name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence[5]
NATIONAL SIGNIFICANCE							
Birds							
Australasian Bittern	*Botaurus poiciloptilus*	2002	9	EN	L	en	**2**
Plains-wanderer	*Pedionomus torquatus*	#	-	CR	L	cr	**2**
Australian Painted Snipe	*Rostratula australis*	1956	1	VU	L	cr	3
Swift Parrot	*Lathamus discolor*	2006	10	CR	L	en	**1**
Orange-bellied Parrot	*Neophema chrysogaster*	1986	3	CR	L	cr	4
Regent Honeyeater	*Anthochaera phrygia*	1993	2	CR	L	cr	4
Painted Honeyeater	*Grantiella picta*	#	-	VU	L	vu	**2**
Mammals							
Swamp Antechinus	*Antechinus minimus maritimus*	#	-	VU	L	nt	3
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	1964	1	EN	L	nt	4
Eastern Barred Bandicoot	*Perameles gunnii*	1977	15	EN	L	ex	4
Long-nosed Potoroo	*Potorous tridactylus tridactylus*	#	-	VU	L	nt	4
Grey-headed Flying-fox	*Pteropus poliocephalus*	2002	9	VU	L	vu	**2**
Reptiles							
Striped Legless Lizard	*Delma impar*	1992	1	VU	L	en	**2**
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	#	1	EN	L	cr	4
Frogs							
Growling Grass Frog	*Litoria raniformis*	2010	11	VU	L	en	**2**
Fish							
Dwarf Galaxias	*Galaxiella pusilla*	#	-	VU	L	en	3

Common name	Scientific name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence[5]
Australian Grayling	*Prototroctes maraena*	1998	47	VU	L	vu	**2**
Murray Cod	*Maccullochella peelii*	1873	1	VU	L	vu	3
Macquarie Perch	*Macquaria australasica*	1981	6	EN	L	en	4
Yarra Pygmy Perch	*Nannoperca obscura*	2014	34	VU	L	vu	**2**
Invertebrates							
Golden Sun Moth	*Synemon plana*	2009	1	CR	L	cr	**2**
STATE SIGNIFICANCE							
Birds							
Magpie Goose	*Anseranas semipalmata*	1999	12	-	L	nt	3
Musk Duck	*Biziura lobata*	2006	27	-	-	vu	3
Freckled Duck	*Stictonetta naevosa*	1979	1	-	L	en	3
Australasian Shoveler	*Anas rhynchotis*	1999	12	-	-	vu	3
Hardhead	*Aythya australis*	2013	62	-	-	vu	**2**
Blue-billed Duck	*Oxyura australis*	1979	3	-	L	en	**2**
Diamond Dove	*Geopelia cuneata*	1977	1	-	L	nt	4
White-throated Needletail	*Hirundapus caudacutus*	2000	14	-	-	vu	**2**
Little Bittern	*Ixobrychus minutus dubius*	1970	1	-	L	en	3
Eastern Great Egret	*Ardea modesta*	2014	169	-	L	vu	**1**
Intermediate Egret	*Ardea intermedia*	2001	14	-	L	en	**2**
Little Egret	*Egretta garzetta nigripes*	2014	170	-	L	en	**2**
Square-tailed Kite	*Lophoictinia isura*	2008	1	-	L	vu	3
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	2007	6	-	L	vu	3
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	2007	25	-	L	vu	**1**
Black Falcon	*Falco subniger*	2012	7	-	-	vu	**2**
Brolga	*Grus rubicunda*	2012	5	-	L	vu	3
Lewin's Rail	*Lewinia pectoralis pectoralis*	2006	8	-	L	vu	**2**

