

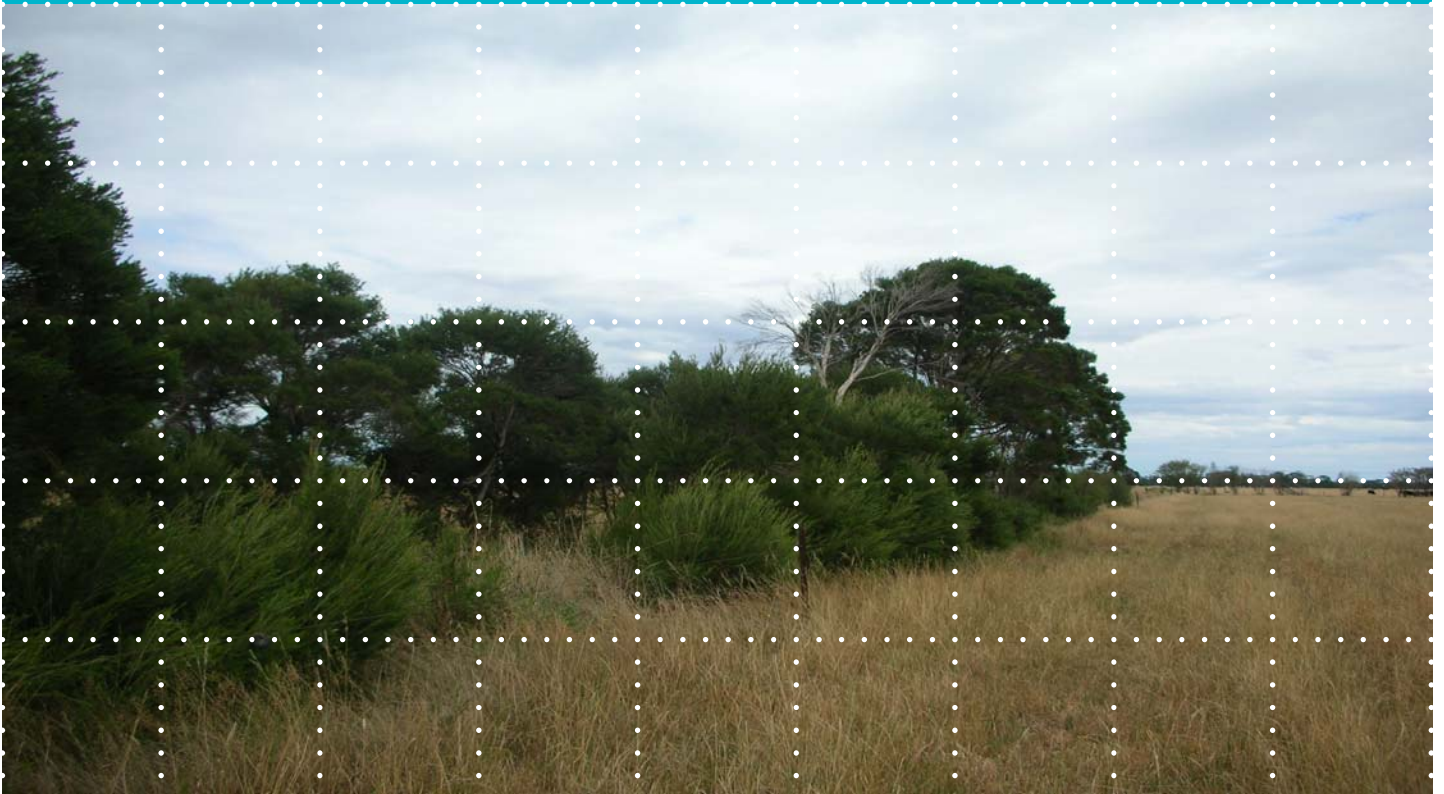
FINAL REPORT:

Flora and Net Gain Assessment for the Proposed Racecourse Development, at Nar Nar Goon, Victoria

PREPARED FOR:

Pakenham Racing Club

April 2010



Ecology Partners Pty Ltd

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The following Ecology Partners Pty. Ltd. employees either completed the field assessments and/or contributed to the preparation of the final report: Jenna Forbes, Simon Scott and Robyn Giles.

