Vegetation and Biodiversity Report

Grant Street and Avenue of Honor SPS

December 2016

Tree Wishes
land care advice

Report Title	**Vegetation and Biodiversity Report; Grant Street and Avenue of Honor SPS**
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Report prepared by Tree Wishes

Contents

1 Introduction

1.1 Project Background

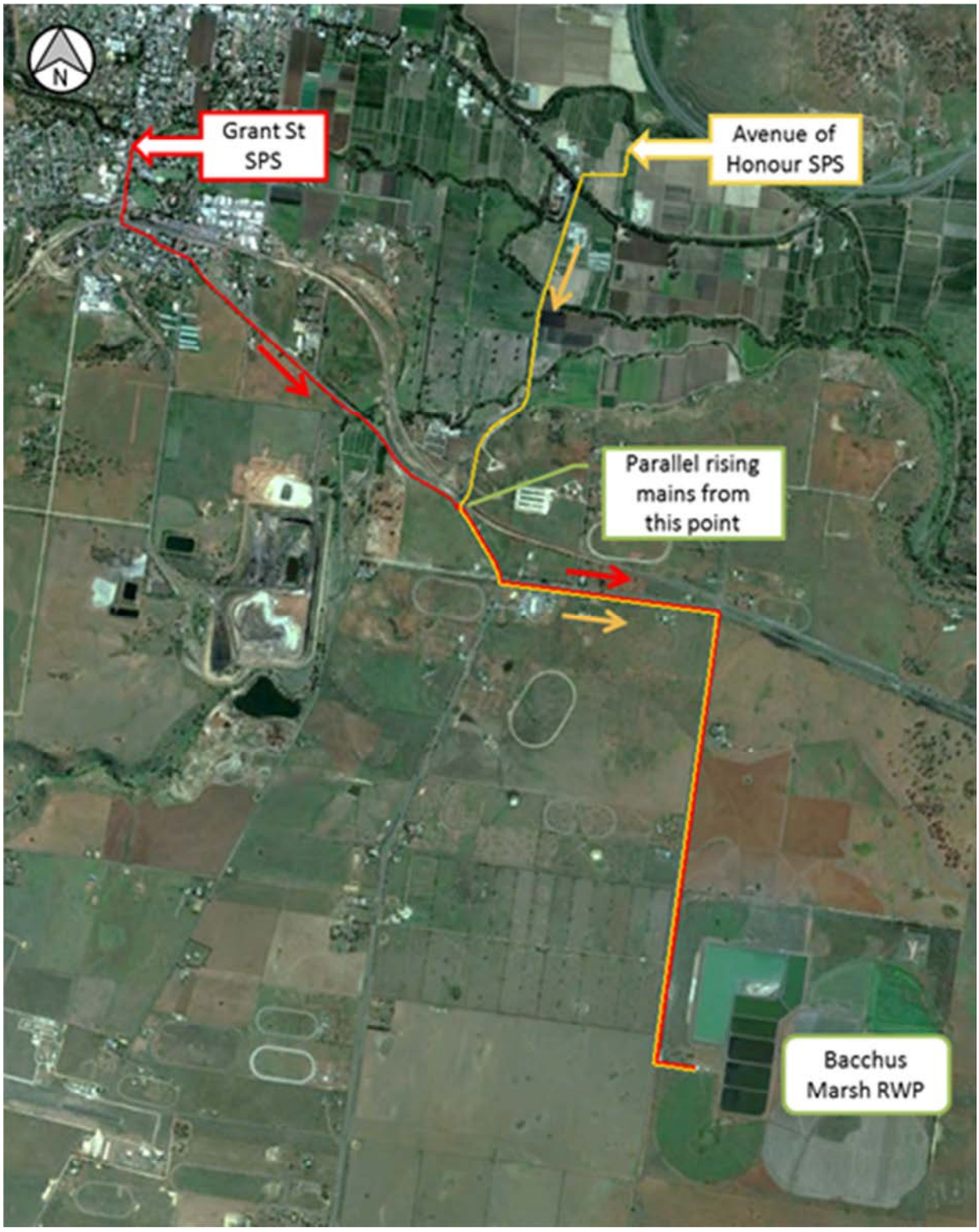
Ongoing infrastructure projects propose that a water pipeline be installed from the Western Water Treatment Plant at Parwan to Grant Street and the Avenue of Honor in Bacchus Marsh.

Tree Wishes has previously completed preliminary biodiversity reports for the projects (See: '*Preliminary Vegetation Assessment Avenue of Honor Rising Mains Duplication Western Water, Bacchus Marsh July 2010*, and '*Grant Street Pump Station and Rising Main; Preliminary Biodiversity Assessment, July 2012*'). These were completed six years ago necessitating new preliminary assessments.

1.2 Project Description

The project aims to install a pipe underground using trenching methods. The impact including that caused by machinery will be within a twelve metre wide by an approximate nine kilometre long transect. Figure One below shows the route.

Figure One: Proposed pipeline alignment



1.3 Study Area

Variable/Constant	Description
Location	The project will take place along the roadside verges of the Bacchus Marsh–Geelong Road, Parwan–Exford Road and Parwan South Road.
Size of the Project	The project length is 9.3 km, and will have an impact of approximately 10m in width
General Description of the Land	Roadside area
Aspect	The site is variable from flats to undulations.
Municipality	Moorabool Shire
Planning Zones	The alignment passes through a number of zones including: Farming Zone (FZ) Road Zone – Category 1 Road Zone – Category 2 Public Use Zone – Schedule 1 Public Park And Recreation Zone
Overlays	Environmental Significance Overlay - Schedule 2 Environmental Significance Overlay - Schedule 8 Heritage Overlay 47 Heritage Overlay 57 Heritage Overlay 83 Design and Development Overlay – Schedule 2
Vegetation Pattern – EVCs or Scattered Trees	EVC 132 – Plains Grassland EVC 292 – Red Gum Swamp EVC 55 – Plains Grassy Woodland
Bioregion	Victorian Volcanic Plain (VVP)

2 Vegetation Study Outcomes

2.1 Native Vegetation Definition

In Victoria, a planning permit is required to remove, destroy or lop native vegetation. Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. A planning permit is required to remove native plants that meet this definition, unless an exemption applies. The *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (the Guidelines) classify native vegetation in two categories; remnant patches and scattered trees.

