

**DINGLEY CORRIDOR – WARRIGAL ROAD TO
WESTALL ROAD**

FLORA AND FAUNA ASSESSMENT

VicRoads Eastern Projects



Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

25 Burwood Road, Hawthorn, Vic. 3122

P.O. Box 74, Richmond, Vic. 3121

Ph. (03) 9815 2111

Fax. (03) 9815 2685

December 2010

Report No. 8094(8.1)

ISSUE AND REVISION RECORD

Version	Date	Author/s	Reviewer	Revisions
8.0	04/11/10	Justin Sullivan, Teisha Sloane	Alan Brennan	Initial draft
8.1	16/12/10	Alan Brennan	Alan Brennan	Final report

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1. EXECUTIVE SUMMARY

VicRoads Eastern Projects engaged Brett Lane and Associates Pty. Ltd. to conduct a flora and fauna assessment of a number of parcels of land along a six kilometre proposed road corridor from Warrigal Road to Westall Road Extension, Dingley, southeast of Melbourne.

Fourteen remnant patches of native vegetation comprising the following Ecological Vegetation Classes were recorded within the study area:

- Damp Sands herb-rich Woodland (EVC 3);
- Swamp Scrub (EVC 53);
- Plains Grassy Woodland (EVC 55);
- Creekline Grassy Woodland (EVC 68); and
- Plains Grassy Wetland (EVC 125).

No threatened flora species were recorded during the current survey.

Suitable habitat for Growling Grass Frog, Southern Brown Bandicoot and Southern Toadlet was recorded within the study area.

The following implications would pertain to the current development proposal:

- A planning permit is required under Clause 52.17 for the removal of native vegetation within the proposed road corridor for this project;
- The current proposal would trigger a referral to DSE due to the proposed removal of more than 0.5 hectares of an endangered or vulnerable vegetation type;
- Offsets would be required to compensate for the loss of native vegetation within the proposed road corridor. Habitat hectare and scattered tree assessments are required to determine the quality of native vegetation present and offsets required for their removal;
- Targeted surveys are required for the Growling Grass Frog, Southern Brown Bandicoot and Southern Toadlet which were found to have the potential to be present in the study area and to be impacted on by the proposal. Timing of targeted surveys for threatened fauna is strictly seasonal. Survey periods for targeted surveys that may be required in the study area are listed below:
 - Growling Grass Frog (October to March);
 - Southern brown Bandicoot (All year round); and
 - Southern Toadlet (March to July).
- The submission of a Referral under the EPBC Act would be considered prudent if the Southern Brown Bandicoot and/or Growling Grass Frog are found to potentially be significantly impacted upon by the proposed development.
- The Responsible Authority will consider impacts on the Southern Toadlet if found to be present in the study area.

2. INTRODUCTION

VicRoads Eastern Projects engaged Brett Lane and Associates Pty Ltd to conduct a Flora and Fauna Assessment of a number of parcels of land along a six kilometre proposed road corridor from Warrigal Road to Westall Road Extension, Dingley, in southeast Melbourne.

This investigation was commissioned to provide information on the extent and condition of native vegetation and fauna habitat in the study area. This report outlines any implications under various national, state and local legislation and policy, including Victoria's Native Vegetation Management Framework (DNRE 2002), referred to herein as the 'Framework'.

Specifically, the scope of the investigation included:

- A review of existing information (e.g. DSE Flora Information System and Atlas of Victorian Wildlife; EPBC Act Protected Matters Search Tool);
- A site survey involving:
 - Characterisation and mapping of remnant native vegetation on the site;
 - Assessment of the nature and quality of native fauna habitat;
 - Assessment of the likelihood of occurrence of threatened flora and fauna in the area; and
 - Compilation of flora and fauna species lists for the site.
- Preparation of an overview map of the site showing the extent of any native vegetation and fauna habitat; and
- Preparation of this report.

This report is divided into the following sections:

Section 3 describes the sources of information, including the methods used for the field survey.

Section 4 provides an overview of the characteristics of the study area.

Section 5 presents the investigation results, describing the flora and fauna of the study area.

Section 6 discusses the implications of the findings under relevant Commonwealth, State and local legislation and policies.

Section 7 provides recommendations to inform the design process and assist the development of a minimum impact proposal.

This investigation was undertaken by a team from Brett Lane & Associates Pty Ltd, comprising Justin Sullivan (Botanist), Teisha Sloane (Zoologist) and Alan Brennan (Senior Ecologist & Project Manager).

3. SOURCES OF INFORMATION

3.1. Existing information

Existing information regarding flora and fauna utilised as part of this investigation is described below. Note that ‘study area’ refers to the six kilometre proposed route for the Dingley Freeway between Warrigal Road and Westall Road Extension. Existing information has been obtained from a wider area, termed the ‘search region’ defined for this assessment as an area with radius five kilometres along the proposed alignment of coordinates: latitude 37° 56’ 19” S and longitude 145° 04’ 47” E to latitude 37° 58’ 07” S and longitude 145° 08’ 07” E.

The following previous reports on the study area were reviewed:

- Preliminary Ecological Assessment for 12 kilometres of proposed roadway between the South Gippsland Freeway and Warrigal Road – Biosis Research Pty. Ltd. October 2008.

3.1.1. Flora

A list of the flora species recorded in the search region was obtained from the Viridans Flora Information System (FIS), a database administered by the Department of Sustainability and Environment (DSE) (Viridans Biological Databases 2010a). This database search listed all plant species, including rare and threatened plants found in the search region. Plant taxonomy used throughout this report follows the FIS standards.

The likelihood of suitable habitat in the study area for nationally threatened flora species was ascertained through a search of the online *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (DEWHA 2010) using the same search region.

3.1.2. Ecological Vegetation Classes

Pre-1750 (pre-European settlement) vegetation mapping was reviewed to determine the type of native vegetation likely to occur in the study area. Information on Ecological Vegetation Classes was obtained from published EVC benchmarks. These sources included:

- Relevant EVC benchmarks for the Gippsland Plain bioregion¹ (DSE 2010a); and
- Biodiversity Interactive Maps (DSE 2010b).

3.1.3. Fauna

A list of the fauna species recorded in the search region was obtained from the Atlas of Victorian Wildlife (AVW), a database administered by DSE (Viridans Biological Databases 2010b). Fauna taxonomy used throughout this report follows the AVW nomenclature.

¹ A bioregion is defined as “a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values”. In general bioregions reflect underlying environmental features of the landscape (DNRE 1997).

The presence or likelihood of occurrence in the study area of nationally threatened fauna species was obtained through the EPBC Act Protected Matters Search Tool (DEWHA 2010).

3.2. Field methodology

The field assessment was conducted on the 28th September 2010. During this assessment, the study area was inspected initially by vehicle and areas supporting remnant native vegetation and/or fauna habitat were surveyed in more detail on foot.

Sites in the study area found to support native vegetation and/or habitat for rare or threatened flora and fauna were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing.

3.2.1. Flora

Incidental records of flora species were made based on intuitive sampling methods within all vegetation types and landforms. Specimens requiring identification using laboratory techniques were collected.

3.2.2. Native vegetation

Native vegetation in Victoria has been defined by the DSE as belonging to three categories:

- Remnant patch;
- Scattered trees; and
- Degraded treeless vegetation.

A description of these is provided below with the prescribed DSE methods to assess them. Wetlands are not assessed as native vegetation under the Framework.

Remnant patch

Remnant patches of native vegetation comprise indigenous plant species considered part of a clearly definable EVC and are defined by the DSE as:

- An area of native vegetation, with or without trees, where at least 25% of the understorey cover is indigenous (excluding bare ground); and/or
- “A group (i.e. three or more) of trees where the tree canopy cover is at least 20%” (DSE 2007a).

Scattered trees

DSE (2007a) define scattered trees as indigenous canopy trees with a diameter at breast height (1.3 metres) (DBH) greater than ten centimetres “within an area where at least 75% of the total understorey plant cover is introduced vegetation and the overall canopy cover for a group (i.e. three or more) of trees is less than 20%”.

Degraded treeless vegetation

Degraded treeless vegetation comprises all other vegetation (DSE 2007a) including:

- Treeless vegetation with less than 25% total cover of indigenous species (excluding bare ground); or
- Treeless vegetation that has greater than 25% total cover of indigenous species (excluding bare ground) but is dominated by a small number of opportunistic native species which were unlikely to have been dominant prior to a disturbance event (e.g. cropping).

3.2.3. Fauna

The following techniques were used to detect fauna species inhabiting the study area:

- Incidental searches for mammal scats, tracks and signs (e.g. diggings, signs of feeding and nests/burrows);
- Turning over logs and other ground debris for reptiles, frogs and mammals;
- Bird observation during the day; and
- General searches for reptiles and frogs; including identification of frog calls in seasonally wet areas

Fauna habitat types were characterised in the study area and are described in Section 5.2.1. The quality of fauna habitat was assessed based on the criteria detailed below. These are based on habitat components which include including old-growth trees, fallen timber, leaf litter, surface rocks. Three quality categories were used, as described below:

High: The majority of fauna habitat components are present and habitat linkages to other remnant ecosystems in the landscape are intact.

Moderate: The majority of fauna habitat components are present but habitat linkages to other remnant ecosystems in the landscape are absent; or

The majority of habitat components are absent but habitat linkages to other remnant ecosystems in the landscape are intact.

Low: The majority of fauna habitat components are absent and habitat linkages to other remnant ecosystems in the landscape are absent.

3.3. Limitations of field assessment

Where feasible, all efforts are made to schedule flora and fauna field surveys in optimal weather conditions and times of year. Nevertheless, field surveys usually fail to record all species present for various reasons, including the seasonal absence of some species and short survey duration. Rare or cryptic species are often missed in short surveys.

Flora surveying was carried out in spring, when some late spring-emergent plant species may have been in the senescent stage of their life-cycle and lacking essential identification characteristics. The timing of the survey and condition of vegetation was otherwise considered suitable to ascertain the extent and quality of native vegetation.

The fauna assessment was undertaken in early spring during mild temperatures, patchy cloud cover with occasional light showers. These conditions were considered suitable for detecting most fauna groups likely to occur in the study area.

As the primary purpose of the investigation was to assess the extent and quality of native vegetation and fauna habitats in the study area, the review of existing information, combined with the field survey were sufficient to complete this aspect of the assessment.

Wherever appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of suitable habitat. The implications under legislation and policy are considered accordingly.

4. SITE DESCRIPTION

The study area for this investigation (Figure 1) is a six kilometre long proposed road corridor from Warrigal Road to Westall Road Extension, Dingley, approximately 20 kilometres south east of Melbourne.

The study area comprises various land uses, including farming (mainly cropping) and existing roads and adjacent road reserves. Vegetation within farm properties is limited to planted crop, introduced pasture grasses and weeds. Few scattered indigenous trees were recorded in these areas. Several patches of native vegetation were recorded within existing road reserves, including a large area of remnant vegetation on the western side of Westall Road (Springvale Road).