Common name	Scientific name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence[5]
Baillon's Crake	*Porzana pusilla palustris*	2010	15	-	L	vu	**1**
Major Mitchell's Cockatoo	*Lophocroa leadbeateri*	1999	2	-	L	vu	4
Powerful Owl	*Ninox strenua*	1976	4	-	L	vu	**2**
Barking Owl	*Ninox connivens connivens*	1993	2	-	L	en	**2**
Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	2004	11	-	-	nt	**2**
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	1907	3	-	L	vu	3
Speckled Warbler	*Chthonicola sagittatus*	1976	5	-	L	vu	**2**
Hooded Robin	*Melanodryas cucullata cucullata*	1971	2	-	L	nt	**2**
Diamond Firetail	*Stagonopleura guttata*	1979	4	-	L	nt	**2**
Mammals							
Common Dunnart	*Sminthopsis murina murina*	1964	2	-	-	vu	**2**
Crustaceans							
Western Burrowing Crayfish	*Engaeus merosetosus*	2014	5	-	-	en	**2**
Invertebrates							
Yellow Sedge-skipper	*Hesperilla flavescens flavescens*	1988	1	-	L	vu	4
REGIONAL SIGNIFICANCE							
Birds							
Pied Cormorant	*Phalacrocorax varius*	2014	132	-	-	nt	3
Black-faced Cormorant	*Phalacrocorax fuscescens*	2001	2	-	-	nt	4
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2010	64	-	-	nt	**1**
Glossy Ibis	*Plegadis falcinellus*	1978	1	-	-	nt	3
Royal Spoonbill	*Platalea regia*	2014	124	-	-	nt	**2**
Spotted Harrier	*Circus assimilis*	2013	9	-	-	nt	**1**
Latham's Snipe	*Gallinago hardwickii*	2014	133	-	-	nt	**2**
Little Button-quail	*Turnix velox*	1977	2	-	-	nt	3
Australian Pratincole	*Stiltia isabella*	1985	1	-	-	nt	3

Common name	Scientific name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence[5]
Azure Kingfisher	*Alcedo azurea*	1999	4	-	-	nt	2
Spotted Quail-thrush	*Cinclosoma punctatum*	1976	2	-	-	nt	3
Mammals							
Fat-tailed Dunnart	*Sminthopsis crassicaudata*	1973	2	-	-	nt	2

Notes:

1) # - Species only nominated by the EPBC Act PMST (not previously recorded within 10 kilometres of the study area)

2) Listed as Critically Endangered (CR), Endangered (E) or Vulnerable (V)) under the EPBC Act

3) Listed (L) under the FFG Act

4) Listed as Extinct (ex), Critically Endangered (cr), Endangered (e), Vulnerable (v) or Near Threatened (nt) on the Victoria Advisory List (DSE 2009;2013).

5) Likelihood of occurrence:

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 (VBA 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 2011b); 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.