Remnant patch

A remnant patch of native vegetation is either:

• an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native

• any area with three or more native canopy trees where the canopy foliage cover is at least 20 per cent of the area.

Scattered tree

A scattered tree is a native canopy tree that does not form part of a remnant patch.

2.2 Ecological Vegetation Classes

EVC is an acronym for Ecological Vegetation Class, which is a type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and through an inferred fidelity to particular environmental attributes. EVCs are assessed in patches. The current definition of a remnant patch of EVC is either:

a) an area of vegetation, with or without trees, where less than 75% of the total understorey plant cover is weeds or non-native plants (bare ground is not included). That is at least 25% of the understorey cover is native; or

b) a group (i.e. three or more) of trees where the combined tree canopy cover is at least 20%.

According to the Department of Environment, Land Water and Planning's (DELWP) Biodiversity Interactive Map (BIM) the three EVC's present across this site are:

EVC 132_61: *Heavier-soils* Plains Grassland

EVC 292: Red Gum Swamp, and

EVC 55: Plains Grassy Woodland.

Remnants of these EVC's are present along parts of the project area in accordance with the BIM.

2.2.1 Description of EVC 132_61; *Heavier-soils* Plains Grassland

Treeless vegetation mostly less than 1m tall dominated by largely graminoid and herb life forms. Occupies fertile cracking basalt soils prone to seasonal water logging in areas receiving at least 500 mm annual rainfall.

Remnant patches of this EVC are present along both sides of Parwan South Road, with the west side carrying significantly more than the east side of the road.

2.2.2 Description of EVC 55_61; Plains Grassy Woodland

Open eucalypt woodland to 15 m tall. 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. It occupies areas receiving approximately 500 – 700 mm annual rainfall.

Remnant patches of this EVC are present on both sides of Parwan-Exford Road. The patch on the south side supports a lower diversity of species than the northern side.

2.2.3 Description of EVC 292; Red Gum Swamp

Open woodland to 15 m tall. It occurs on alluvial plains in the seasonally wet depressions of shallow drainage lines or prior stream meanders, typically associated with heavy paludal soils, sometimes with gilgai development. The annual rainfall across its distribution is generally below 700 mm, and the period of inundation may range from 2 to 6 months. River Red Gum woodland with sedgy or grassy-herbaceous ground-layer, comprising various balances of true aquatics and species tolerant of intermittent to seasonal inundation.

Scattered Trees belonging to this EVC can be found along Grant Street and nearby to the waterways.

2.3 Rare or Threatened Vegetation Communities

2.3.1 State FFG Listed Communities:

The following vegetation communities which are listed in the Flora and Fauna Guarantee Act 1988 are present in the vicinity of the project area.

Western (Basalt) Plains Grassland

This community is often found on the heavy, basalt derived soils of the Victorian Volcanic Plain, ranging from Melbourne west to Hamilton. Rainfall ranges from 400mm in the east to 700mm in the west.

The community is predominantly open treeless grassland, usually dominated by Kangaroo Grass (*Themeda triandra*) in the drier areas, with Wallaby Grasses (*Austrodanthonia* spp.) and Spear Grasses (*Austrostipa* spp.), and Tussock Grasses (*Poa* spp.) in areas of higher moisture regimes. Herbs and forbs are often also present Woody plants are generally absent.

EVC 132_61 – *Heavier-soils* Plains Grassland is considered to be part of this listed vegetation community.

This community **is present** along the west side of Parwan South Road.

Grey Box - Buloke Grassy Woodland Community

This community is mainly a grassy woodland found on flat or very gently undulating plains in northern Victoria and a few places in central Victoria. It tends to develop in the absence of fire on sites with relatively fertile, fine-grained soils.

Grey Box (*Eucalyptus microcarpa*) is usually the structurally dominant tree over a lower stratum of Buloke (*Allocasuarina luehmannii*). Where fire is absent over a very long period, buloke may become the dominant species. The ground layer is mainly grasses, although a shrub layer is usually lacking, a scattering of wattles is present at some sites, and a few other shrubs such as Drooping Cassinia or 'Chinese Scrub' (*Cassinia arcuata*).

This community is **not** present along any sections of the alignment.

2.3.2 Federal EPBC Listed Communities:

The following vegetation communities which are listed in the Environmental Protection and Biodiversity Act 1999 are present in the vicinity of the project area.

Natural Temperate Grassland and Grassy Eucalypt Woodland (of the Victorian Volcanic Plain)

As detailed in the Australian Governments Department of Sustainability, Environment, Water, Population and Communities document titled '*Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland: A guide to the identification, assessment and management of nationally threatened ecological communities'* (Page 35) EVC 132_61 – *Heavier-soils* Plains Grassland is found within with this EPBC listed Natural Temperate Grassland vegetation community.

Following the flow chart to identify the Grassy Eucalypt Woodland and/or Natural Temperate Grassland ecological communities of the Victorian Volcanic Plain (Page 22 of the aforementioned document), the site condition of the vegetation along Exford Road is such that it **does** have sufficient quality to be considered the threatened Grassy Eucalypt Woodland community.

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia

As detailed in the Australian Governments Department of Sustainability, Environment, Water, Population and Communities document titled '*Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia; A guide to the identification, assessment and management of a nationally threatened ecological community'* the ecological community occurs in two forms, a grassy woodland form and as a derived native grassland.