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SUMMARY

Introduction

Ecology Partners Pty. Ltd. was commissioned by the Pakenham Racing Club to undertake a flora and Net Gain assessment of Chippendale Road and remnant vegetation within the study area at Nar Nar Goon, Victoria. The study area is located south of the rail line adjacent to Nar Nar Goon Longwarry Road, approximately 70 kilometres south-east of Melbourne. The study area is currently private farm land which is owned and managed by Pakenham Racing Club and will become part of the overall development of the new Racecourse.

The study area is proposed to be developed as part of the new Pakenham racecourse in the future. The study area is currently zoned as Green Wedge Zone (Schedule 1) under the Cardinia Shire Council planning scheme.

The purpose of the assessment was to assess the ecological values of the site, and to produce a report containing sufficient detail for Pakenham Racing Club to obtain a planning permit through the Priority Development Panel process. The report also makes recommendations which assist Pakenham Racing Club to design and undertake upgrade works which avoid and minimise impacts on ecological values. A discussion on recommendations and requirements under Commonwealth, State, and local legislation and polices has also been included.

Methods

Biological databases maintained by the Department of Sustainability and Environment (DSE) were reviewed, including the Atlas of Victorian Wildlife (AVW 2007) and Flora Information System (FIS 2007). The presence of Ecological Vegetation Classes within the study area was reviewed using DSE's biodiversity interactive maps (DSE 2009), and potential matters of national environmental significance, protected under the Environment Protection and Biodiversity Conservation Act (EPBC Act 1999), was obtained from the Department of the Environment, Water, Heritage and the Arts Protected Matters Search Tool (DEWHA 2009).

A site assessment was undertaken to obtain terrestrial flora values on 4 February 2010, within the study area and immediate surrounds. A list of flora was recorded. A habitat hectare assessment was undertaken, consistent with DSEs guidelines (DSE 2004). The study area was traversed on foot, and boundaries of vegetation polygons marked by GPS and onto an aerial photograph. A list of all plant species present during the site assessment was compiled and indigenous trees were recorded.

Results

A total of 48 taxa of plants (14 indigenous, 34 exotics) were recorded within the study area during the present field assessment. The majority of the vegetation on the site occurred along Chippendale Road reserve and farm tracks. Vegetation that occurred within the study area included Ecological Vegetation Classes (EVCs) Swampy Woodland (EVC 937), and Swamp

Scrub (EVC 53) and was highly modified. Some areas of planted non-indigenous vegetation were also present, including trees which have been planted for windrows and exotic weeds and pasture grasses which have been cultivated for agricultural purposes. Nineteen indigenous scattered trees were recorded in the study area.

Ecological Significance

No national or state significant flora species were recorded within the study area during the present assessment. Indigenous flora species and patches of vegetation which are generally located along farm tracks or along fencelines are considered to be of local significance. The majority of the study area, which is highly modified due to agricultural uses, is considered to be of negligible conservation significance

Overall, the study area is considered to be of local conservation significance. However, two dams are known to contain Growling Grass Frog, so the study area has some national values of conservation significance (Ecology Partners 2010). Additional assessments for flora are not recommended.

Habitat Hectare assessment

There are approximately **0.48 habitat hectares** of High conservation significance Swampy Woodland within the study area.

Approximately 0.15 habitat hectares of Swampy Woodland is proposed to be removed, and actions to achieve Net Gain should be negotiated between the proponent, Cardinia Shire Council and DSE, and offset measures detailed in an Offset Management Plan (OMP).

Legislative and policy implications

A 'Protected Flora Licence or Permit' from the Department of Sustainability and Environment (DSE) pursuant to the *Flora and Fauna Guarantee Act 1988* is not recommended as the potential development is privately owned. Also, a referral to the Department of the Environment Water, Heritage and the Arts (DEWHA) has been prepared for the Growling Grass Frog (a Conservation Management Plan has also been prepared for this species)

Potential Impacts and Mitigation Measures

Detailed information relating to potential impacts on ecological values within the study area and mitigation measures are provided in Section 6.