APPENDIX E - COUNCIL MAPPED BIOSITES

Table E1 Council Mapped BioSites

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1000143	895	Escarpment Shrubland	-	-	On-site survey	1.010	-	*Rytidosperma caespitosum* Common Wallaby-grass, *Dichondra repens* Kidney-weed, *Austrostipa scabra* Rough Spear-grass, *Austrostipa* spp. Spear Grass
1000144	56	Floodplain Riparian Woodland	-	-	On-site survey	0.008	-	-
1000145	72	Granitic Hills Woodland	Not applicable	Private	On-site survey	143.938		*Acacia mearnsii* Black Wattle, *Acacia melanoxylon* Blackwood, *Acacia paradoxa* Hedge Wattle, *Acacia pycnantha* Golden Wattle, *Acaena echinata* Sheep's Burr, *Agave americana* Century Plant, *Aira caryophyllea* subsp. *caryophyllea* Silvery Hair- grass, *Aira elegantissima* Delicate Hair-grass, *Amyema miquelii* Box Mistletoe, *Lysimachia arvensis* Pimpernel, *Aphanes arvensis* Parsley Piert, *Aphelia pumilio* Dwarf Aphelia, *Arctotheca calendula* Cape weed, *Arthropodium minus* Small Vanilla-lily, *Asparagus asparagoides* Bridal Creeper, *Astroloma humifusum* Cranberry Heath, *Briza maxima* Large Quaking-grass, *Briza minor* Lesser Quaking-grass, *Bursaria spinosa* subsp. *spinosa* Sweet Bursaria, *Calandrinia calyptrata* Pink *Purslane,Carduus tenuiflorus* Winged Slender-thistle, *Carpobrotus modestus* Inland Pigface, *Cassytha glabella* Slender Dodder-laurel, *Allocasuarina verticillata* Drooping Sheoak, *Centaurium erythraea* Common Centaury, *Centrolepis strigosa* subsp. *strigosa* Hairy Centrolepis, *Cerastium glomeratum s.l.* Common Mouse-ear Chickweed, *Cheilanthes austrotenuifolia* Green Rock-fern, *Cirsium vulgare* Spear Thistle, *Convolvulus erubescens spp. agg*. Pink Bindweed, *Correa glabra var. glabra* Rock Correa, *Cotula australis* Common Cotula, *Crassula decumbens var. decumbens* Spreading Crassula, *Crassula closiana* Stalked Crassula, *Crassula sieberiana s.l. Sieber* Crassula, *Dactylis glomerata* Cocksfoot, *Rytidosperma erianthum* Hill Wallaby-grass, *Rytidosperma geniculatum* Kneed Wallaby-grass, *Rytidosperma racemosum var. racemosum* Slender Wallaby-grass, *Dichondra repens* Kidney-weed, *Drosera glanduligera* Scarlet Sundew, *Drosera aberrans* Scented Sundew, *Ehrharta erecta var. erecta* Panic Veldt-grass, *Ehrharta longiflora* Annual Veldt-grass, *Einadia nutans* Nodding Saltbush, *Erodium cicutarium* Common Heron's-bill, *Eucalyptus camaldulensis* River Red-gum, *Exocarpos cupressiformis* Cherry Ballart, *Exocarpos strictus* Pale-fruit Ballart, *Freesia alba x Freesia leichtlinii* Freesia hybrid,*Fumaria bastardii* Bastard's Fumitory, *Galium aparine* Cleavers, *Galium murale* Small Goosegrass, *Gladiolus undulatus* Wild Gladiolus,

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
								Euchiton japonicus s.s. Creeping Cudweed, *Euchiton sphaericus* Annual Cudweed, *Gonocarpus elatus* Tall Raspwort, *Gonocarpus tetragynus* Common Raspwort, *Goodenia ovata* Hop Goodenia, *Hedypnois rhagadioloides* Hedypnois, *Hyalosperma demissum* Moss Sunray, *Hibbertia riparia* Erect Guinea-flower, *Hydrocotyle callicarpa* Small Pennywort, *Hypericum gramineum spp. agg*. Small St John's Wort, *Hypochaeris glabra* Smooth Cat's-ear, *Hypochaeris radicata* Flatweed, *Isolepis marginata* Little Club-sedge, *Juncus capitatus* Capitate Rush, *Juncus planifolius* Broad-leaf Rush, *Kunzea ericoides spp. agg*. Burgan, *Leontodon taraxacoides* subsp. *taraxacoide*s Hairy Hawkbit, *Lepidosperma curtisiae* Little Sword-sedge, *Lolium rigidum* Wimmera Rye-grass, *Lomandra filiformis* Wattle Mat-rush, *Lycium ferocissimum* African Box-thorn, *Lysiana exocarpi* Harlequin Mistletoe, *Medicago polymorpha* Burr Medic, *Microlaena stipoides var. stipoides* Weeping Grass, *Moenchia erecta* Erect Chickweed, *Nassella trichotoma* Serrated Tussock, *Oxalis exilis* Shady Wood-sorrel, *Oxalis pes-caprae* Soursob,*Parietaria debilis* s.l. Shade Pellitory, *Phalaris aquatica* Toowoomba Canary-grass, *Pimelea humilis* Common Rice-flower, *Pinus radiata* Radiata Pine, *Plantago lanceolata* Ribwort, *Plantago varia* Variable Plantain, *Polycarpon tetraphyllum* Four-leaved Allseed, *Poranthera microphylla* s.l. Small Poranthera, ***Prostanthera nivea var. nivea*** Snowy Mint-bush, *Rapistrum rugosum* Giant Mustard, *Reseda luteola* Weld, *Rhamnus alaternus* Italian Buckthorn, *Rosa rubiginosa* Sweet Briar, *Siloxerus multiflorus* Small Wrinklewort, *Schinus molle* Pepper Tree, *Schoenus apogon* Common Bog-sedge, *Sherardia arvensis* Field Madder, *Silybum marianum* Variegated Thistle, *Solanum laciniatum* Large Kangaroo Apple, *Sonchus asper s*.l. Rough Sow-thistle, *Sonchus oleraceus* Common Sow-thistle, *Sporobolus africanus* Rat-tail Grass, *Stellaria media* Chickweed, *Stellaria pallida* Lesser Chickweed, *Stuartina muelleri* Spoon Cudweed, *Themeda triandra* Kangaroo Grass, *Thysanotus patersonii* Twining Fringe-lily, *Trifolium arvense var. arvense* Hare's-foot Clover, *Trifolium campestre var. campestre* Hop Clover, *Trifolium dubium* Suckling Clover, *Trifolium glomeratum* Cluster Clover, *Trifolium repens var. repens* White Clover, *Vulpia muralis* Wall Fescue, *Agapanthus praecox subsp. orientalis* Agapanthus, *Vulpia myuros f. myuros* Rat's-tail Fescue, *Clematis microphylla var. microphylla spp. agg*. Small-leaved Clematis, *Epilobium billardierianum subsp. cinereum* Grey Willow-herb, *Lomandra longifolia subsp. longifolia* Spiny-headed Mat-rush, *Cerastium glomeratum s.s*. Sticky Mouse-ear Chickweed, *Bursaria spinosa* Sweet Bursaria, *Callitris spp*. Cypress-pine, *Crassula spp*. Crassula, *Microtis spp*. Onion Orchid, *Petrorhagia spp*. Pink, *Austrostipa spp*. Spear Grass, *Trifolium spp.* Clover
1000146	-	No Indigenous Vegetation	Not applicable	Private	On-site survey	0.008	-	-
1000147	-	No Indigenous	Not	Roadside	On-site	0.008	-	-