Surrounding land predominantly supports current residential developments.

The study area supported sandy soils on a mainly flat landscape. A large dam was present in the eastern part of the study area adjacent to an existing quarry. This area was full of water at the time of surveying due to recent rains.

Native vegetation within the study area consisted of damp sands woodland and swamp scrub vegetation. Woodland patches were dominated by Coast Manna-gum (*Eucalyptus viminalis* subsp. *pryoriana*) and also comprised various native shrub species including Coast Wattle and Coast Tea-tree. Austral Bracken was common in the understorey in these areas along with a high cover of introduced grasses. Scrubby vegetation was distinguished in the study area by the presence of Swamp Paperbark.

Some connectivity existed with similar woodland habitat along roadsides and golf courses to Braeside Park, located approximately 2.5km south of the study area. Additionally, the study area and surrounding houses supported a number of trees which provided a movement corridor for tree-dwelling species.

The study area lies within the Gippsland Plain bioregion and falls within the Port Phillip and Westernport catchment. It is currently zoned Road Zone – Category 1 (RDZ1) in the Kingston and Greater Dandenong Planning Scheme.

5. ASSESSMENT RESULTS

The study area and areas of native vegetation are shown in Figure 1.

5.1. Vegetation assessment

5.1.1. *Flora species*

During the field assessment 40 plant species were recorded. Of these, 10 (25%) were indigenous and 30 (75%) were introduced or non-indigenous native in origin (Appendix 1).

FIS records (Viridans Biological Databases 2010a) and the EPBC Protected Matters Search Tool (DEWHA 2010) indicate that within the search region there are records of, or there occurs potential suitable habitat for, 39 rare or threatened flora species. Of these, seven species were listed under the federal EPBC Act, nine on the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and 38 on DSE's Advisory List for Rare and Threatened Flora (DSE 2005). No rare or threatened flora species were detected during the current field survey.

The likelihood of occurrence in the study area of threatened species listed under the FFG Act or the EPBC Act is addressed in Table 1. This analysis indicates that no suitable habitat occurs on site for any listed flora species. Therefore, no threatened flora are considered likely to occur in the study area.

Table 1: FFG Act and EPBC Act listed flora species and likelihood of occurrence

Common Name	Scientific Name	Conservation Status		Habitat	Habitat suitability in study area	Likelihood of occurrence
		EPBC	FFG			
Austral Toad-flax	<i>Thesium australe</i>	V	f	Occurs on grasslands, grassy woodlands or sub-alpine grassy heathlands. Usually associated with Kangaroo Grass and Poa species (Scarlett et al. 2003).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
Clover Glycine	<i>Glycine latrobeana</i>	V	f	Grasslands and grassy woodlands (Jeanes 1996).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
Frankston Spider-orchid	<i>Caladenia robinsonii</i>	E	f	Only one remaining population near Rosebud. Grows in Tall heathland dominated by <i>Lepidosperma laevigatum</i> and <i>Acacia sophorae</i> on low (grey) sandy ridges (Entwisle 1994).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
Grey Billy-buttons	<i>Craspedia canens</i>		f	Lowland grasslands, often on swamp fringes. Current records occur between Cranbourne and Traralgon (Everett 1999).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	E	f	Favouring heathland and Grassland on black clays (Bates 1994).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
Metallic Sun-orchid	<i>Thelymitra epipactoides</i>	E	f	Coastal and inland in fertile loams, scrubby heaths or near swampy depressions (Weber & Entwisle 1994).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
Purple Blown-grass	<i>Lachnagrostis punicea</i> subsp. <i>filifolia</i>		f	Scattered in the SW of Vic, away from the coast. Occurs on seasonally wet, heavy clay soils (Walsh 1994).	Low (Vegetation in wetter areas dominated by weeds).	No suitable habitat present – Unlikely to occur.
Purple Diuris	<i>Diuris punctata</i> var. <i>punctata</i>		f	Plains country with low heathland or grassland, on heavy soils, with or without trees (Bishop 1996).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.
River Swamp Wallaby-grass	<i>Amphibromus fluitans</i>	V		Wetlands and permanent swamps (Walsh 1994).	Low (Vegetation fringing swampy areas dominated by weeds).	No suitable habitat present – Unlikely to occur.

Common Name	Scientific Name	Conservation Status		Habitat	Habitat suitability in study area	Likelihood of occurrence
		EPBC	FFG			
Western Water-starwort	<i>Callitriche cyclocarpa</i>	V	f	NSW and Victoria in thick patches in floodwaters. Also Victoria in River Red Gum open woodland with an open grassy understorey dominated by <i>Paspalidium jubiflorum</i> along river banks, and with wallaby grasses on ground less-frequently inundated (DEC 2007).	Low (Understorey disturbed throughout study area).	No suitable habitat present – Unlikely to occur.

C = Critically Endangered; E = Endangered; V = Vulnerable; L = Listed as threatened under FFG Act



Legend

- Study Area
- Scattered trees

Native Vegetation

- Creekland Grassy Woodland (EVC 68)
- Damp Sands Herb-rich Woodland (EVC 3)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Degraded Treeless Vegetation

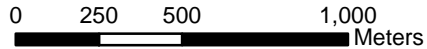


Figure 1: Study Area and Native vegetation - Overview		
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5.1.2. Ecological Vegetation Classes

Pre-European EVC mapping (DSE 2010b) indicates that the study area and surrounds would have supported several different EVCs prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested Damp Sands herb-rich Woodland (EVC 3), Swamp Scrub (EVC 53), Plains Grassy Woodland (EVC 55), Creekline Grassy Woodland (EVC 68) and Plains Grassy Wetland (EVC 125) were present within the study area.

Damp Sands herb-rich Woodland (EVC 3) has a vulnerable conservation status in the Gippsland Plain bioregion. The benchmark for this EVC describes it as “A low, grassy or bracken-dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses, and orchids. [It] occurs mainly on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils).” (Appendix 3).

Swamp Scrub (EVC 53) has an endangered conservation status in the Gippsland Plain bioregion. The benchmark for this EVC describes it as “Closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer” (Appendix 3).

Plains Grassy Woodland (EVC 55) has an endangered conservation status in the Gippsland Plain bioregion. The benchmark for this EVC describes it as “An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. [It] occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer” (Appendix 3).

Creekline Grassy Woodland (EVC 68) has an endangered conservation status in the Gippsland Plain bioregion. The benchmark for this EVC describes it as “Eucalypt-dominated woodland to 15 m tall with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. Occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds” (Appendix 3).

Plains Grassy Wetland (EVC 125) has an endangered conservation status in the Gippsland Plain bioregion. The benchmark for this EVC describes it as “... usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas” (Appendix 3).

A total of 14 remnant patches (referred to herein as habitat zones) comprising the abovementioned EVCs were identified in the study area (Table 2). The location of these habitat zones are shown in Figures 2 to 4.



Legend

- Study Area
- Scattered trees
- A Native Vegetation labels

Native Vegetation

- Creekland Grassy Woodland (EVC 68)
- Damp Sands Herb-rich Woodland (EVC 3)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Degraded Treeless Vegetation

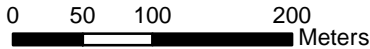


Figure 2: Study Area and Native vegetation		
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Legend

- Study Area
- Scattered trees
- Native Vegetation labels

Native Vegetation

- Creekland Grassy Woodland (EVC 68)
- Damp Sands Herb-rich Woodland (EVC 3)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Degraded Treeless Vegetation

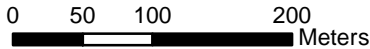


Figure 3: Study Area and Native vegetation		
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Legend

- Study Area
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Native Vegetation

- Creekland Grassy Woodland (EVC 68)
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- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
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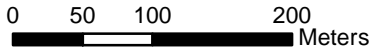


Figure 4: Study Area and Native vegetation		
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Table 2: Description of habitat zones in the study area

Habitat Zone	EVC	Bioregional Conservation Status	Description
A	Damp Sands Herb-rich Woodland (EVC 3)	Vulnerable	Small patch of woodland on western side of Old Boundary Road dominated by Coast Manna-gum. Coast Wattle and Coast Tea-tree present in mid-layer. Ground cover consists namely of introduced grasses and Blackberry.
B	Damp Sands Herb-rich Woodland (EVC 3)	Vulnerable	Patch of open woodland on eastern side of Old Boundary Road dominated by Coast Manna-gum. Coast Wattle and Coast Tea-tree present in mid-layer. Ground cover consists namely of introduced grasses and Blackberry.
C	Swamp Scrub (EVC 53)	Endangered	Small linear patch of scrub on western side of Grange Road consisting of Swamp Paperbark. Weed cover is high in understorey.
D	Swamp Scrub (EVC 53)	Endangered	Small linear patch of scrub west of Tootal Road consisting of Swamp Paperbark.
E	Damp Sands Herb-rich Woodland (EVC 3)	Vulnerable	Patch of woodland with a sparse canopy of Coast Manna-gum. Vegetative cover mostly consists of a mixture of native (Coast Tea-tree and Coast Wattle) and introduced shrubs (Flax-leaf Broom, Tree Lucerne).
F	Damp Sands Herb-rich Woodland (EVC 3)	Vulnerable	Large patch of woodland on western side of Westall Road (Springvale Road). Dominant native species include Coast Manna-gum, Swamp Paperbark and Coast Wattle. The understorey is predominantly weedy and consists of a high weed cover, namely Annual Veldt-grass, Panic Veldt-grass and Flax-leaf Broom.
G	Plains Grassy Woodland (EVC 55)	Endangered	Odd shaped patch of woodland distinguished by a continuous canopy cover of River Red-gum. Understorey is sparse and consists mostly of introduced grasses.

Habitat Zone	EVC	Bioregional Conservation Status	Description
H	Swamp Scrub (EVC 53)	Endangered	Patch of Swamp Scrub dominated by Swamp Paperbark. Some planted trees occur in this area. The understorey consists mainly of introduced grasses.
I	Damp Sands Herb-rich Woodland (EVC 3)	Vulnerable	Small patch of woodland dominated by Coast Manna-gum. Some planted trees occur in this area. The understorey consists mainly of introduced grasses.
J	Swamp Scrub (EVC 53)	Endangered	Patch of Swamp Scrub dominated by Swamp Paperbark. Some planted trees occur in this area. The understorey consists mainly of introduced grasses.
K	Creepline Grassy Woodland (EVC 68)	Endangered	Occurs along an existing drainage line in which a small amount of water was present at the time of surveying. Swamp Gum was the dominant canopy species and Black Wattle was common in dense cover. Woody weeds such as Sweet Pittosporum as well as a high cover of introduced grasses were present in this area.
L	Plains Grassy Woodland (EVC 55)	Endangered	Not assessed during the current survey. Mapping adopted from Biosis report (Biosis 2008).
M	Plains Grassy Wetland (EVC 125)	Endangered	Not assessed during the current survey. Mapping adopted from Biosis report (Biosis 2008).
N	Plains Grassy Woodland (EVC 55)	Endangered	Not assessed during the current survey. Mapping adopted from Biosis report (Biosis 2008).