Further Requirements

There are opportunities to enhance ecological values within the study area, principally through woody and herbaceous weed control, and revegetation in the vicinity of the proposed Growling Grass Frog ponds.

1 INTRODUCTION

1.1 Background

Ecology Partners Pty. Ltd. was commissioned by Pakenham Racing Club to undertake a flora and Net Gain analysis of the proposed site for the new Pakenham Racecourse, in Nar Nar Goon, Victoria.

The flora and Net Gain assessment was undertaken to identify any species of conservation significance and to provide information in relation to potential impacts and mitigation measures associated with the proposed use of the site. Implications for relevant environmental legislation and policy associated with the proposed use have also been provided.

A previous flora and fauna report for the study area has been undertaken by Biosis Research (2008). This report follows that earlier report, and includes a Net Gain assessment based on a development plan.

This report does not provide a fauna assessment. A fauna assessment has previously been undertaken (Biosis Research 2008) and conservation management plan for Growling Grass Frog has been prepared (Ecology Partners 2010).

1.2 Scope of Assessment

The scope of the flora assessment was to:

- Review the Flora Information System and other available literature;
- Conduct a site assessment, to identify flora species and habitat values within the study area, including any areas of remnant native vegetation which may potentially constrain future development of the site;
- Identify any significant vegetation communities;
- Preparation of a figure showing the remnant vegetation including mature indigenous trees (i.e. scattered remnant trees), any locations of significant species recorded during the surveys and previously recorded within the vicinity of the study area (based on the desktop assessment); and,
- Determine the potential impacts on flora values at a national, state, regional and local level associated with the development of the site.

The following tasks were carried out to address the implications under Victoria's *Native Vegetation Management – A Framework for Action* ('the Framework'):

- A 'habitat hectare' assessment of areas of remnant native vegetation (i.e. habitat hectare polygons of areas within the study area) has been conducted;
- A figure of 'habitat hectare' polygons and indigenous trees has been prepared whilst on-site;
- Count the number of very large and large trees within the remnant patches of native vegetation, and also any scattered remnant trees within the study area;
- Offset calculations or Net Gain targets for any native vegetation proposed to be removed as part of the proposed development;
- Determine if proposed offsets for the loss of native vegetation can be achieved on-site; and,
- If possible, document how the three step approach of 'avoid', 'minimise' and 'offset' should be considered, or how it should be addressed as part of the future development of the site.

1.3 Study Area

The study area is located south-east of Melbourne in Nar Nar Goon. It is bounded by the Gippsland train line and Nar Nar Goon Longwarry Road to the north, Chippendale Road to the east and private farmland to the south and west (Figure 1). It is located within a rural setting, with the small townships of Nar Nar Goon and Tynong within two kilometres either side.

The study area is currently zoned as a Green Wedge Zone (Schedule 1) under the Cardinia Shire Council planning scheme. It is covered by a Land Subject to Inundation Overlay (LSIO) (DSE 2009b).

The study area is within the Port Phillip and Westernport Catchment and in the Gippsland Plain bioregion. The Gippsland Plain Bioregion extends from Port Phillip Bay in the west to Bairnsdale in the east, between the southern slopes of the Great Dividing Range and Wilsons Promontory, excluding the Strzelecki Ranges.

2 METHODS

2.1 Nomenclature

Common and scientific names of vascular plants follow the Department of Sustainability and Environment's Flora Information System (FIS 2007) and the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow the DSE EVC benchmarks (DSE 2009a).

Terrestrial and aquatic vertebrate and invertebrate fauna (mammals, birds, reptiles, amphibians, fish, butterflies) follow the Atlas of Victorian Wildlife (AVW).

2.2 Database Searches

The FIS and AVW, which are biological databases maintained by DSE were reviewed to establish the flora and fauna which had previously been recorded at the study area and surrounds. Information referring to matters of national environmental significance (listed taxa and ecological communities, Ramsar wetlands) protected under the EPBC Act was obtained from the Department of the Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool (DEWHA 2009). In each of these cases a 10-kilometre buffer around the study area was used.

The presence of Ecological Vegetation Classes (EVCs) within the study area were reviewed using DSE's Biodiversity Interactive Map (DSE 2010a). Relevant information from the Cardinia Shire Council was obtained online (DSE 2010b).