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
		Vegetation	applicable		survey			
1000148	72	Granitic Hills Woodland	Not applicable	Private	On-site survey	0.008	-	-
1000149	175	Grassy Woodland	Not applicable	Private	On-site survey	0.008	-	-
1000150	0	No Indigenous Vegetation	Not applicable	Private	On-site survey	0.008	-	-
1000151	72	Granitic Hills Woodland	Not applicable	Private	On-site survey	0.008	-	-
1000152	72	Granitic Hills Woodland	Not applicable	Private	On-site survey	0.008	-	-
1000153	175	Grassy Woodland	Not applicable	Private	On-site survey	0.008	-	-
1000154	-	No Indigenous Vegetation	Not applicable	Private	On-site survey	0.008	-	-
1000156	-	No Indigenous Vegetation	Not applicable	Private	On-site survey	0.008	-	-
1000157	56	Floodplain Riparian Woodland	Moorabool River	Private	On-site survey	0.008	-	-
1000259	132	Plains Grassland	Not applicable	Railway Reserve	On-site survey	4.736	-	*Asperula conferta* Common Woodruff, *Calocephalus citreus* Lemon Beauty-heads, *Convolvulus erubescens spp. agg*. Pink Bindweed, *Einadia nutans* Nodding Saltbush, *Maireana decalvans s.*l. Black Cotton-bush, *Plantago gaudichaudii* Narrow Plantain, *Ptilotus macrocephalus* Feather Heads, *Ptilotus spathulatus* Pussy Tails, *Themeda triandra* Kangaroo Grass, ***Pimelea spinescens*** **subsp. *spinescens* Spiny Rice-flower**, *Lomandra micrantha s.s*. Small-flower Mat-rush, *Danthonia s.l. spp*. Wallaby Grass, *Austrostipa spp*. Spear Grass, *Wahlenbergia spp*. Bluebell
1000261	55	Plains Grassy Woodland	Not applicable	Private	Air photo interpretation	1.525	-	*Eucalyptus camaldulensis* River Red-gum
1000284	175	Grassy	Not	Private	On-site	0.008	-	-