This community is known to exist locally but is **not** present along the alignment.

2.4 EPBC Listed Flora Species

According to the EPBC Online Tool, seven nationally listed threatened plant species are predicted to occur in the area surrounding the project.

Refer to the Appendix for details of flora species listed as threatened under the EPBC Act 1999 that are predicted to occur within the region.

Table One lists all the rare and threatened flora species predicted to occur within the area and the acts under which they are protected.

The species were targeted during the site visit, in particular Matted Flax-lily (*Dianella amoena*), and Adamsons Blown-grass (*Lachnagrostis adamsonii*). Neither of the species were found to be present in the project area.

2.5 Biodiversity Interactive Map (BIM)

A search of the Department of Environment, Land, Water and Planning's (DELWP) Biodiversity Interactive Map (BIM) returned seven results within a 10km radius of the projected impact zone.

The species were targeted during the site visit, and two threatened species were found to be present in the project area; Arching Flax-lily (*Dianella sp. aff. longifolia* (Benambra)) and Bacchus Marsh Varnish Wattle (*Acacia rostriformis)*.

Table One lists rare and threatened flora species, their status and the acts under which they are protected.

Table One: Rare and Threatened Flora, Status and Protections

Common Name	*Scientific Name*	Status	FFG	EPBC	Record
Bacchus Marsh Varnish Wattle	***Acacia rostriformis***	**Threatened**	**FFG**	**-**	**Present on west side of Parwan South Road**
Buloke	*Allocasuarina luehmannii*	Threatened	FFG	-	Within 5km
Clover Glycine, Purple Clover	*Glycine latrobeana*	Vulnerable	FFG	EPBC	Within 10km
Hairy Tails	*Ptilotus erubescens*	Threatened	FFG	-	In the region
Hoary Sunray, Grassland Paper-daisy	*Leucochrysum albicans var. tricolor*	Endangered	-	EPBC	Species or species habitat likely to occur within area
Large-fruit Fireweed, Large-fruit Groundsel	*Senecio macrocarpus*	Vulnerable	FFG	EPBC	Species or species habitat likely to occur within area
Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid	*Prasophyllum frenchii*	Endangered	FFG	EPBC	Species or species habitat likely to occur within area
Matted Flax-lily	*Dianella amoena*	Endangered	-	EPBC	Species or species habitat likely to occur within area
Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea	*Pimelea spinescens subsp. spinescens*	Critically Endangered	FFG	EPBC	Within 5km
Small Golden Moths Orchid, Early Golden Moths	*Diuris basaltica*	Endangered	FFG	EPBC	Within 5km
Non-listed Threatened Species					
Arching Flax-lily	***Dianella sp. aff. longifolia (Benambra)***	**Vulnerable**	**-**	**-**	**Present on the west side of Parwan South Road**
Austral Tobacco	*Nicotiana suaveolens*	Rare	-	-	Within 5km
Black Roly-poly	*Sclerolaena muricata var. muricata*	Poorly Known	-	-	Within 5km
Black-tip Greenhood	*Pterostylus bicolour*	Poorly known	-	-	Within 5km
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	Rare	-	-	Within 10km
Buloke Mistletoe	*Amyema linophylla subsp. orientale*	Vulnerable	-	-	Within 10km
Curved Rice-flower	***Pimelea curviflora subsp. subglabrata***	**Poorly known**	-	-	**On the north side of Parwan-Exford Road**
Fragrant Saltbush	*Rhagodia parabolica*	Rare	-	-	Within 5km
Heath Spear-grass	*Austrostipa exilis*	Rare	-	-	Within 5km
Rye Beetle-grass	*Tripogon loliiformis*	Rare	-	-	Within 5km

2.6 Native Vegetation Information Management System

The Department of Environment, Land Water and Planning's Native Vegetation Information Management system (NVIM) is an online tool to access Victoria's native vegetation information.

According to the NVIM much of the site falls into Location A, with a very small portion of the site falling into Location B (see Figure Two).

Figure Two: Native Vegetation Location Risk.