5.1.3. Scattered trees

Scattered trees recorded in the study area would have once comprised the canopy component of Damp Sands Herb-rich Woodland (EVC 3). A total of three scattered Coast Manna-gums were recorded in the study area (See Figures 2 to 4). A detailed tree assessment was not undertaken during this survey.

5.1.4. Degraded treeless vegetation

One area of Degraded Treeless Vegetation was recorded within the study area (Figure 2). This area supported a mixture of native and introduced shrub species around a small dam to the east of Boundary Road.

5.1.5. Conservation significance according to the Framework

Detailed habitat hectare assessments have not been undertaken at this early stage of the project. As such, habitat zones in the study area may range from medium to very high conservation significance. This is based on a combination of the vulnerable to endangered bioregional conservation status of the EVCs.

Very large, large and medium scattered trees in the study area are assigned a medium to high conservation significance based on the bioregional conservation status of the EVC to which they once belonged.

5.2. Fauna

5.2.1. Habitat assessment

The study area supports the following habitat types:

- Introduced Pasture and Market Gardens;
- Planted Trees;
- Woodland: and
- Aquatic Habitat

Introduced pasture and market gardens

This habitat covered most of the study area and comprised introduced grasses such as Kikuyu, Couch, Veldt-grasses, Capeweed, Angled Onion Grass and Prairie Grass. Patches of introduced shrubs were scattered throughout and included Tree Lucerne, Willows and small areas of indigenous Swamp Paperbark. Dense stands of blackberry occurred throughout parts of the study area. Cultivated land used for growing vegetables was extensively modified from original vegetation and offers few opportunities for native wildlife. Therefore, these habitats were considered low quality fauna habitat.

Planted Trees

Roadside corridors were predominantly planted native treed vegetation, with small patches of remnant native vegetation. These areas provided dispersal routes for species that move between larger areas of habitat. Planted trees comprised pines, Southern Mahogany, Paperbarks (*Melaleuca* spp.) and Sheoke. The remaining vegetation was typically mixed plantings of middle-sized trees and

shrubs. Consequently, this habitat provided few opportunities for fauna other than a small subset of local fauna expected in semi-rural landscapes in Victoria.

Woodland

One moderate sized but somewhat isolated remnant patch of this habitat remains at the end of the alignment, west of Westall Road and north of Spring Road (Figure 4). The predominant vegetation type class in the study area was Damp Sands Herb-rich Woodland. The canopy consisted of predominantly Rough-barked Manna Gum, Swamp Gum and Swamp Paperbark. Several of the trees supported a number of hollows. There is a varied shrub and ground layer comprising mainly native shrubs and sedges. Most conspicuous species are Mat-rushes, Sword-sedges, Austral Bracken, Coast Wattle, Blackwood, Coast Tea-tree and Kangaroo Apple. Swamp scrub and Blackberry formed dense areas of habitat which provided foraging and refuge opportunities for bush birds and ground-dwelling mammals. Diggings and scratchings of European Rabbit were evident in the sandy soils within this habitat.

Although the woodland was somewhat weedy, it retained most of its original habitat elements (eg. fallen logs, leaf litter, hollow-bearing trees) and is continuous with larger nearby remnants such as Braeside Park via roadside vegetation. Taking all these factors into account, this habitat is considered to be of moderate quality for fauna.

Aquatic Habitat

A large artificial dam exists within the quarry, east of Old Dandenong Road. Fringing vegetation comprised of Rush (*Typha* species) and tussock grasses. Pacific Gulls and swamphens, which were observed during the current assessment, may move between this dam to other wetland habitats in the region. A smaller dam occurred near the junction of Boundary and Heatherton Road and contained fringing and emergent vegetation (Rush). Invasive weeds had colonised the dam banks, Blackberry being particularly evident.

Whilst these dams are isolated, they are likely to provide roosting and feeding habitat for a variety of waterbirds and frogs and provide temporary habitat for some threatened waterbird species.

A shallow freshwater wetland located south of the woodland adjacent to Westall Road, provides habitat for waterbirds and common frog species. A small stream that runs through the southern part of the woodland into the wetland was found to be polluted and degraded during the current field assessment. In addition, a collection of high quality wetlands occur in Karkarook Park, located at the start of the alignment on Warrigal Road, has the potential to support threatened waterbird and frog species.

The aquatic habitat has been assessed as being moderate quality for fauna, as it provides habitat for a range of aquatic fauna, despite lacking connectivity with other wetlands or streams in the district.

5.2.2. Fauna species

The review of existing information and current field survey indicated that 191 fauna species may occur in the study area, including 151 bird (12 introduced), 18 mammal (seven introduced), 14 reptile and eight frog species. Appendix 2 details

fauna species that may occur within the study area and lists species that were recorded during the field survey.

The AVW (DSE 2010d) and the EPBC Protected Matters Search Tool (DEWHA 2010) indicated that 31 rare or threatened fauna species (21 bird, six mammal, one reptile, two frog and one invertebrate) listed on the EPBC Act and/or FFG Act occur or potentially occur within the search region. The likelihood of threatened fauna potentially occurring within the study area is presented in Table 3.

Table 3: Threatened fauna identified as occurring or potentially occurring in the study area (excluding fish)

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Year of Last Record	Likelihood of Occurrence
		EPBC	FFG	DSE				
Birds								
Australasian Shoveler	<i>Anas rhynchos</i>			VU	Large and deep permanent bodies of water and aquatic flora abundant. Also occurs on billabongs, watercourses and flood waters on alluvial plains, freshwater meadows, shallow swamps, reed swamps, wooded lakes, sewage farms and farm dams (Marchant and Higgins 1990).	8	2001	Likely (deep vegetated dam in quarry)
Australian Painted Snipe	<i>Rostratula australis</i>	VU, M (CAMBA)	L	CE	Lowlands on shallow freshwater swamps with emergent vegetation and flooded saltmarshes (Marchant and Higgins 1993).	1	1986	Likely (shallow freshwater wetland)
Blue-billed Duck	<i>Oxyura australis</i>		L	EN	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies (Marchant and Higgins 1990).	22	2001	Likely (deep vegetated dam in quarry)
Diamond Firetail	<i>Stagonopleura guttata</i>		L	VU	Commonly found in box-ironbark forests and woodlands and also occurs along watercourses and in farmland areas (Emison <i>et al.</i> 1987; Tzaros 2005).	2	1990	Unlikely (no suitable habitat)
Eastern Great Egret	<i>Ardea modesta</i>	M (JAMBA, CAMBA)	L	VU	Occurs in a variety of wetlands including: permanent water bodies on flood plains; shallows of deep permanent lakes, either open or vegetated with shrubs or trees; semi-permanent swamps with tall emergent vegetation (e.g. Typha) and herb dominated seasonal swamps with abundant aquatic flora (Marchant and Higgins 1990).	3	2001	Likely (shallow freshwater wetland)
Glossy Ibis	<i>Plegadis falcinellus</i>	M (CAMBA, Bonn)		NT	Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation (Marchant and Higgins 1990).	1	1999	Likely (shallow freshwater wetland)
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>		L	EN	Inhabits dry woodlands and forests with a shrub layer and a groundcover of leaf litter and fallen timber. In Victoria it is found in woodlands and forests with box-ironbark eucalypt associations and River Red Gums, including narrow remnants along roadsides and streams (Higgins and Peter 2002; Tzaros 2005).	43	2002	Unlikely (no suitable habitat)
Hardhead	<i>Aythya australis</i>			VU	Inhabits large, deep waters where vegetation is abundant; particularly deep swamps and lakes, pools and creeks. Also occur on freshwater meadows, seasonal swamps with abundant aquatic flora, reed swamps, wooded lakes and swamps, rice fields, and sewage ponds (Marchant and Higgins 1990).	32	2002	Likely (deep vegetated dam in quarry)

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Year of Last Record	Likelihood of Occurrence
		EPBC	FFG	DSE				
Intermediate Egret	<i>Ardea intermedia</i>		L	CE	It mainly inhabits terrestrial wetlands; only occasionally visit coastal wetlands and forages amongst aquatic vegetation in shallow water and requires trees for roosting and nesting. It often occurs in wetlands that contain vegetation, including Typha (Marchant and Higgins 1990).	1	1999	Likely (shallow freshwater wetland)
Latham's Snipe	<i>Gallinago hardwickii</i>	M (JAMBA, CAMBA, ROKAMBA, Bonn)		NT	Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes (Higgins and Davies 1996).	15	2000	Likely (shallow freshwater wetland)
Little Egret	<i>Egretta garzetta nigripes</i>		L	EN	It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as Typha and requires trees for roosting and nesting (Marchant and Higgins 1990).	1	1999	Likely (shallow freshwater wetland)
Magpie Goose (reintroduced)	<i>Anseranas semipalmata</i>		L	VU	Terrestrial and aquatic habitats, but activities centered on wetlands, mainly those on floodplains of rivers (Marchant and Higgins 1990).	4	1999	Likely (shallow freshwater wetland)
Musk Duck	<i>Biziura lobata</i>			VU	It inhabits terrestrial wetlands, estuarine habitats and sheltered inland waters. Almost entirely aquatic; preferring deep water of large swamps, lakes and estuaries, where conditions are stable and aquatic flora abundant (Marchant and Higgins 1990).	6	2000	Likely (deep vegetated dam in quarry)
Nankeen Night Heron	<i>Nycticorax caledonicus hillii</i>			NT	Inhabits littoral and estuarine habitats and terrestrial wetlands. Mainly nocturnal; forage over soft or firm substrates in still or slow-moving shallow water, on exposed shores, banks and flats of wetlands, or swampy vegetation; often where sheltered by tall emergent or ground vegetation, and near trees used for roosting (Marchant and Higgins 1990).	5	2001	Likely (shallow freshwater wetland)
Pacific Gull	<i>Larus pacificus pacificus</i>			NT	Inhabits sandy or less often rocky shores; prefer areas protected from ocean swells, such as bays, inlets, estuaries and lagoons. Often on offshore islands, sometimes occur up to 10km inland (Higgins and Davies 1996).	13	2001	Recorded (deep vegetated dam in quarry)
Pied Cormorant	<i>Phalacrocorax varius</i>			NT	In marine and coastal habitats. They require trees in which to nest, such as dead eucalypts or melaleucas and also occurs in the Murray-Darling Basin and other large lakes (Marchant and Higgins 1990).	3	2000	Likely (deep vegetated dam in quarry)