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
		Woodland	applicable		survey			
1000354	56	Floodplain Riparian Woodland	Moorabool River	-	Air photo interpretation	66.451	-	*Eucalyptus camaldulensis* River Red-gum
1000362	56	Floodplain Riparian Woodland	Moorabool River	-	Air photo interpretation	16.866	-	-
1000363	56	Floodplain Riparian Woodland	Moorabool River	-	Air photo interpretation	42.007	-	-
1000364	56	Floodplain Riparian Woodland	Barwon River	-	Air photo interpretation	128.060	-	*Acacia dealbata* Silver Wattle, *Acacia melanoxylon* Blackwood, *Acacia verticillata* Prickly Moses *Acaena novae-zelandiae* Bidgee-widgee, *Calystegia sepium subsp. roseata* Large Bindweed, *Epilobium hirtigerum* Hairy Willow-herb, *Eucalyptus camaldulensis* River Red-gum, *Galium murale* Small Goosegrass, *Goodenia ovata* Hop Goodenia, *Juncus pallidus* Pale Rush, *Leptospermum lanigerum* Woolly Tea-tree, *Lomandra longifolia* Spiny-headed Mat-rush, *Duma florulenta* Tangled Lignum, *Phragmites australis* Common Reed, *Poa labillardierei* Common Tussock-grass, *Raphanus raphanistrum* Wild Radish, *Rubus parvifolius* Small-leaf Bramble *Gynatrix pulchella s.s.* Hemp Bush, *Triglochin procera s.s.* Common Water-ribbons, *Malva preissiana s.s.* (white-flowered coastal form) **Coast Hollyhock**, ***Geranium solanderi var. solanderi* s.s. Austral Crane's-bill**, *Azolla spp.* Azolla, *Fraxinus spp.* Ash
1000406	0	No Indigenous Vegetation	Dog Rocks	Private	On-site survey	0.008	-	-
1000407	0	No Indigenous Vegetation	Dog Rocks	Private	On-site survey	0.008	-	-
1002310	55_61	Plains Grassy Woodland	Evans Rd	Roadside	EHP	0.023	0.01	*Acacia paradoxa* Hedge Wattle, *Dactylis glomerata* Cocksfoot, *Rytidosperma caespitosum* Common Wallaby-grass, *Galenia pubescens var. pubescens* Galenia, *Lomandra filiformis* Wattle Mat-rush, *Plantago lanceolata* Ribwort, *Austrostipa bigeniculata* Kneed Spear-grass, *Nassella neesiana* Chilean Needle-grass
1002311	132_63	Low-rainfall Plains Grassland	Pennsylvania Ave	Roadside	EHP	0.034	0.01	*Chloris truncata* Windmill Grass, *Rytidosperma caespitosum* Common Wallaby-grass, *Rytidosperma racemosum var. racemosum* Slender Wallaby-grass, *Galenia pubescens var. pubescens* Galenia, *Plantago lanceolata* Ribwort