2.3 Vegetation Assessment

The flora assessment was undertaken on 4 February 2010. The study area was visually assessed on foot, and the condition and cover abundance of vegetation were noted. All indigenous plants and dominant exotic flora were recorded. Planted vegetation was not recorded unless it was seen to be naturally spreading.

Remnant vegetation in the local area was also reviewed to assist in determining the original vegetation within the study area. EVCs were determined by reference to DSE pre-1750 and extant EVC mapping (DSE 2009a). The significance assessment criteria of taxa and vegetation communities are presented in Appendix 1.

2.4 Net Gain Assessment

The habitat hectare (and tree) methodology is one method of measuring the quality and quantity of vegetation within a discrete area, and an analysis was undertaken, where appropriate during the vegetation assessment. It can aid in quantifying losses and gains for the Net Gain policy.

Net Gain is an overall outcome where native vegetation and habitat gains are greater than vegetation and habitat losses. The Framework has defined a three-step approach for applying Net Gain to protection and clearance decisions. Emphasis is placed on the first two steps, and only after these two steps have been considered should offsets (actions undertaken to achieve commensurate gains) be considered (NRE 2002). The three-step approach is:

1. To avoid adverse impacts, particularly vegetation clearance.
2. If impacts cannot be avoided, to minimise impacts through appropriate consideration in planning processes and expert input to project design or management.
3. Identify appropriate offset options.

2.4.1 Habitat Hectare Assessment

The Framework uses the habitat hectare measure to assist with quantifying Net Gain outcomes for native vegetation. Methodology on habitat scoring and habitat hectares is described in the Vegetation Quality Assessment Manual (DSE 2004, DSE website). The habitat hectare is a unit of measurement, which combines both quality (relative to a published Benchmark) and quantity (EVC type) for a habitat zone.

Under the recently released DSE guidelines, three categories of vegetation have been defined (DSE 2007b). The three categories are ‘remnant patches’, ‘scattered trees’ and ‘degraded treeless vegetation’.

Habitat hectare assessments are only undertaken in areas of vegetation which are considered ‘remnant patches’, this is where the canopy layer is greater than 20% or where at least 25% of the understorey cover is indigenous, as a proportion of total understorey cover (DSE 2007b). Scattered trees consist of canopy species and are defined as areas where the canopy cover is less than 20% and the weed cover in the understorey is equal to or greater than 75% of the total understorey cover. ‘Degraded treeless vegetation’ is all other vegetation that does not meet the thresholds for a remnant patch or scattered trees. Where losses are permitted, the definition of conservation significance and offset objectives are guided by the Framework (NRE 2002) and the *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006).

The habitat score is calculated using ten components: large trees, tree canopy cover, understorey, weediness, recruitment, organic litter, logs, patch size, neighbourhood context and distance to core area. Each component is listed on the Vegetation Quality Field Assessment Sheet (DSE 2004). An assessor then scores the site according to the conditions and landscape context.

2.4.2 Tree Assessment

The Framework includes minimum protection/replacement ratios for trees that are to be removed as part of permitted clearing. Size classes apply to indigenous trees based on their Diameter at Breast Height (DBH) relative to the EVC Benchmark.

2.5 Assessment Qualifications and Limitations

While the objectives of the assessment were to document the ecological values within the study area, a prolonged assessment over several seasons was beyond the scope of this study, and this study was not a targeted survey for threatened flora species. The short duration of the survey meant that uncommon flora species may have been absent from typically occupied habitats at the time of the present assessment. The assessment was also not undertaken at an optimal time of year to record plant species.

Notwithstanding the above, terrestrial flora and fauna data collected during the field surveys, the modified nature of the majority of the study area (i.e. highly modified grassland and planted vegetation), and information obtained from relevant sources (e.g. biological databases and relevant literature) were reviewed and considered sufficient to provide an accurate assessment of the ecological values and habitat hectare assessments within the study area.

3 RESULTS

3.1 Flora Species

A total of 48 taxa of plants (14 indigenous, 34 exotics) were recorded during the present assessment within the study area (Appendix 2.1).