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Year of Last Record	Likelihood of Occurrence
		EPBC	FFG	DSE				
Powerful Owl	<i>Ninox strenua</i>		L	VU	Open and tall wet sclerophyll forests with sheltered gullies and old growth forest with dense understory. They are also found in dry forests with box and ironbark eucalypts and River Red Gum. Large old trees with hollows are required by this species for nesting (Higgins 1999).	1	1995	Unlikely (no suitable habitat)
Regent Honeyeater	<i>Xanthomyza phrygia</i>	EN, M (JAMBA)	L	CE	Inhabits dry box-ironbark eucalypt forests near rivers and creeks on inland slopes of the Great Dividing Range. It could also occur in small remnant patches or in mature trees in farmland or partly cleared agricultural land (Higgins et al. 2001).	1	1947	Unlikely (no suitable habitat)
Royal Spoonbill	<i>Platalea regia</i>			VU	Terrestrial wetlands, sheltered marine habitats and wet grasslands. Foraging limited to shallow waters; often among aquatic or emergent vegetation or submerged logs that shelter prey and favour coastal habitats (Marchant and Higgins 1990).	2	2001	Likely (shallow freshwater wetland))
Swift Parrot	<i>Lathamus discolor</i>	EN	L	EN	Prefers a narrow range of eucalypts in Victoria, including White Box, Red Ironbark and Yellow Gum as well as River Red Gum when this species supports abundant 'lerp' (Emison et al. 1987; Higgins 1999; Kennedy and Tzaros 2005).	4	1995	Likely (flowering Eucalypts)
Wood Sandpiper	<i>Tringa glareola</i>	M (JAMBA, CAMBA, ROKAMBA, Bonn)		VU	Inhabits well vegetated, shallow, freshwater wetlands, such as swamps, lakes, pools, and waterholes; typically with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reed (Higgins and Davies 1996).	1	1999	Unlikely (no suitable habitat)
Mammals								
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	VU	L	VU	Roosts in riverine habitat in Melbourne and forages widely in flowering eucalypts and fruit trees (Menkhorst 1995).	5	2004	Likely (flowering Eucalypts)
Long-nosed Potoroo	<i>Potorous tridactylus tridactylus</i>	VU	L	EN	In Victoria coastal heathy woodland; In Tasmania moist forest with dense shrub layer; in the north edge of rainforest (Menkhorst 1995).	None	None	Unlikely (no suitable habitat and no historical records)
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	VU	L	VU	Coastal heath and scrub, heathy woodland, open forest and vegetated sand-dunes (Menkhorst 1995).	None	None	Unlikely (no suitable habitat and no historical records)

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Year of Last Record	Likelihood of Occurrence
		EPBC	FFG	DSE				
Smoky Mouse	<i>Pseudomys fumeus</i>	EN	L	CE	Coastal heath, heathy woodland, sub-alpine heath, dry forest and gullies in wet forest (Menkhorst 1995).	None	None	Unlikely (no suitable habitat and no historical records)
Southern Brown Bandicoot	<i>Isoodon obseulus obesulus</i>	EN	I	NT	Heathy forest, woodland, coastal scrub and heathland (Menkhorst 1995).	10	1990	Likely (swamp scrub in woodland)
Spot-tailed Quoll	<i>Dasyurus maculatus maculatus</i>	EN	L	EN	Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	None	None	Unlikely (no suitable habitat and no historical records)
Reptiles								
Lace Monitor	<i>Varuanus varius</i>			VU	Well timbered areas from dry woodland to wet southern forests and rainforest (Wilson and Swan 2003).	1	1977	Unlikely (no suitable habitat and woodland patch too small)
Frogs								
Growling Grass Frog	<i>Litoria raniformis</i>	VU	L	EN	Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann and Gillespie 2004).	4	1999	Likely (deep vegetated dam in quarry and wetland)
Southern Toadlet	<i>Pseudophryne semimarmorata</i>			VU	Damp areas in forests and woodlands (Cogger 2000).	1	1990	Likely (shallow freshwater wetland and woodland)
Invertebrates								
Golden Sun Moth	<i>Synemon plana</i>	CE	L	CE	Areas that are, or have been native grasslands or grassy woodlands. It is known to inhabit degraded grasslands with introduced grasses being dominant, with a preference for the native wallaby grass being present (O'Dwyer and Attiwill 1999).	None	None	Unlikely (no suitable habitat and no historical records)

C = Critically Endangered; **E** = Endangered; **V** = Vulnerable; **NT** = Lower risk, near threatened; **DD** = data deficient; **L** = Listed as threatened under FFG Act; **M** = Listed migratory species; **(JAMBA)** = Japan-Australia Migratory Bird Agreement; **(CAMBA)** = China-Australia Migratory Bird Agreement; **(ROKAMBA)** = Republic of Korea- Australia Migratory Bird Agreement; **(Bonn)** = Bonn Convention

Birds

Based on the assessment in Table 3, the following 14 threatened bird species were considered likely to occur in the study area, at least occasionally:

- Australasian Shoveler;
- Australian Painted Snipe;
- Blue-billed Duck;
- Eastern Great Egret;
- Glossy Ibis;
- Hardhead;
- Intermediate Egret;
- Latham's Snipe
- Little Egret;
- Magpie Goose;
- Nankeen Night Heron;
- Pacific Gull;
- Pied Cormorant; and
- Swift Parrot.

Given that all but one (Swift Parrot) of these species are waterbirds that are likely to visit the aquatic habitat of the study area only rarely and in small numbers, targeted surveys are not required. Although Pacific Gulls were observed at a dam in close proximity to the proposed freeway, the study area does not represent a key habitat for this bird species and is unlikely to form part of their core distribution.

Similarly, the **Swift Parrot** is likely to be occasional visitor to the study area to forage on large flowering Eucalypts between autumn and winter. However, the study area does not represent a key habitat for this bird species and is unlikely to form part of their core distribution.

Therefore it can be concluded that these species are unlikely to be significantly affected by the current proposal.

Migratory Birds

The EPBC Act identified suitable habitat for 12 migratory bird species. Of these, there is a possibility that **Rufous Fantail**, **Satin Flycatcher** and **White-throated Needletail** will occasionally occur in the study area along with wetland birds such as **snipes and egrets**, which may occasionally occur in the shallow freshwater wetland adjacent to Westall Road. Due to the relatively small size of habitats in the study area, the proposed development would be unlikely to have a significant impact on the species.

The remaining migratory species have not been recorded in the search region and habitat for them (large lakes and gullies) is absent from the study area. Therefore it is expected they would not occur regularly in the study area and are unlikely to be significantly impacted upon by the proposed development.

Mammals

Based on the assessment in Table 6, two listed mammal species were considered likely to occur in the study area. The vulnerability of these species to potential impacts from the proposed development is discussed below.

The **Grey-headed Flying-fox** is considered likely to fly over the study area or feed close to it in flowering or fruiting trees. However, there is no habitat in the study area large enough to maintain a regularly occurring population. Although this species could occasionally pass through the study area, it is unlikely that the proposed development would significantly impact this species.

The **Southern Brown Bandicoot** usually inhabits heathy woodlands or shrublands that occur on sandy, well-drained soils, always with densely vegetated understorey (Menkhorst 1995). Biosis Research Pty. Ltd. (2008) last recorded the species in the Westall Road woodland in 1991 by hair sample taken from hair tubes placed in swamp scrub. Biosis stated that no further surveys have been undertaken in the study area since. Although this site is relatively isolated, there is potential for the species to still occur in the area due to the presence of suitable habitat. Bandicoots have also been known to occur in Blackberry (T.Sloane pers.comm.) which protects it from predators

A targeted survey would be required to determine the status of this species in the study area. If present, Southern Brown Bandicoot could be significantly affected by the current proposal. Further investigation of impacts on this species would be required for the planning assessment of the project.

Reptiles

No reptile species were recorded during the field assessment.

The review of existing information and field assessment indicated that no listed threatened reptile species were likely to occur in the study area. Therefore, impacts to this species group would be negligible.

Frogs

During the field assessment one frog species was recorded (Appendix 2). No listed threatened frog species were recorded.

One frog species is considered likely to occur based on the review of existing information and field assessment. Its susceptibility to impacts from the proposed development is discussed below.

The likelihood of occurrence of the **Growling Grass Frog** in the study area is considered moderate due to the presence of suitable habitat. Previous AVW historical records date back from 1991 from Braeside Park, located approximately 3km south of the study area. A population has recently been released in Waterways, south of Braeside Park.

There is potential for this species to occur in the study area in the quarry dam, since there is permanent water with emergent and fringing vegetation. There is also possibility of it occurring at the shallow wetlands adjacent to Westall Road. Further survey work is required at the appropriate time of year (October – March) to ascertain whether the current proposal is likely to have a significant impact on this species.

Similarly, there is potential for the **Southern Toadlet** to occur in the southern section of the swampy woodland adjacent to the wetland. This species was last recorded in 1990 from Braeside Park. Further survey work is required at the appropriate time of year (March to July) to ascertain whether the current proposal is likely to have a significant impact on this species.

Invertebrates

The review of existing information and field assessment indicated that no listed threatened invertebrate species were likely to occur in the study area. Therefore, impacts to this species group would be negligible.

6. IMPACTS AND REGULATORY IMPLICATIONS

6.1. Proposed development and direct impacts

The proposed development will involve the development of a road corridor from Warrigal Road to Westall Road Extension.

The proposed development would result in the following impacts:

- The removal of several patches of native vegetation including Damp Sands Herb-rich Woodland (EVC 3), Swamp Scrub (EVC 53) and Creekline Grassy Woodland (EVC 68);
- The removal of scattered trees; and
- The removal of habitat for native fauna.

6.2. Planning controls

Destruction, lopping or removal of native vegetation (including the removal of dead trees with a DBH of 40 centimetres or greater) on allotments of 0.4 hectares or more requires a planning permit under Clause 52.17 of all Victorian Planning Schemes.

A planning permit is required for the removal of native vegetation within the proposed road corridor for this project.

Before issuing a planning permit, Responsible Authorities are obligated to refer to Clause 15.09 (Protection of Flora and Fauna) in the Planning Scheme. This refers in turn to the Native Vegetation Management Framework, discussed in the following section.

6.3. Native Vegetation Management Framework

6.3.1. How the Framework operates

Any proposal that requires a permit under Clause 52.17 to remove native vegetation from the study area must demonstrate that the three-step approach of 'Net Gain' outlined in the Framework has been applied. This approach is hierarchical and includes the following principles:

- Adverse impacts on native vegetation should be *avoided*, particularly removal of vegetation;
- Where impacts cannot be avoided, impacts should be *minimised* through responsive planning and design, with input from relevant experts; and
- Appropriate *offsets* need to be identified to compensate for native vegetation removal.

A combination of project design and offsetting should aim to achieve a net gain in the area and quality of native vegetation across Victoria.

Responses to planning permit applications to remove native vegetation vary depending on the conservation significance of the vegetation proposed for removal. Conservation significance determines both the likelihood of approval and, importantly, the scale of the required offset. This is summarised in Table 4.