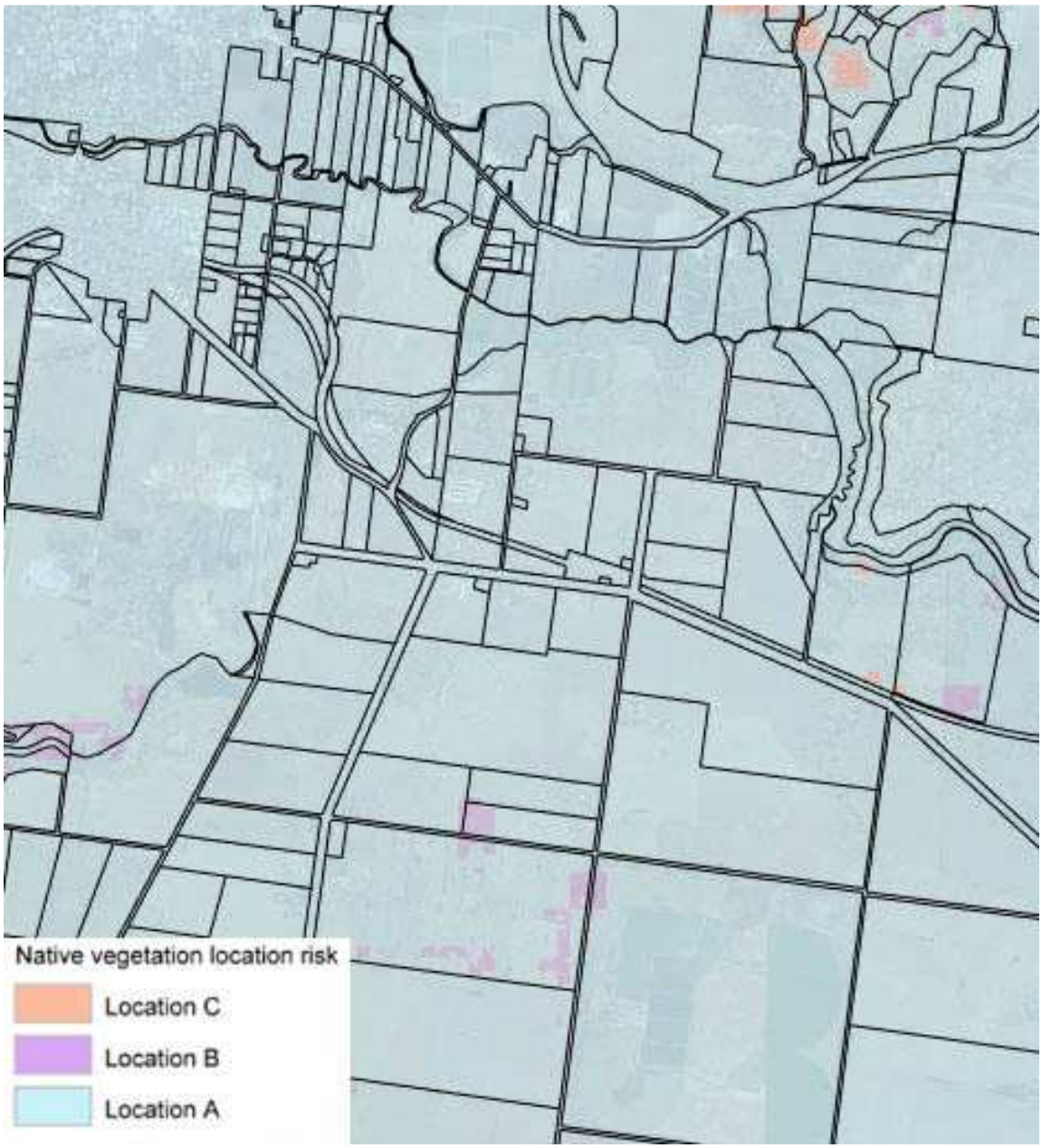


Figure Three details the predicted native vegetation condition score for the project area. There is significant variability between the predicted scores for different areas within the project area.

Figure Three: Native Vegetation Condition Score.