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002312	132_63	Low-rainfall Plains Grassland	Old Ballarat Rd	Roadside	EHP	0.018	0.01	-
1002480	55_61	Plains Grassy Woodland	Moorabool River Reserve, Batesford	Crown	EHP	0.051	0.01	*Dactylis glomerata* Cocksfoot, *Rytidosperma caespitosum* Common Wallaby-grass, *Juncus subsecundus* Finger Rush, *Microlaena stipoides var. stipoides* Weeping Grass, *Oxalis pes-caprae* Soursob, *Plantago lanceolata* Ribwort, *Poa labillardierei* Common Tussock-grass, *Persicaria prostrata* Creeping Knotweed
1002481	641	Riparian Woodland	Moorabool River Reserve, Batesford	Crown	EHP	0.681	0.19	*Acacia melanoxylon* Blackwood, *Dactylis glomerata* Cocksfoot, *Eucalyptus camaldulensis* River Red-gum, *Melicytus dentatus s.l.* Tree Violet, *Nassella trichotoma* Serrated Tussock, *Phragmites australis* Common Reed, *Poa labillardierei* Common Tussock-grass, *Raphanus raphanistrum* Wild Radish, *Solanum aviculare* Kangaroo, Apple, *Vinca major* Blue Periwinkle, *Populus spp.* Poplar
1002482	641	Riparian Woodland	Moorabool River Reserve, Batesford	Crown	EHP	0.020	0	*Dactylis glomerata* Cocksfoot, *Juncus subsecundus* Finger Rush, *Nassella trichotoma* Serrated Tussock, *Poa labillardierei* Common Tussock-grass, *Vinca major* Blue Periwinkle, *Lachnagrostis filiformis s.s.* Common Blown-grass, *Ulmus X hollandica* Dutch Elm
1002483	641	Riparian Woodland	Moorabool River Reserve, Batesford	Crown	EHP	3.107	1.31	*Acacia melanoxylon* Blackwood, *Acacia longifolia subsp. sophorae* Coast Wattle, *Atriplex semibaccata* Berry Saltbush, *Azolla filiculoides* Pacific Azolla, *Callistemon sieberi* River Bottlebrush, *Carex breviculmis* Common Grass-sedge, *Carex tereticaulis* Poong'ort, *Cirsium vulgare* Spear Thistle, *Clematis microphylla s.l.* Small-leaved Clematis, *Dactylis glomerata* Cocksfoot, *Dodonaea viscosa* Sticky Hop-bush, *Ehrharta erecta var. erecta* Panic Veldt-grass, *Einadia nutans* Nodding Saltbush, *Enchylaena tomentosa var. tomentosa* Ruby Saltbush, *Eucalyptus camaldulensis* River Red-gum, *Galenia pubescens var. pubescens* Galenia, *Melicytus dentatus s.l.* Tree Violet, *Ficinia nodosa* Knobby Club-sedge, *Juncus pallidus* Pale Rush, *Leptospermum continentale* Prickly Tea-tree, *Lomandra longifolia* Spiny-headed Mat-rush, *Microlaena stipoides var. stipoides* Weeping Grass, *Oxalis perennans* Grassland Wood-sorrel, *Oxalis pes-caprae* Soursob, *Paspalum distichum* Water Couch, *Phalaris aquatica* Toowoomba Canary-grass, *Phragmites australis* Common Reed, *Poa labillardierei* Common Tussock-grass, *Raphanus raphanistrum* Wild Radish, *Schinus molle* Pepper Tree, *Solanum aviculare* Kangaroo Apple, *Stellaria pungens* Prickly Starwort, *Triglochin striata* Streaked Arrowgrass, *Vinca major* Blue Periwinkle, *Triglochin procera s.s.* Common Water-ribbons, *Carex spp.* Sedge, *Salix spp.* Willow, *Senecio spp.* Groundsel