Table 4: Likely response to applications for removal of intact native vegetation

Framework conservation significance	Likely response to application for clearing	Likely offset requirements
VERY HIGH	Clearing not permitted unless exceptional circumstances apply. Offset Management Plan to be submitted with application.	Substantial Net Gain At least 2 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
HIGH	Clearing generally not permitted	Net Gain At least 1.5 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
MEDIUM	Clearing generally not permitted	Equivalent Gain At least 1 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed

Offset targets are directly related to the habitat hectare value of the removed vegetation. They can comprise indigenous vegetation retained for conservation purposes within the study area, or vegetation elsewhere, secured on a case-by-case basis by the proponent or through the DSE Bush Broker scheme.

Clause 66.02 of the planning scheme determines the role of the DSE in the assessment of indigenous vegetation removal planning permit applications. If an application is referred to the DSE then the Responsible Authority must follow that department's recommendation in relation to that permit application. The criteria presented in Table 5 indicate when the DSE becomes a referral authority.

Table 5: Application referral criteria

Applications will be referred to the Department of Sustainability and Environment under the following circumstances:
<p>Scattered Trees</p> <ul style="list-style-type: none"> ▪ To remove more than 15 native or indigenous trees of DBH less than 40 centimetres ▪ To remove more than five native or indigenous trees of DBH 40 centimetres or greater (DBH = diameter at 1.3 metres above ground)
<p>Remnant Patch Vegetation (may include trees)</p> <ul style="list-style-type: none"> ▪ To remove more than 0.5 hectares of vegetation in an EVC with Bioregional Conservation Status of Endangered, Vulnerable or Rare. ▪ To remove more than one hectare of vegetation in an EVC with Bioregional Conservation Status of Depleted or Least Concern.

The current proposal would trigger a referral to DSE due to the proposed removal of more than 0.5 hectares of an endangered or vulnerable vegetation type.

6.3.2. Design recommendations

The following recommendations are provided in accordance with the principles of the Framework:

- Avoid and minimise impacts to native vegetation by the following design measures:
 - Reduce the amount of native vegetation proposed for removal by altering the alignment where possible; and
 - Avoid the removal of large trees within habitat zones where possible.
- Any areas of native vegetation to be removed are will be offset.

6.3.3. Offset targets for removal from habitat zones

Offsets for the removal of native vegetation from habitat zones are directly related to the habitat hectare value of the removed vegetation. These may include the permanent protection for conservation purposes of other existing remnant vegetation. Offsets may be located within the study area or offsite, and maintained for up to 10 years. Offsite offsets may be identified on a case-by-case basis by the proponent or through the DSE Bush Broker scheme.

A habitat hectare assessment is required to determine the habitat score of the native vegetation within the study area and the offset required for its removal.

6.3.4. Offset targets for removal of scattered trees

Any approved removal of scattered trees will attract an offset target comprising protection and recruitment components, whereby a prescribed number of trees of the same size class must be protected and recruitment (planting or assisted regeneration) of indigenous plants undertaken. The scale of the offset is determined by the size class of the trees proposed to be removed. Alternatively, in the event that the protection of existing trees is considered not to be feasible, a 'recruit only' offset for tree removal may apply, subject to negotiation with the Responsible Authority.

A detailed tree assessment is required to determine the offset requirement for any removal of scattered trees within the study area.

6.4. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* contains a list of threatened species and ecological communities that are considered to be of national conservation significance. Any impacts on these species considered significant requires the approval of the Australian Minister for the Environment. If there is a possibility of a significant impact on nationally threatened species or communities or listed migratory species, a Referral under the EPBC Act should be considered. The Minister will decide after 20 business days whether the project will be a 'controlled action' under the EPBC Act, in which case it cannot be undertaken without the approval of the Minister. This approval depends on a further assessment and approval process (lasting between three and nine months, depending on the level of assessment).

No EPBC Act listed flora species are considered vulnerable to impacts from the proposed development.

The following two EPBC Act listed fauna species are considered susceptible to significant impacts from the proposed development:

- Southern Brown Bandicoot (survey period - All year); and
- Growling Grass Frog (survey period - October to March).

Targeted surveys are therefore recommended for these species to assess the potential impacts and determine the requirements for an EPBC Act Referral.

6.5. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* lists threatened flora and fauna species to provide for their protection and management. The FFG Act has limited direct application to private land. However, Clause 15.09 of the Planning Scheme makes reference to this Act. The local planning authority is likely to consider impacts on FFG Act-listed species and communities when deciding on planning permit applications.

The removal of threatened species or communities, or protected flora under the FFG Act from public land requires a licence under the Act. This licence is obtained from the Department of Sustainability and Environment.

No listed or protected flora species are susceptible to impacts from the proposed development.

The following two listed fauna species are susceptible to impacts from the proposed development.

- Southern Brown Bandicoot (Survey period - All year); and
- Growling Grass Frog (Survey period - October to March).

Targeted surveys are recommended for these species.

6.6. EE Act

Under the *Environment Effects Act 1978*, proponents are required to prepare a Referral to the state minister for Planning, which will determine if an Environment Effects Statement (EES) is required for the project. Criteria related to flora and fauna are:

- Potential clearing of ten hectares or more of native vegetation from an area with endangered EVC, or vegetation that is or is likely to be, of very high conservation significance according to Victoria's Native Vegetation Management Framework, except where authorised under an approved Forest Management Plan or Fire Protection Plan;
- Potential long-term loss of a significant proportion (1 to 5% depending upon conservation status of species concerned) of known remaining habitat or population of a threatened species in Victoria;
- Potential long-term change to a wetland's ecological character, where that wetland is Ramsar listed, or listed in 'A Directory of Important Wetlands in Australia';
- Potential major effects upon the biodiversity of aquatic ecosystems over the long term;
- Potential significant effects on matters listed under the *Flora and Fauna Guarantee Act 1988*.

One or a combination of these criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine if an EES is required.

6.7. DSE advisory lists

Rare and threatened species advisory lists administered by the Department of Sustainability and Environment include flora and fauna species known to be rare or threatened throughout the state. Although the advisory list has no statutory status, the Responsible Authority will consider impacts on any species on the list when assessing a planning application.

No DSE *Advisory List of Rare and Threatened Plants in Victoria* (DSE 2005) are considered susceptible to impacts from the proposed development.

The following fauna species listed on the DSE *Advisory List of Threatened Vertebrate Fauna in Victoria* (2007b) are vulnerable to impacts from the proposed development.

- Southern Brown Bandicoot (Survey period - All year round);
- Growling Grass Frog (Survey period - October to March); and
- Southern Toadlet (Survey period - March to July).

Surveys are recommended for these species to determine their presence in the study area.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. Conclusions

The following implications would pertain to the current development proposal:

- A planning permit is required under Clause 52.17 for the removal of native vegetation within the proposed road corridor for this project.
- The current proposal would trigger a referral to DSE due to the proposed removal of more than 0.5 hectares of an endangered or vulnerable vegetation type.
- Offsets would be required to compensate for the loss of native vegetation within the proposed road corridor. Habitat hectare and scattered tree assessments are required to determine the quality of native vegetation present and offsets required for their removal.

During the current investigation, impacts of the proposed development could not be determined for the following listed species:

- Southern Brown Bandicoot (Survey period - All year round);
- Growling Grass Frog (Survey period - October to March); and
- Southern Toadlet (Survey period - March to July).

Targeted surveys are recommended for these species to determine their status within the study area and potential impacts of the project. The submission of a Referral under the EPBC Act would be considered prudent if the Southern Brown Bandicoot or Growling Grass Frog are found to potentially be significantly impacted by the proposal. The Responsible Authority will consider impacts on the Southern Toadlet if found to be present in the study area.

7.2. Mitigation Recommendations

Consideration should be given to including the mitigation measures described below in a construction and operational environmental management plan for the project:

Pre-construction:

- Avoid disturbing the intact native vegetation and scattered trees where feasible;
- Avoid removal of large, hollow-bearing indigenous trees where feasible;
- In accordance with the *Catchment and Land Protection Act 1994*, the noxious weed species listed below, which were recorded in the study area, must be controlled using precision methods that minimise off-target kills (e.g. spot spraying). This method of control will be implemented throughout the project.
 - African Box-thorn;
 - Angled Onion;
 - Fennel;
 - Flax-leaf Broom;

- Gorse; and
- Montpellier Broom.
- The proposed development should be designed in a way that does not alter the site's hydrology in areas that support native vegetation;
- Construction contractors should be inducted into an environmental management program for construction works; and
- All environmental controls should be checked for compliance on a regular basis.

Construction phase:

- Environmentally sensitive areas should be securely fenced at two metres from the perimeter and appropriately signed. All machinery and earthworks are to be excluded from these areas;
- Any tree pruning should be undertaken by an experienced arborist to prevent disease or unnecessary damage to the tree or disturbance to understorey vegetation during tree trimming;
- Any stockpiling will occur outside of environmentally sensitive areas;
- All machinery should enter and exit works sites along defined routes that do not impact on native vegetation or cause soil disturbance and weed spread;
- All machinery bought on site should be weed and pathogen free. This is important for environmental and agricultural protection. Soil borne pathogens such as Cinnamon Fungus and livestock diseases can be easily transported by machinery;
- All machinery wash down, lay down and personnel rest areas should be defined (fenced) and located in disturbed areas; and
- Best practice erosion control should be installed where an erosion hazard is identified, erosion control activities should include:
 - The use of sediment fences down slope of exposed soil and stockpiles;
 - Bunding of stockpiles; and
 - Minimisation of the area of disturbed soil at any one time.

Post-construction phase:

- Weed control, by an experienced bush regenerator, is to be carried out along disturbed areas after construction to control any weed outbreaks in bushland or wetland areas;
- A thirty metre buffer area along rivers, creeks and significant drainage lines should be revegetated with appropriate indigenous plants of local genetic provenance; and
- The use of local indigenous plant species, of local genetic provenance, should be considered in the landscaping of any development on the site. Locally indigenous species generally have low water-use requirements, high survival rates and provide habitat to local fauna species.