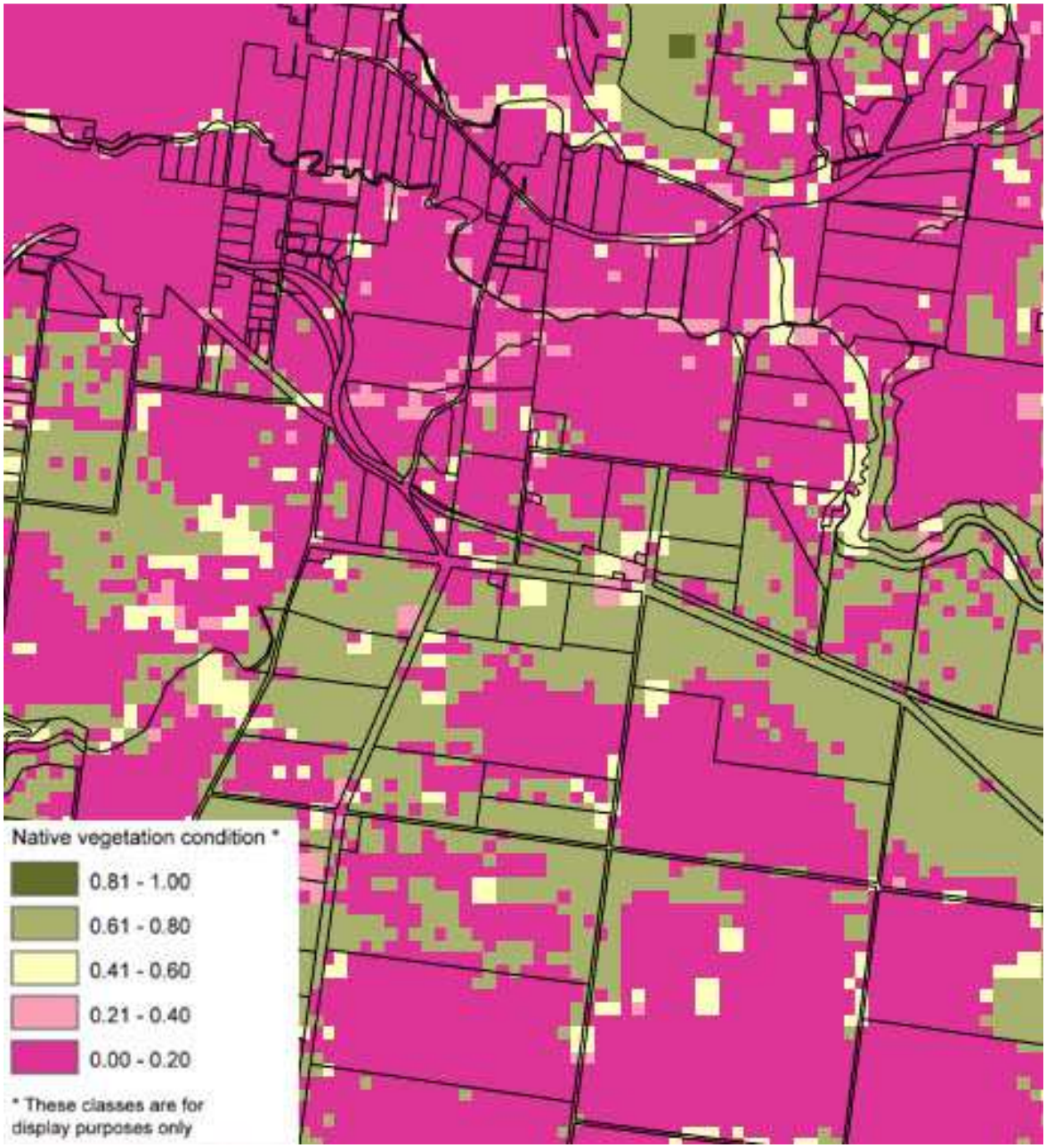
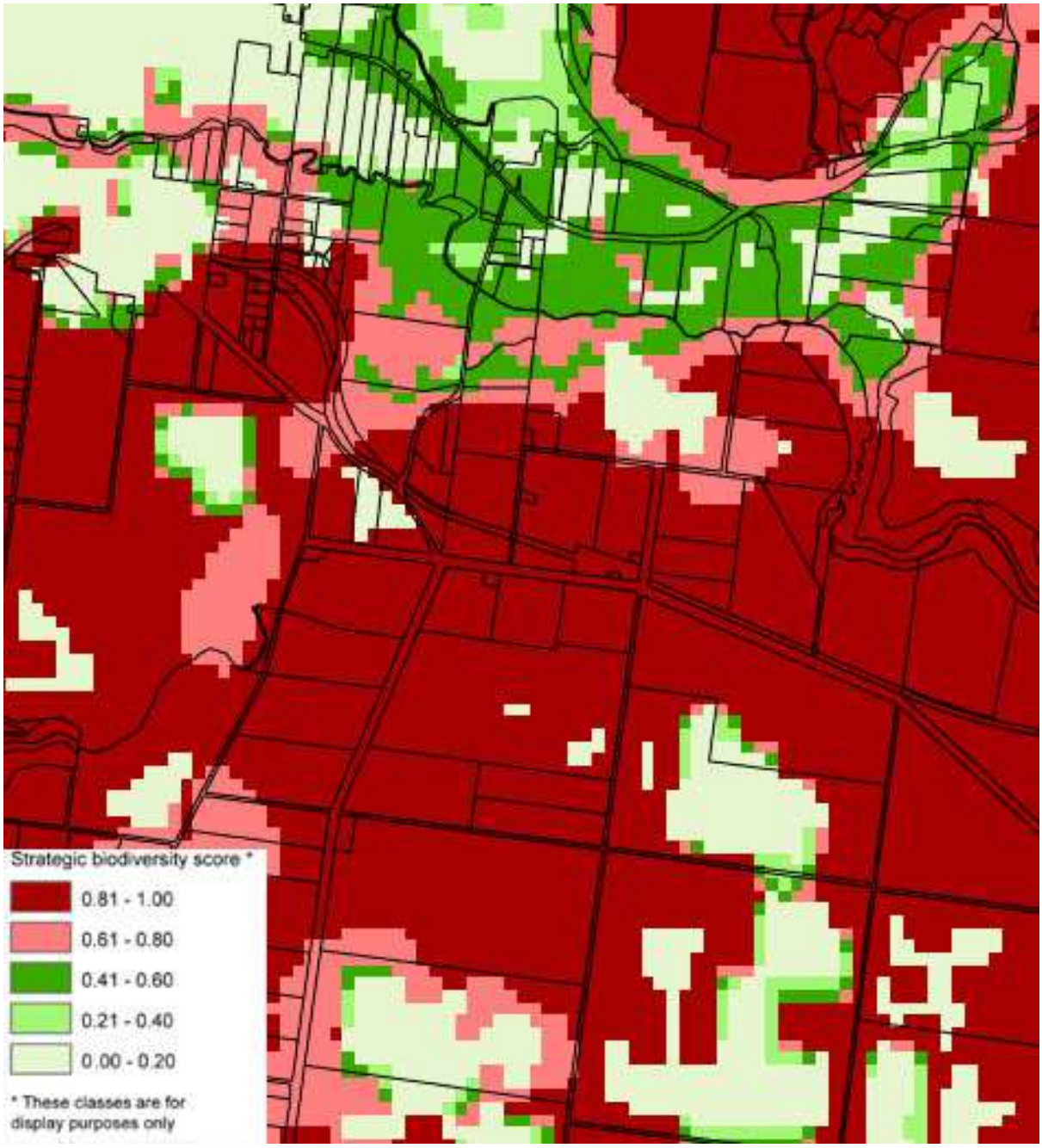


Figure Four details the strategic biodiversity score for the project area.

Figure Four: Strategic Biodiversity Score.



2.7 Vegetation Survey

The site was surveyed preliminarily in early September 2016, with more detailed site surveys being conducted in mid-October, 2016.

Thirty-five indigenous plant species and forty non-indigenous plant species were recorded during the surveys.

It must be noted that there may be seasonal constraints which impact on the ability to accurately survey the project area.

The detailed surveys were conducted after multiple rainfall events, which has resulted in the germination of many introduced grass species.

3 Fauna

3.1 EPBC Listed Fauna Species

According to the EPBC Online Tool, 26 nationally listed threatened terrestrial vertebrate and invertebrate fauna species are predicted to occur in the area surrounding the project.

Table Two lists all the rare and threatened fauna species predicted to occur within the area and the acts under which they are protected.

No EPBC listed fauna species were deemed likely to inhabit or make significant use the project area.

3.2 Biodiversity Interactive Map (BIM)

A search of the Department of Environment, Land, Water and Planning's (DELWP) Biodiversity Interactive Map (BIM) returned 17 results within a 10km radius of the projected impact zone.

The species were not formally surveyed although habitat considerations were undertaken on site.

Table Two lists rare and threatened fauna species, their status and the acts under which they are protected.

No listed fauna species were deemed likely to inhabit or make significant use the project area.