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002484	641	Riparian Woodland	Moorabool River, Batesford	Crown	EHP	3.380	1.52	*Acacia mearnsii* Black Wattle, *Acacia paradoxa* Hedge Wattle, *Asparagus asparagoides* Bridal Creeper, *Briza maxima* Large Quaking-grass, *Bromus diandrus* Great Brome, *Carex breviculmis* Common Grass-sedge, *Carex brownii* Stream Sedge, *Carpobrotus modestus* Inland Pigface, *Cassinia arcuata* Drooping Cassinia, *Allocasuarina verticillata* Drooping Sheoak, *Ehrharta erecta var. erecta* Panic Veldt-grass, *Eleocharis acuta* Common Spike-sedge, *Eucalyptus viminalis* Manna Gum, *Euphorbia lathyris* Caper Spurge, *Exocarpos strictus* Pale-fruit Ballart *Galenia pubescens var. pubescens* Galenia, *Juncus pallidus* Pale Rush, *Leptospermum lanigerum* Woolly Tea-tree, *Microlaena stipoides var. stipoides* Weeping Grass, *Myoporum insulare* Common Boobialla, *Pteridium esculentum* Austral Bracken, *Raphanus raphanistrum* Wild Radish, *Rhagodia candolleana subsp. candolleana* Seaberry Saltbush, ***Rhagodia parabolica*** **Fragrant Saltbush**, *Austrostipa acrociliata* Graceful Spear-grass, *Austrostipa scabra* Rough Spear-grass, *Vinca major* Blue Periwinkle, *Lepidosperma gunnii* Slender Sword-sedge *Dianella admixta* Black-anther Flax-lily, *Bursaria spinosa* Sweet Bursaria, *Myriophyllum spp*. Water Milfoil, *Anthosachne scabra* s.s. Common Wheat-grass
1002485	71	Hills Herb-rich Woodland	Moorabool River Reserve, Batesford	-	-	1.464	0.5	*Acacia mearnsii* Black Wattle, *Asparagus asparagoides* Bridal Creeper, *Bromus diandrus* Great Brome, *Carpobrotus modestus* Inland Pigface, *Cassinia arcuata* Drooping Cassinia, *Allocasuarina verticillata* Drooping Sheoak, *Chrysanthemoides monilifera* Boneseed, *Ehrharta erecta var. erecta* Panic Veldt-grass, *Eucalyptus camaldulensis* River Red-gum, *Eucalyptus melliodora* Yellow Box, *Exocarpos cupressiformis* Cherry Ballart, *Galenia pubescens var. pubescens* Galenia, *Microlaena stipoides var. stipoides* Weeping Grass, *Rhagodia candolleana subsp. candolleana* Seaberry Saltbush, ***Rhagodia parabolica*** **Fragrant Saltbush**, *Austrostipa scabra* Rough Spear-grass, *Themeda triandra* Kangaroo Grass, *Vinca major* Blue Periwinkle, *Dianella admixta* Black-anther Flax-lily, *Bursaria spinosa* Sweet Bursaria
1002486	641	Riparian Woodland	Moorabool River Reserve, Batesford	Crown	EHP	2.330	-	*Acacia mearnsii* Black Wattle, *Acacia paradoxa* Hedge Wattle, *Asparagus asparagoides* Bridal Creeper, *Carex breviculmis* Common Grass-sedge, *Carpobrotus modestus* Inland Pigface, *Cassinia arcuata* Drooping Cassinia, *Cassytha pubescens s.s.* Downy Dodder-laurel, *Allocasuarina verticillata* Drooping Sheoak, *Chrysanthemoides monilifera* Boneseed, *Ehrharta erecta var. erecta* Panic Veldt-grass, *Eleocharis acuta* Common Spike-sedge, *Eucalyptus melliodora* Yellow Box, *Eucalyptus tricarpa* Red Ironbark, *Exocarpos cupressiformis* Cherry Ballart, *Exocarpos strictus* Pale-fruit Ballart, *Galenia pubescens var. pubescens* Galenia, *Goodenia ovata* Hop Goodenia, *Juncus pallidus* Pale Rush, *Kunzea ericoides spp. agg*. Burgan, *Leptospermum lanigerum* Woolly Tea-tree, *Microlaena stipoides var. stipoides* Weeping Grass, *Raphanus raphanistrum* Wild Radish, *Rhamnus alaternus* Italian Buckthorn, *Austrostipa scabra* Rough Spear-grass, *Themeda triandra* Kangaroo Grass, *Typha domingensis* Narrow-leaf

Site No	EVC No	EVC Name	Property Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
								Cumbungi, *Vinca major* Blue Periwinkle, *Lepidosperma gunnii* Slender Sword-sedge, *Dianella admixta* Black-anther Flax-lily, *Centrolepis spp*. Centrolepis, *Myriophyllum spp*. Water Milfoil, *Anthosachne scabra s.s*. Common Wheat-grass
1002487	55_61	Plains Grassy Woodland	Moorabool River Reserve, Batesford	Crown	EHP	0.384	-	*Acacia mearnsii* Black Wattle, *Atriplex semibaccata* Berry Saltbush, *Carpobrotus rossii* Karkalla, *Cirsium vulgare* Spear Thistle, *Dactylis glomerata* Cocksfoot, *Rytidosperma caespitosum* Common Wallaby-grass, *Ehrharta calycina* Perennial Veldt-grass, *Ehrharta erecta var. erecta* Panic Veldt-grass, *Einadia nutans* Nodding Saltbush, *Enchylaena tomentosa var. tomentosa* Ruby Saltbush, *Eucalyptus camaldulensis* River Red-gum, *Galenia pubescens var. pubescens* Galenia, *Raphanus raphanistrum* Wild Radish, *Solanum aviculare* Kangaroo Apple, *Austrostipa bigeniculata* Kneed Spear-grass, *Austrostipa scabra* Rough Spear-grass

Notes:

1) Significant species highlighted Bold