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Appendix 1: Flora species recorded in the study area and threatened species known (or with the potential) to occur in the search region

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DSE	Recorded
*	African Box-thorn	<i>Lycium ferocissimum</i>	Solanaceae				X
*	Angled Onion	<i>Allium triquetrum</i>	Alliaceae				X
*	Annual Veldt-grass	<i>Ehrharta longiflora</i>	Poaceae				X
	Austral Bracken	<i>Pteridium esculentum</i>	Dennstaedtiaceae				X
	Austral Toad-flax	<i>Thesium australe</i>	Santalaceae	V	f	v	
*	Bastard's Fumitory	<i>Fumaria bastardii</i>	Fumariaceae				X
*	Black Nightshade	<i>Solanum nigrum s.s.</i>	Solanaceae				X
	Black Roly-poly	<i>Sclerolaena muricata var. muricata</i>	Chenopodiaceae			k	
*	Blackberry	<i>Rubus fruticosus spp. agg.</i>	Rosaceae				X
	Bog Gum	<i>Eucalyptus kitsoniana</i>	Myrtaceae			r	
*	Bridal Creeper	<i>Asparagus asparagoides</i>	Asparagaceae				X
*	Cape Weed	<i>Arctotheca calendula</i>	Asteraceae				X
	Clover Glycine	<i>Glycine latrobeana</i>	Fabaceae	V	f	v	
	Coast Manna-gum	<i>Eucalyptus viminalis subsp. pryoriana</i>	Myrtaceae				X
	Coast Saltwort	<i>Salsola tragus subsp. pontica</i>	Chenopodiaceae			r	
	Coast Stackhousia	<i>Stackhousia spathulata</i>	Stackhousiaceae			k	
#	Coast Tea-tree	<i>Leptospermum laevigatum</i>	Myrtaceae				X
#	Coast Wattle	<i>Acacia longifolia subsp. sophorae</i>	Mimosaceae				X
*	Common Prickly-pear	<i>Opuntia stricta</i>	Cactaceae				X
*	Common Vetch	<i>Vicia sativa</i>	Fabaceae				X
	Cream Spider-orchid	<i>Caladenia patersonii s.s.</i>	Orchidaceae			e	
	Dodder Laurel	<i>Cassytha spp.</i>	Lauraceae				X
*	Fennel	<i>Foeniculum vulgare</i>	Apiaceae				X
*	Flax-leaf Broom	<i>Genista linifolia</i>	Fabaceae				X

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DSE	Recorded
	Frankston Spider-orchid	<i>Caladenia robinsonii</i>	Orchidaceae	E	f	e	
	Fringed Helmet-orchid	<i>Corybas fimbriatus</i>	Orchidaceae			r	
*	Galenia	<i>Galenia pubescens var. pubescens</i>	Aizoaceae				X
	Golden Cowslips	<i>Diuris behrii</i>	Orchidaceae			v	
*	Gorse	<i>Ulex europaeus</i>	Fabaceae				X
	Green-top Sedge	<i>Carex chlorantha</i>	Cyperaceae			k	
	Grey Billy-buttons	<i>Craspedia canens</i>	Asteraceae		f	e	
	Half-bearded Spear-grass	<i>Austrostipa hemipogon</i>	Poaceae			r	
	Kangaroo Apple	<i>Solanum aviculare</i>	Solanaceae				X
*	Kikuyu	<i>Pennisetum clandestinum</i>	Poaceae				X
	Large River Buttercup	<i>Ranunculus papulentus</i>	Ranunculaceae			k	
	Large White Spider-orchid	<i>Caladenia venusta</i>	Orchidaceae			r	
*	Lemon-scented Gum	<i>Corymbia citriodora subsp. citriodora</i>	Myrtaceae				X
	Lightwood	<i>Acacia implexa</i>	Mimosaceae				X
	Lizard Orchid	<i>Burnettia cuneata</i>	Orchidaceae			r	
	Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	Orchidaceae	E	f	e	
	Melbourne Yellow-gum	<i>Eucalyptus leucoxylon subsp. connata</i>	Myrtaceae			v	
	Mentone Greenhood	<i>Pterostylis X toveyana</i>	Orchidaceae			v	
	Metallic Sun-orchid	<i>Thelymitra epipactoides</i>	Orchidaceae	E	f	e	
*	Montpellier Broom	<i>Genista monspessulana</i>	Fabaceae				X
	Narrow-lip Spider-orchid	<i>Caladenia leptochila</i>	Orchidaceae			k	
	Netted brake	<i>Pteris comans</i>	Pteridaceae			r	
*	Onion Grass	<i>Romulea rosea</i>	Iridaceae				X
	Pale Swamp Everlasting	<i>Helichrysum aff. rutidolepis (Lowland Swamps)</i>	Asteraceae			v	
*	Panic Veldt-grass	<i>Ehrharta erecta var. erecta</i>	Poaceae				X

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DSE	Recorded
*	Prairie Grass	<i>Bromus catharticus</i>	Poaceae				X
	Prawn Greenhood	<i>Pterostylis pedoglossa</i>	Orchidaceae			v	
	Purple Blown-grass	<i>Lachnagrostis punicea subsp. filifolia</i>	Poaceae		f	r	
	Purple Diuris	<i>Diuris punctata var. punctata</i>	Orchidaceae		f	v	
*	Rat-tail Grass	<i>Sporobolus africanus</i>	Poaceae				X
	River Red-gum	<i>Eucalyptus camaldulensis</i>	Myrtaceae				X
	River Swamp Wallaby-grass	<i>Amphibromus fluitans</i>	Poaceae	V			
	Rough Daisy-bush	<i>Olearia asterotricha</i>	Asteraceae			r	
#	Sallow Wattle	<i>Acacia longifolia</i>	Mimosaceae				X
PI	Sheoak	<i>Allocasuarina spp.</i>	Casuarinaceae				X
	Silky Golden-tip	<i>Goodia lotifolia var. pubescens</i>	Fabaceae			r	
	Snowy Mint-bush	<i>Prostanthera nivea var. nivea</i>	Lamiaceae			r	
#	Southern Mahogany	<i>Eucalyptus botryoides</i>	Myrtaceae				X
	Southern Spider-orchid	<i>Caladenia australis</i>	Orchidaceae			k	
	Studley Park Gum	<i>Eucalyptus X studleyensis</i>	Myrtaceae			e	
	Swamp Gum	<i>Eucalyptus ovata</i>	Myrtaceae				X
	Swamp Paperbark	<i>Melaleuca ericifolia</i>	Myrtaceae				X
#	Sweet Pittosporum	<i>Pittosporum undulatum</i>	Pittosporaceae				X
	Sword Sedge	<i>Lepidosperma spp.</i>	Cyperaceae				X
	Thatch Saw-sedge	<i>Gahnia radula</i>	Cyperaceae				X
*	Tree Lucerne	<i>Chamaecytisus palmensis</i>	Fabaceae				X
*	Turnip	<i>Brassica spp.</i>	Brassicaceae				X
	Veined Spear-grass	<i>Austrostipa rudis subsp. australis</i>	Poaceae			r	
	Water Blinks	<i>Montia fontana subsp. amporitana</i>	Portulacaceae			k	
	Water Parsnip	<i>Berula erecta</i>	Apiaceae			k	

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DSE	Recorded
	Western Water-starwort	<i>Callitriche cyclocarpa</i>	Veronicaceae	V	f	v	
	Wine-lipped Spider-orchid	<i>Caladenia oenochila</i>	Orchidaceae			v	
	Woolly Waterlily	<i>Philydrum lanuginosum</i>	Philydraceae			v	
	Yarra Gum	<i>Eucalyptus yarraensis</i>	Myrtaceae			r	
*	Yorkshire Fog	<i>Holcus lanatus</i>	Poaceae				X

* = introduced species; # = native species occurring outside of natural range; PI = planted; L = listed as threatened; EPBC = status under EPBC Act; DSE = status under DSE's Advisory List; C = critically endangered; E, e = endangered; V, v = vulnerable; R, r = rare; k = insufficiently known

Appendix 2: Vertebrate terrestrial fauna species that occur or are likely to occur in the study area

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
Birds						
	Australasian Grebe	<i>Tachybaptus novaehollandiae</i>				
	Australasian Pipit	<i>Anthus novaeseelandiae</i>				
	Australasian Shoveler	<i>Anas rhynchotis</i>			VU	
	Australian Hobby	<i>Falco longipennis</i>				
	Australian Magpie	<i>Gymnorhina tibicen</i>				
	Australian Painted Snipe	<i>Rostratula australis</i>	VU	L	CE	
	Australian Pelican	<i>Pelecanus conspicillatus</i>				
	Australian Raven	<i>Corvus coronoides</i>				X
	Australian Shelduck	<i>Tadorna tadornoides</i>				
	Australian White Ibis	<i>Threskiornis molucca</i>				
	Australian Wood Duck	<i>Chenonetta jubata</i>				
	Banded Lapwing	<i>Vanellus tricolor</i>				
	Black Swan	<i>Cygnus atratus</i>				
	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>				
	Black-fronted Dotterel	<i>Euseiornis melanops</i>				
	Black-shouldered Kite	<i>Elanus axillaris</i>				X
	Black-tailed Native-hen	<i>Gallinula ventralis</i>				
	Black-winged Stilt	<i>Himantopus himantopus</i>				
	Blue-billed Duck	<i>Oxyura australis</i>		L	EN	
	Brown Falcon	<i>Falco berigora</i>				
	Brown Goshawk	<i>Accipiter fasciatus</i>				
	Brown Thornbill	<i>Acanthiza pusilla</i>				X

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
	Budgerigar	<i>Melopsittacus undulatus</i>				
	Buff-banded Rail	<i>Gallirallus philippensis</i>				
	Chestnut Teal	<i>Anas castanea</i>				
	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>				
	Cockatiel	<i>Nymphicus hollandicus</i>				
	Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>				
	Common Bronzewing	<i>Phaps chalcoptera</i>				
	Crested Pigeon	<i>Ocyphaps lophotes</i>				X
	Crested Shrike-tit	<i>Falcunculus frontatus</i>				
	Crimson Rosella	<i>Platycercus elegans elegans</i>				X
	Darter	<i>Anhinga novaehollandiae</i>				
	Dusky Moorhen	<i>Gallinula tenebrosa</i>				
	Dusky Woodswallow	<i>Artamus cyanopterus</i>				
	Eastern Great Egret	<i>Ardea modesta</i>		L	VU	
	Eastern Rosella	<i>Platycercus eximius</i>				
	Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>				
	Eastern Yellow Robin	<i>Eopsaltria australis</i>				
	Eurasian Coot	<i>Fulica atra</i>				
	Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>				
	Galah	<i>Eolophus roseicapilla</i>				
	Glossy Ibis	<i>Plegadis falcinellus</i>			NT	
	Golden Whistler	<i>Pachycephala pectoralis</i>				
	Golden-headed Cisticola	<i>Cisticola exilis</i>				
	Great Crested Grebe	<i>Podiceps cristatus</i>				

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
	Grey Butcherbird	<i>Cracticus torquatus</i>				
	Grey Currawong	<i>Strepera versicolor</i>				
	Grey Fantail	<i>Rhipidura albiscarpa</i>				
	Grey Shrike-thrush	<i>Colluricincla harmonica</i>				
	Grey Teal	<i>Anas gracilis</i>				
	Hardhead	<i>Aythya australis</i>			VU	
	Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>				
	Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>				
	Intermediate Egret	<i>Ardea intermedia</i>		L	CE	
	Latham's Snipe	<i>Gallinago hardwickii</i>			NT	
	Laughing Kookaburra	<i>Dacelo novaeguineae</i>				
	Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>				
	Little Corella	<i>Cacatua sanguinea</i>				
	Little Eagle	<i>Hieraaetus morphnoides</i>				
	Little Egret	<i>Egretta garzetta</i>		L	EN	
	Little Grassbird	<i>Megalurus gramineus</i>				
	Little Lorikeet	<i>Glossopsitta pusilla</i>				
	Little Pied Cormorant	<i>Microcarbo melanoleucos</i>				
	Little Wattlebird	<i>Anthochaera chrysoptera</i>				
	Long-billed Corella	<i>Cacatua tenuirostris</i>				
	Magpie Goose	<i>Anseranas semipalmata</i>		L	NT	
	Magpie-lark	<i>Grallina cyanoleuca</i>				X
	Masked Lapwing	<i>Vanellus miles</i>				
	Masked Woodswallow	<i>Artamus personatus</i>				