Table Two: Rare and Threatened Fauna, Status and Protections

Common Name	*Scientific Name*	Status	FFG	EPBC	Record
Australian Grayling	*Prototroctes maraena*	Vulnerable	FFG	EPBC	Species or species habitat likely to occur within area
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	FFG	EPBC	Species or species habitat known to occur within area
Australian Painted Snipe	*Rostratula australis*	Critically Endangered	FFG	EPBC	Within 5km
Black-faced Monarch	*Monarcha melanopsis*	Threatened	-	EPBC	Species or species habitat may occur within area
Blue-billed Duck	*Oxyura australis*	Endangered	FFG	-	Within 5km
Brush-tailed Phascogale	*Phascogale tapoatafa tapoatafa*	Vulnerable	FFG	-	Within 10km
Cattle Egret	*Ardea ibis*	Threatened	FFG	EPBC	Species or species habitat may occur within area
Common Greenshank, Greenshank	*Tringa nebularia*	Vulnerable	-	-	Species or species habitat may occur within area
Diamond Firetail	*Stagonopleura guttata*	Near Threatened	FFG	-	Within 10km
Eastern Dwarf Galaxias, Dwarf Galaxias	*Galaxiella pusilla*	Endangered	FFG	EPBC	Species or species habitat likely to occur within area
Fork-tailed Swift	*Apus pacificus*	Threatened	-	EPBC	Species or species habitat likely to occur within area
Freckled Duck	*Stictonetta naevosa*	Endangered	FFG	-	Within 5km
Golden Sun Moth	*Synemon plana*	Critically Endangered	FFG	EPBC	Species or species habitat may occur within area
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	Critically Endangered	FFG	EPBC	Species or species habitat may occur within area
Great Egret	*Ardea alba*	Endangered	FFG	EPBC	Within 5km
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable	FFG	EPBC	Foraging, feeding or related behaviour likely to occur within area
Growling Grass Frog	*Litoria raniformis*	Endangered	FFG	EPBC	Within 5km
Latham's Snipe	*Gallinago hardwickii*	Near Threatened	-	EPBC	Within 5km
Little Egret	*Egretta garzetta nigripes*	Endangered	-	EPBC	Within 5km
Painted Snipe	*Rostratula benghalensis s. lat.*	Threatened	FFG	EPBC	Species or species habitat likely to occur

					within area
Painted Honeyeater	*Grantiella picta*	Vulnerable	FFG	EPBC	Species or species habitat likely to occur within area
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	*Aprasia parapulchella*	Vulnerable	-	EPBC	Species or species habitat may occur within area
Plains-wanderer	*Pedionomus torquatus*	Critically Endangered	-	-	Species or species habitat likely to occur within area
Rainbow Bee-eater	*Merops ornatus*	Threatened	-	EPBC	Species or species habitat may occur within area
Regent Honeyeater	*Xanthomyza phrygia*	Critically Endangered	FFG	EPBC	Foraging, feeding or related behaviour likely to occur within area
Rufous Fantail	*Rhipidura rufifrons*	Threatened	-	EPBC	Breeding known to occur within area
Satin Flycatcher	*Myiagra cyanoleuca*	Threatened	-	EPBC	Breeding known to occur within area
Striped Legless Lizard	*Delma impar*	Vulnerable	FFG	EPBC	Species or species habitat likely to occur within area
Swift Parrot	*Lathamus discolour*	Endangered	FFG	EPBC	Species or species habitat likely to occur within area
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Threatened	FFG	EPBC	Species or species habitat likely to occur within area
White-throated Needletail	*Hirundapus caudacutus*	Threatened	-	EPBC	Species or species habitat Known to occur within area
Yellow Wagtail	*Motacilla flava*	Threatened	-	EPBC	Species or species habitat may occur within area
Non-listed Threatened Species					
Australasian Shoveler	*Anas rhynchotis*	Vulnerable	-	-	Within 5km
Brown Treecreeper	*Climacteris picumnus*	Near Threatened	-	-	Within 10km
Fat-tailed Dunnart	*Sminthopsis crassicaudata*	Near Threatened	-	-	Within 5km
Hardhead	*Aythya australis*	Vulnerable	-	-	Within 5km
Little Buttonquail	*Turnix velax*	Near Threatened	-	-	Within 5km
Musk Duck	*Biziura lobata*	Vulnerable	-	-	Within 5km
Nankeen Night Heron	*Nycticorax caledonicus*	Near Threatened	-	-	Within 5km
Royal Spoonbill	*Platalea regia*	Vulnerable	-	-	Within 5km

4 Zones and Overlays

The alignment passes through several zones and overlays, however, only two are relevant to the vegetation aspect of this project. They are detailed below:

4.1 Schedule 2 of Environmental Significance Overlay - Waterway Protection

Statement of environmental significance

The Shire of Moorabool contains several proclaimed water catchments, which provide water to urban and rural development throughout the Shire. The protection of waterways, which carry water within these catchments, is essential to the health of all communities that rely on water for domestic and stock supply.

Environmental objective to be achieved

- To protect the habitat significance of vegetation.
- To provide for appropriate development of land within 100 metres of either side of a waterway.
- To prevent pollution and increased turbidity of water in natural waterways.
- To prevent increased surface runoff or concentration of surface water runoff leading to erosion or siltation of waterways.
- To conserve existing flora and fauna habitats close to waterways and to encourage generation and regeneration of habitats.

An application to complete works in this area must address the effect on the quality and quantity of water within a waterway, and on flora and fauna habitats located close to those waterways, The requirements and provisions of the State Environment Protection Policy (Waters of Victoria) and The impact of the proposed use and development on soils, and the need to prevent soil erosion.

4.2 Schedule 8 To The Environmental Significance Overlay - River Red Gums In The Bacchus Marsh Valley

Statement of environmental significance

River Red Gums, *Eucalyptus camaldulensis*, represent the oldest living natural heritage of Bacchus Marsh, and are a striking feature of the Bacchus Marsh Valley. The hollow-bearing nature of the River Red Gum provides ideal fauna habitat and food for many species of native birds, mammals, insects and spiders.