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
	Mistletoebird	<i>Dicaeum hirundinaceum</i>				
	Musk Duck	<i>Biziura lobata</i>			VU	
	Musk Lorikeet	<i>Glossopsitta concinna</i>				
	Nankeen Kestrel	<i>Falco cenchroides</i>				
	Nankeen Night Heron	<i>Nycticorax caledonicus</i>			NT	
	New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>				X
	Noisy Miner	<i>Manorina melanocephala</i>				X
*	Northern Mallard	<i>Anas platyrhynchos</i>				
	Olive-backed Oriole	<i>Oriolus sagittatus</i>				
	Pacific Barn Owl	<i>Tyto javanica</i>				
	Pacific Black Duck	<i>Anas superciliosa</i>				
	Pacific Gull	<i>Larus pacificus pacificus</i>			NT	X
	Pallid Cuckoo	<i>Cuculus pallidus</i>				
	Peaceful Dove	<i>Geopelia striata</i>				
	Peregrine Falcon	<i>Falco peregrinus</i>				
	Pied Cormorant	<i>Phalacrocorax varius</i>			NT	
	Pied Currawong	<i>Strepera graculina</i>				
	Pink-eared Duck	<i>Malacorhynchus membranaceus</i>				
	Purple Swamphen	<i>Porphyrio porphyrio</i>				X
	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>				X
	Red Wattlebird	<i>Anthochaera carunculata</i>				X
	Red-browed Finch	<i>Neochmia temporalis</i>				
	Red-kneed Dotterel	<i>Erythrogonys cinctus</i>				
	Red-rumped Parrot	<i>Psephotus haematonotus</i>				

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
	Royal Spoonbill	<i>Platalea regia</i>			VU	
	Rufous Fantail	<i>Rhipidura rufifrons</i>				
	Rufous Whistler	<i>Pachycephala rufiventris</i>				
	Sacred Kingfisher	<i>Todiramphus sanctus</i>				
	Satin Flycatcher	<i>Myiagra cyanoleuca</i>				
	Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>				
	Scarlet Robin	<i>Petroica boodang</i>				
	Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>				
	Silver Gull	<i>Chroicocephalus novaehollandiae</i>				X
	Silvereye	<i>Zosterops lateralis</i>				
	Southern Boobook	<i>Ninox novaeseelandiae</i>				
	Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>				
	Spotted Pardalote	<i>Pardalotus punctatus</i>				
	Spotted Turtle-Dove	<i>Streptopelia chinensis</i>				
	Straw-necked Ibis	<i>Threskiornis spinicollis</i>				X
	Striated Thornbill	<i>Acanthiza lineata</i>				
	Stubble Quail	<i>Coturnix pectoralis</i>				
	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>				
	Superb Fairy-wren	<i>Malurus cyaneus</i>				X
	Swamp Harrier	<i>Circus approximans</i>				
	Swift Parrot	<i>Lathamus discolor</i>	EN	L	EN	
	Tawny Frogmouth	<i>Podargus strigoides</i>				
	Tree Martin	<i>Hirundo nigricans</i>				
	Varied Sittella	<i>Daphoenositta chrysoptera</i>				

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
	Welcome Swallow	<i>Hirundo neoxena</i>				
	Whistling Kite	<i>Haliastur sphenurus</i>				
	White-browed Scrubwren	<i>Sericornis frontalis</i>				
	White-browed Woodswallow	<i>Artamus superciliosus</i>				
	White-eared Honeyeater	<i>Lichenostomus leucotis</i>				
	White-faced Heron	<i>Egretta novaehollandiae</i>				
	White-fronted Chat	<i>Epthianura albifrons</i>				
	White-naped Honeyeater	<i>Melithreptus lunatus</i>				
	White-necked Heron	<i>Ardea pacifica</i>				
	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>				X
	White-throated Needletail	<i>Hirundapus caudacutus</i>				
	White-throated Treecreeper	<i>Cormobates leucophaeus</i>				
	Willie Wagtail	<i>Rhipidura leucophrys</i>				X
	Yellow Thornbill	<i>Acanthiza nana</i>				
	Yellow-billed Spoonbill	<i>Platalea flavipes</i>				
	Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>				
	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>				
	Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>				
	Zebra Finch	<i>Taeniopygia guttata</i>				
	Little Raven	<i>Corvus mellori</i>				
*	Rock Dove	<i>Columba livia</i>				
	Striated Pardalote	<i>Pardalotus striatus</i>				
	Cattle Egret	<i>Ardea ibis</i>				
*	Spotted Turtle-Dove	<i>Streptopelia chinensis</i>				

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
*	Common Blackbird	<i>Turdus merula</i>				
*	Song Thrush	<i>Turdus philomelos</i>				
*	European Skylark	<i>Alauda arvensis</i>				
*	Eurasian Tree Sparrow	<i>Passer montanus</i>				
*	House Sparrow	<i>Passer domesticus</i>				
*	European Goldfinch	<i>Carduelis carduelis</i>				
*	European Greenfinch	<i>Carduelis chloris</i>				
*	Common Myna	<i>Acridotheres tristis</i>			X	
*	Common Starling	<i>Sturnus vulgaris</i>				
Mammals						
	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>				
	Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	EN		NT	
	Common Brushtail Possum	<i>Trichosurus vulpecula</i>				
	Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>				
	Sugar Glider	<i>Petaurus breviceps</i>				
	Koala	<i>Phascolarctos cinereus</i>				
	Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	VU	L	VU	
	White-striped Freetail Bat	<i>Tadarida australis</i>				
	Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>				
	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>				
	Chocolate Wattled Bat	<i>Chalinolobus morio</i>				
*	Black Rat	<i>Rattus rattus</i>				
*	Brown Rat	<i>Rattus norvegicus</i>				
*	House Mouse	<i>Mus musculus</i>				

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
*	European Rabbit	<i>Oryctolagus cuniculus</i>				
*	European Hare	<i>Lepus europeaus</i>				
*	Red Fox	<i>Vulpes vulpes</i>				
*	Cat	<i>Felis catus</i>				
Reptiles						
	Marbled Gecko	<i>Christinus marmoratus</i>				
	Tree Dragon	<i>Amphibolurus muricatus</i>				
	Delicate Skink	<i>Lampropholis delicata</i>				
	Garden Skink	<i>Lampropholis guichenoti</i>				
	Weasel Skink	<i>Saproscincus mustelinus</i>				
	Bougainville's Skink	<i>Lerista bougainvillii</i>				
	Spencer's Skink	<i>Pseudemoia spenceri</i>				
	Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>				
	White-lipped Snake	<i>Drysdalia coronoides</i>				
	Tiger Snake	<i>Notechis scutatus</i>				
	Eastern Three-lined Skink	<i>Bassiana duperreyi</i>				
	Eastern Brown Snake	<i>Pseudonaja textilis</i>				
	Little Whip Snake	<i>Suta flagellum</i>				
	Lowland Copperhead	<i>Austrelaps superbus</i>				
Frogs						
	Southern Bullfrog	<i>Limnodynastes dumerilii</i>				
	Striped Marsh Frog	<i>Limnodynastes peronii</i>				
	Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>				
	Common Froglet	<i>Crinia signifera</i>				X

Origin	Common Name	Scientific Name	Conservation Status			Recorded
			EPBC	FFG	DSE	
	Southern Toadlet	<i>Pseudophryne semimarmorata</i>			VU	
	Southern Brown Tree Frog	<i>Litoria ewingii</i>				
	Eastern Dwarf Tree Frog	<i>Litoria fallax</i>				
	Growling Grass Frog	<i>Litoria raniformis</i>	VU	L	EN	

DSE – Status from DSE Advisory List; **EPBC** – Status under EPBC Act; **FFG** – Status under FFG Act; **CE** – Critically endangered; **EN** – Endangered; **VU** – Vulnerable; **NT** – Lower risk near threatened; **DD** = data deficient; **L** – Listed under FFG Act; ***** = introduced species; **X** = recorded

Appendix 3: EVC Benchmarks

- Gippsland Plain:
 - Damp Sands herb-rich Woodland (EVC 3);
 - Swamp Scrub (EVC 53);
 - Plains Grassy Woodland (EVC 55);
 - Creekline Grassy Woodland (EVC 68); and
 - Plains Grassy Wetland (EVC 125).

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 3: Damp Sands Herb-rich Woodland

Description:

A low, grassy or bracken-dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses, and orchids. Occurs mainly on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils).

Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	15 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus viminalis</i> ssp. <i>pryoriana</i>	Rough-barked Manna Gum

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	1	5%	T
Medium Shrub	5	25%	MS
Small Shrub	3	5%	SS
Prostrate Shrub	1	1%	PS
Large Herb	2	5%	LH
Medium Herb	8	15%	MH
Small or Prostrate Herb	5	10%	SH
Large Tufted Graminoid	2	10%	LTG
Large Non-tufted Graminoid	1	1%	LNG
Medium to Small Tufted Graminoid	4	10%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Ground Fern	1	15%	GF
Bryophytes/Lichens	na	10%	BL

EVC 3: Damp Sands Herb-rich Woodland - Gippsland Plain bioregion

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia mearnsii</i>	Black Wattle
T	<i>Acacia melanoxylon</i>	Blackwood
MS	<i>Epacris impressa</i>	Common Heath
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
MS	<i>Banksia marginata</i>	Silver Banksia
MS	<i>Leptospermum myrsinoides</i>	Heath Tea-tree
SS	<i>Leucopogon virgatus</i>	Common Beard-heath
SS	<i>Dillwynia glaberrima</i>	Smooth Parrot-pea
SS	<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge
PS	<i>Astroloma humifusum</i>	Cranberry Heath
MH	<i>Gonocarpus tetragynus</i>	Common Raspwort
MH	<i>Drosera peltata</i> ssp. <i>auriculata</i>	Tall Sundew
MH	<i>Viola hederacea</i> sensu Willis (1972)	Ivy-leaf Violet
MH	<i>Geranium solanderi</i> s.l.	Austral Cranesbill
SH	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
SH	<i>Opercularia varia</i>	Variable Stinkweed
SH	<i>Dichondra repens</i>	Kidney-weed
SH	<i>Poranthera microphylla</i>	Small Poranthera
LTG	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
LTG	<i>Austrostipa mollis</i>	Supple Spear-grass
LNG	<i>Tetrarrhena juncea</i>	Forest Wire-grass
MTG	<i>Lepidosperma concavum</i>	Sandhill Sword-sedge
MTG	<i>Dianella revoluta</i> s.l.	Black-anther Flax-lily
MTG	<i>Lomandra filiformis</i>	Wattle-headed Mat-rush
MTG	<i>Poa sieberiana</i>	Grey Tussock-grass
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
GF	<i>Pteridium esculentum</i>	Austral Bracken

Recruitment:

Continuous

Organic Litter:

40 % cover

Logs:

15 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
LTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 53: Swamp Scrub

Description:

Closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer.

Canopy Cover:

%cover	Character Species	Common Name
50%	<i>Leptospermum lanigerum</i> <i>Melaleuca ericifolia</i>	Woolly Tea-tree Swamp Paperbark

Understorey:

Life form	#Spp	%Cover	LF code
Medium Shrub	2	10%	MS
Small Shrub	2	1%	SS
Large Herb	2	5%	LH
Medium Herb	3	15%	MH
Small or Prostrate Herb	2	5%	SH
Large Tufted Graminoid	2	10%	LTG
Large Non-tufted Graminoid	3	10%	LNG
Medium to Small Tufted Graminoid	2	5%	MTG
Medium to Tiny Non-tufted Graminoid	2	15%	MNG
Ground Fern	1	5%	GF
Scrambler or Climber	1	1%	SC
Bryophytes/Lichens	na	20%	BL

LF Code	Species typical of at least part of EVC range	Common Name
MS	<i>Coprosma quadrifida</i>	Prickly Currant-bush
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
LH	<i>Lycopus australis</i>	Australian Gipsywort
LH	<i>Lythrum salicaria</i>	Purple Loosestrife
LH	<i>Persicaria praetermissa</i>	Spotted Knotweed
MH	<i>Hydrocotyle pterocarpa</i>	Wing Pennywort
MH	<i>Stellaria angustifolia</i>	Swamp Starwort
MH	<i>Lobelia anceps</i>	Angled Lobelia
SH	<i>Crassula helmsii</i>	Swamp Crassula
LTG	<i>Juncus procerus</i>	Tall Rush
LTG	<i>Poa labillardierei</i>	Common Tussock-grass
LNG	<i>Gahnia radula</i>	Thatch Saw-sedge
LNG	<i>Phragmites australis</i>	Common Reed
LNG	<i>Baumea rubiginosa</i> s.l.	Soft Twig-rush
MTG	<i>Triglochin procerum</i> s.l.	Water Ribbons
MTG	<i>Juncus gregiflorus</i>	Green Rush
MNG	<i>Eleocharis acuta</i>	Common Spike-sedge
GF	<i>Blechnum cartilagineum</i>	Gristle Fern
SC	<i>Calystegia sepium</i>	Large Bindweed

EVC 53: Swamp Scrub - Gippsland Plain bioregion

Recruitment:

Continuous

Organic Litter:

40 % cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 55: Plains Grassy Woodland

Description:

An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer.

Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	80 cm	10 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
20%	<i>Eucalyptus tereticornis</i> ssp. <i>mediana</i>	Gippsland Red-gum
	<i>Eucalyptus camaldulensis</i>	River Red-gum

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	1	5%	T
Medium Shrub	2	10%	MS
Small Shrub	1	1%	SS
Prostrate Shrub	1	1%	PS
Large Herb	1	5%	LH
Medium Herb	10	20%	MH
Small or Prostrate Herb	3	5%	SH
Large Tufted Graminoid	2	5%	LTG
Large Non-tufted Graminoid	1	10%	LNG
Medium to Small Tufted Graminoid	9	35%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Bryophytes/Lichens	na	10%	BL

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Allocasuarina littoralis</i>	Black Sheoak
T	<i>Acacia mearnsii</i>	Black Wattle
T	<i>Acacia melanoxylon</i>	Blackwood
MS	<i>Kunzea ericoides</i>	Burgan
SS	<i>Pimelea humilis</i>	Common Rice-flower
PS	<i>Bossiaea prostrata</i>	Creeping Bossiaea
MH	<i>Hypericum gramineum</i>	Small St John's Wort
MH	<i>Oxalis perennans</i>	Grassland Wood-sorrel
SH	<i>Dichondra repens</i>	Kidney-weed
SH	<i>Poranthera microphylla</i>	Small Poranthera
LTG	<i>Austrostipa rudis</i>	Veined Spear-grass
LNG	<i>Gahnia radula</i>	Thatch Saw-sedge
MTG	<i>Themeda triandra</i>	Kangaroo Grass
MTG	<i>Carex breviculmis</i>	Common Grass-sedge
MTG	<i>Lomandra filiformis</i>	Wattle Mat-rush
MTG	<i>Schoenus apogon</i>	Common Bog-sedge
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass

EVC 55: Plains Grassy Woodland - Gippsland Plain bioregion

Recruitment:

Continuous

Organic Litter:

10 % cover

Logs:

10 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Plantago lanceolata</i>	Ribwort	high	low
MH	<i>Hypochaeris radicata</i>	Cat's Ear	high	low
MH	<i>Centaureum erythraea</i>	Common Centaury	high	low
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	high	high
MNG	<i>Romulea rosea</i>	Onion Grass	high	low
MNG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MNG	<i>Briza minor</i>	Lesser Quaking-grass	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 68: Creekline Grassy Woodland

Description:

Eucalypt-dominated woodland to 15 m tall with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. Occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds.

Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	80 cm	15 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus camaldulensis</i>	River Red Gum
	<i>Eucalyptus ovata</i>	Swamp Gum

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	2	10%	T
Medium Shrub	2	5%	MS
Small Shrub	2	1%	SS
Large Herb	2	5%	LH
Medium Herb	8	15%	MH
Small or Prostrate Herb	1	1%	SH
Large Tufted Graminoid	3	15%	LTG
Medium to Small Tufted Graminoid	12	20%	MTG
Medium to Tiny Non-tufted Graminoid	3	15%	MNG
Bryophytes/Lichens	na	10%	BL

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia mearnsii</i>	Black Wattle
MS	<i>Ozothamnus ferrugineus</i>	Tree Everlasting
MS	<i>Acacia pycnantha</i>	Golden Wattle
SS	<i>Pimelea humilis</i>	Common Rice-flower
MH	<i>Gonocarpus tetragynus</i>	Common Raspwort
MH	<i>Acaena echinata</i>	Sheep's Burr
SH	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
LTG	<i>Carex appressa</i>	Tall Sedge
LTG	<i>Poa labillardierei</i>	Common Tussock-grass
MTG	<i>Elymus scaber</i> var. <i>scaber</i>	Common Wheat-grass
MTG	<i>Lachnagrostis filiformis</i>	Common Blown-grass
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass

EVC 68: Creekline Grassy Woodland - Gippsland Plain bioregion

Recruitment:

Continuous

Organic Litter:

40% cover

Logs:

20m/0.1 ha

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	low
LH	<i>Plantago lanceolata</i>	Ribwort	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	low	low
MH	<i>Anagallis arvensis</i>	Pimpernel	low	low
LTG	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	low	high
MNG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MNG	<i>Romulea rosea</i>	Onion Grass	high	low
MNG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	low
MNG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MNG	<i>Aira elegantissima</i>	Delicate Hair-grass	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 125: Plains Grassy Wetland

Description:

This EVC is usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas.

Life forms:

Life form	#Spp	%Cover	LF code
Large Herb	3	10%	LH
Medium Herb	10	20%	MH
Small or Prostrate Herb	2	10%	SH
Large Tufted Graminoid	2	5%	LTG
Large Non-tufted Graminoid	2	10%	LNG
Medium to Small Tufted Graminoid	10	20%	MTG
Medium to Tiny Non-tufted Graminoid	4	10%	MNG
Bryophytes/Lichens	na	10%	BL
Total understorey projective foliage cover		95%	

LF Code	Species typical of at least part of EVC range	Common Name
LH	v <i>Craspedia paludicola</i>	Swamp Billy-buttons
LH	<i>Villarsia reniformis</i>	Running Marsh-flower
MH	<i>Myriophyllum crispatum</i>	Upright Water-milfoil
MH	<i>Lythrum hyssopifolia</i>	Small Loosestrife
MH	<i>Centella cordifolia</i>	Centella
SH	<i>Neopaxia australasica</i>	White Purslane
SH	<i>Myriophyllum integrifolium</i>	Tiny Water-milfoil
LTG	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
LNG	<i>Baumea arthropphylla</i>	Fine Twig-sedge
MTG	<i>Schoenus tesquorum</i>	Soft Bog-sedge
MTG	<i>Triglochin alcockiae</i>	Southern Water-ribbons
MTG	<i>Notodanthonia semiannularis</i>	Wetland Wallaby-grass
MTG	<i>Austrodanthonia duttoniana</i>	Brown-back Wallaby-grass
MNG	<i>Eleocharis acuta</i>	Common Spike-sedge
MNG	<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass
MNG	k <i>Eleocharis macbarronii</i>	Grey Spike-sedge
MNG	<i>Triglochin striatum</i>	Streaked Arrowgrass

Recruitment:

Episodic/Flood. Desirable period between disturbances is 5 years.

Organic Litter:

10% cover

EVC 125: Plains Grassy Wetland - Gippsland Plain bioregion

Logs:

5 m/0.1 ha.(where trees are overhanging the wetland)

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Rumex conglomeratus</i>	Clustered Dock	high	high
LH	<i>Plantago lanceolata</i>	Ribwort	high	low
MH	<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	Hairy Hawkbit	high	low
MH	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	high	high
MH	<i>Mentha pulegium</i>	Pennyroyal	high	high
MH	<i>Centaureum erythraea</i>	Common Centaury	high	low
MH	<i>Plantago coronopus</i>	Buck's-horn Plantain	high	high
MH	<i>Hypochaeris radicata</i>	Cat's Ear	high	low
MH	<i>Anagallis arvensis</i>	Pimpernel	high	low
SH	<i>Trifolium repens</i> var. <i>repens</i>	White Clover	high	high
LTG	<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Paspalum dilatatum</i>	Paspalum	high	high
MTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	high	high
MTG	<i>Gladiolus undulatus</i>	Wild Gladiolus	high	low
MTG	<i>Juncus articulatus</i>	Jointed Rush	high	high
MTG	<i>Lolium perenne</i>	Perennial Rye-grass	high	high
MTG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MTG	<i>Agrostis capillaris</i> s.l.	Brown-top Bent	high	high
MNG	<i>Paspalum distichum</i>	Water Couch	high	high
TTG	<i>Cyperus tenellus</i>	Tiny Flat-sedge	high	low
SNG	<i>Sisyrinchium iridifolium</i>	Blue Pigroot	high	high

Published by the Victorian Government Department of Sustainability and Environment May 2005

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