Large hollows do not develop until the trees are well over 100 years old; therefore ongoing protection of all existing River Red Gums (regardless of age) is vital to the biodiversity values of the Bacchus Marsh Valley.

Of the 1411 remaining River Red Gums within the Bacchus Marsh Valley, approximately 150 are aged greater than 300 years and 70% are between 50-150 years old. These younger trees must be protected, as without regeneration the long term population of the River Red Gums will decline.

Environmental objective to be achieved

To provide for the long term preservation and regeneration of the River Red Gum population within the Bacchus Marsh Valley, therefore enhancing biodiversity and landscape quality. Ongoing management practices for River Red Gums should aim to achieve the following:

- Retain all hollow bearing trees.
- Minimisation of disturbance to the Tree Protection Zone for all River Red Gums.
- Support the regeneration of River Red Gums by protecting the growth of young trees.

A permit is not required to construct a building or carry out works outside the Tree Protection Zone of any River Red Gum tree. The Tree Protection Zone is defined as being an area with a radius equal to the furthest point of the tree canopy from the centre of the trunk plus 5 metre. The centre of the trunk is to be measured at the point where it meets the natural ground level.

An application to remove, destroy, lop or prune any River Red Gum or to construct a building or carry out works within the Tree Protection Zone of any River Red Gum must:

- Be accompanied by a plan that indicates the total extent of native vegetation on the land and the extent of proposed clearing, destruction or lopping.
- Specify the purpose of the proposed clearing.
- Demonstrate that the extent of removal, destruction or lopping of native vegetation has been reduced as much as is reasonable and practicable.

5 Vegetation Impacts

Much of the vegetation along the alignment consisted of non-indigenous and weedy species. The sections along much of Bacchus Marsh-Geelong Road and Woolpack Road were heavily grasses with introduced grasses and Carpet Weed (*Galenia pubescens*).

The sections which did support remnant native vegetation are detailed below in Section 4.1.

5.1 Remnant Patches

There are remnant patches of vegetation along the following sections of the alignment:

- Both sides of Parwan South Road between the Western Water Treatment Plant and Exford Road;

Impacts in this section can be minimised by aligning the pipe on the eastern side of Parwan South Road.

- Both sides of Exford Road between Parwan South Road and Bacchus Marsh-Geelong Road.

Impacts in this section can be minimised by aligning the pipe on the south side of Exford Road, and restricting its alignment to avoid impact on trees and higher quality areas of vegetation. There is an existing track that can guide a line of minimal impact through this patch.

5.2 Scattered Trees

There are several Scattered Trees; the majority being Red Gums (*Eucalyptus camaldulensis*) along the section in Grant Street, which are referred to in Schedule 8 to the Environmental Significance Overlay. There are also some Grey Box (*Eucalyptus microcarpa*) in this area.

These can be avoided by aligning the pipe to avoid the critical root zones of these trees, or using boring techniques.

5.3 Threatened Species

Several threatened species were recorded during the survey.

On Parwan South Road Bacchus Marsh Varnish Wattle (*Acacia rostriformis*) and Arching Flax-lily (*Dianella sp. aff. longifolia* (Benambra)) were recorded on the western side of the Road. Impact on these threatened species has been avoided by aligning the pipe on the eastern side of Parwan South Road.

On the north side of Parwan-Exford Road, Curved Rice-flower (*Pimelea curviflora var. aff. subglabrata*) was recorded. Impact on these threatened species has been avoided by aligning the pipe on the south side of Parwan-Exford Road.

No rare or threatened fauna species were recorded during the site surveys.

5.4 Threatened Communities

Impact on the FFG Listed Western (Basalt) Plains Grassland community can be avoided by aligning the pipe on the eastern side of Parwan South Road.

Impact on the EPBC Listed Natural Temperate Grassland (of the Victorian Volcanic Plain) cannot be avoided, however, impact can be minimised.

5.5 Planning Implications

Parts of the remnant vegetation on Parwan South Road (both sides) are in Location B, which means that if the vegetation impact is less than 0.5 hectares an application to remove vegetation will follow the low risk-based pathway (see Figure Five), however, if vegetation removal exceeds 0.5 hectares it will follow a medium risk-based pathway, and if it exceeds 1 hectare it will follow a high risk-based pathway.

Growling Grass Frog surveys may be required as part of this project, however, they are not being recommended by Tree Wishes as they have not been recorded nearby and the vegetation provides sub-optimal habitat for the species. There are no dams or wetlands along the proposed alignment, and no impact should occur to the waterways.

Figure Five: Risk Based Pathway Matrix

	Location A	Location B	Location C
Extent – remnant patch			
< 0.5 hectares	Low	Low	High
≥ 0.5 hectares and < 1 hectare	Low	Moderate	High
≥ 1 hectare	Moderate	High	High
Extent – scattered trees			
< 15 scattered trees	Low	Moderate	High
≥ 15 scattered trees	Moderate	High	High

5.6 Offsets

Offsets will be required as part of this project. Offsets can be minimised by reducing the impact on native vegetation.

The Native Vegetation; Permit application form; Low risk-based pathway for Grant Street SPS; Bacchus Marsh and Parwan South and the associated Biodiversity Assessment Report details the impact as 0.679 hectares within Location Risk A. This totals 0.330 General Biodiversity Equivalence Units (GBEU's). The offset target for this project is 0.495 GBEU's, must have a minimum Strategic Biodiversity Score of 0.734, and must be within the Port Phillip and Westernport CMA.

6 Recommendations

1. Vegetation impacts along Parwan South Road should be minimised by locating the pipeline along the east side of Parwan South Road.
2. Vegetation impacts along Exford Road should be minimised by aligning the pipeline to avoid remnant trees and in areas of remnant EVC the impact area is restricted to the minimal space required.
3. The Critical Root Zones of remnant indigenous trees and where ever possible introduced trees along Grant Street be avoided.
4. Works near or on waterways be conducted in a way that minimises disturbance and does not cause erosion.
5. An Environmental Management Plan should be completed detailing areas of ecological sensitivity to minimize the impact on native vegetation.
6. Reinstatement plans should be completed for areas where impact on remnant patches occurs, and for the areas along the waterways where vegetation must be re-established quickly to reduce the erosion risk.
7. Once an exact alignment has been determined a detailed Biodiversity Assessment Report needs to be completed, and from there it is likely that a Vegetation Quality Assessment and a Habitat Hectare Report will be required.
8. Federal and State referrals will be required for impacts on the Exford Road Grassy Eucalypt Woodland Community and for the Western (Basalt) Pains Grassland community.

7 Tables

7.1 Indigenous Plant Recorded

No	Common Name	Scientific Name	Status
1	Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	Vulnerable
2	Bacchus Marsh Varnish Wattle	*Acacia rostriformis*	Threatened, FFG Listed
3	Bluebell	*Wahlenbergia sp.*	
4	Bottlewasher	*Enneapogon sp.*	
5	Caustic Weed	*Euphorbia drummondii*	
6	Climbing Saltbush	*Einadia nutans*	
7	Common Cassinia	*Cassinia aculeata*	
8	Common wheatgrass	*Elymus scaber*	
9	Creeping Saltbush	*Atriplex semibaccata*	
10	Cudweed	*Gnaphalium sp.*	
11	Curved Rice-flower	*Pimelea curviflora var. curviflora*	
12	Drooping Cassinia	*Cassinia arcuata*	
13	Dwarf Mat-rush	*Lomandra nana*	
14	Golden Wattle	*Acacia pycnantha*	
15	Grey Box	*Eucalyptus microcarpa*	
16	Kangaroo Grass	*Themeda triandra*	
17	Kidney Weed	*Dichondra repens*	
18	Knob Sedge	*Carex inversa*	
19	Knottybutt grass	*Paspalidium constrictum*	Uncommon south of the divide
20	Pink Bindweed	*Convolvulus erubescens*	
21	Plains Joyweed	*Alternanthera* sp.1 (aff. *nana*)	
22	Red Gum	*Eucalyptus camaldulensis*	
22	Red Leg Grass	*Bothriochloa macra*	
24	Ruby Saltbush	*Enchylaena tomentosa*	
25	Rush	*Juncus sp.*	
26	Sheep's Burr	*Acaena echinata*	
27	Speargrass	*Austrostipa sp.*	
28	Speargrass	*Austrostipa scabra*	
29	Tree Violet	*Melicytus dentatus*	
30	Wallaby Grass	*Austrodanthonia sp.*	
31	Wattle mat rush	*Lomandra filiformis*	
32	Windmill grass	*Chloris divaricata*	
33	Wingless Blue-bush	*Maireana enchylaenoides*	
34	Wood Sorrell	*Oxalis sp.*	
35	Yellow Box	*Eucalyptus melliodora*	

7.2 Non-Indigenous Plants Recorded

No	Common Name	Scientific Name
1	African boxthorn	*Lycium ferocissimum*
2	Annual Veldtgrass	*Ehrharta longiflora*
3	Apple of Sodom	*Solanum linnaeanum*
4	Artichoke Thistle	*Cynara cardunculus*
5	Barley grass	*Hordeum glaucum*
6	Blown-grass	*Agrostis* sp.
7	Bracelet Honey Myrtle	*Melaleuca armillaris*
8	Brassica	*Brassica* sp.
9	Bristly ox-tongue	*Picris echioides*
10	Brome Grass	*Bromus* sp.
11	Capeweed	*Arctotheca calendula*
12	Carpet Weed	*Galenia pubescens*
13	Clover	*Trifolium* sp.
14	Cocksfoot	*Dactylis glomerata*
15	Couch Grass	*Cynodon dactylon*
16	Cypress	*Cupressus* sp.
17	Desert Ash	*Fraxinus angustifolia*
18	Hairy Mullein	*Verbascum thapsus*
19	Horehound	*Marrubium* sp.
20	Kikuyu Grass	*Pennisetum clandestinum*
21	Onion Grass	*Romulea rosea*
22	Oxalis	*Oxalis* sp.
23	Paspalum	*Paspalum dilatatum*
24	Paterson's curse	*Echium plantagineum*
25	Peppercorn Tree	*Schinus molle*
26	Perennial Ryegrass	*Lolium perenne*
27	Plantago	*Plantago lanceolata*
28	Plantain (Buckhorn)	*Plantago coronopus*
29	Poplar	*Populus alba*
30	Prairie Ground Cherry	*Physalis viscosa*
31	Prickly Pear	*Opuntia* sp.
32	Scarlet pimpernel	*Anagallis arvensis*
33	Serrated Tussock	*Nassella trichotoma*
34	Small-flowered Mallow	*Malva* sp.
35	Stinging Nettle	*Urtica dioica*
36	Sugar Gum	*Eucalyptus cladocalyx*
37	Thistle	*Silybum* sp.
38	Tree Lucerne	*Chamaecytisus palmensis*
39	Vetch	*Vicia* sp.
40	Wild Oat	*Avena fatua*

8 Photos

Figure One: Facing North along Parwan South Road showing the FFG Listed *Acacia rostriformis* on the left (west) side of the road.

Figure Two: Facing the east side of Parwan South Road, showing non-indigenous grasses and weeds.

Figure Three: The south side of Exford Road showing a remnant patch of indigenous grasses.

Figure Four: Facing the south side of Exford Road showing the EPBC Listed Grassy Eucalypt Woodland

Figure Five: Facing north along Woolpack Road.

Figure Six: Facing north-west along the west side of Bacchus Marsh-Geelong Road showing planted trees and short mown introduced grasses.

Figure Seven: Facing south along Grant Street showing trees that must be protected from impact.