Species within areas of Swampy Woodland include Swamp Gums *Eucalyptus ovata* and Narrow-leaf Peppermint *Eucalyptus radiata*, over an understorey containing species such as Swamp Paperbark *Melaleuca ericifolia*, Spear-grass *Austrostipa* spp., Thatch Saw-sedge *Gahnia radula*, Rush *Juncus* spp. and Common Reed *Phragmites australis*.

There is also a high cover of weeds within areas of native vegetation. The majority of the study area contains exotic weeds and pasture grasses including Blackberry *Rubus fruticosus* sp. agg., Black Nightshade *Solanum nigrum*, Perennial Rye-grass *Lolium perenne*, Cocksfoot *Dactylis glomerata* and Toowoomba Canary-grass *Phalaris aquatica*. There are also exotic weeds which have established in paddocks and around moisture-laden spots within the study area. These include Wild Carrot *Daucus carota*, Barley Grass *Critesion* spp., Couch *Cynodon dactylon*, Small-flower Mallow *Malva parvifolia* and Sweet Vernal-grass *Anthoxanthum odoratum*.

3.2 Ecological Vegetation Classes

The DSE pre-1750 EVC mapping shows that the study area was once covered by Swampy Woodland (EVC 937), Swampy Riparian Woodland (EVC 83) and Swamp Scrub (EVC 53) (DSE 2009). The field assessment confirmed that the extent of native vegetation within the study area occurs as modified areas of Swamp Scrub (EVC 53) and Swampy Woodland (EVC 937). Areas of Swampy Woodland are found in the road reserves of Chippendale Road, and to the south of the study area adjacent Ararat Creek (Figure 2).

All Swampy Woodland remnants are considered Endangered within the Gippsland Plain Bioregion by DSE (DSE 2009).

Vegetation Condition

The study area supports highly modified, poor quality remnants of indigenous vegetation. The most diverse remnants are located in the road reserves of Chippendale Road.

Swampy Woodland remnants present in the south west corner of the study area are of poor quality. The overstorey includes very large and large old trees, which are Swamp Gum *Eucalyptus ovata*. These patches of Swampy Woodland lack any native understorey, which is completely dominated by exotic weeds.

Swamp Scrub within the study area is of very poor quality due to land clearing and livestock grazing, and generally contain a shrub layer of Swamp Paperbark, with some small recruiting specimens, and a high cover of weeds. Considerable areas of Swamp Scrub are growing along

man-made drains within the study area. They are considered to have recolonised after disturbance rather than being remnant. They are therefore classified as Degraded Treeless Vegetation (term used by DSE to describe secondary or recolonising vegetation).

There are several dams present within the study area, some of which contain native aquatic plants such as Cumbungi *Typha* sp. and Common Spike-sedge *Eleocharis acuta*. These areas are not considered to be remnant, and are also considered to be Degraded Treeless Vegetation.

The majority of the study area is farmland, which contains sheep and cattle, and thus contains several introduced pasture grass species, which have been sown for crops, or to improve pasture for livestock. Further information on the condition of vegetation within the study area is provided within the habitat hectare analysis (Section 5).

3.3 Significant Flora Species and Communities

No nationally or state significant¹ flora species or floristic communities were recorded during the current assessment. Vegetation within the study area is not considered to possess any threatened species attributes, and therefore is not considered to be within the ‘best or remaining 50%’ of habitat in the state for rare or threatened flora or fauna species.

Significant flora species derived from Commonwealth and State databases as occurring, or having the potential to occur, within the study area are provided in Appendix 2.2. Significant flora species previously recorded within the vicinity of the study area are shown in Figure 3.

3.3.1 National

One nationally significant flora species, Matted Flax-lily *Dianella amoena*, has previously been documented within 10 km of the study area (FIS 2007). Additionally, three species are predicted as potentially occurring in the local area by the EPBC Act protected matters search tool (Appendix 2.2). These are River Swamp Wallaby-grass *Amphibromus fluitans*, Maroon Leek-orchid *Prasophyllum frenchii* and Swamp Everlasting *Xerochrysum palustre*. It is considered unlikely that such species would persist in the study area due to a lack of suitable habitat and the highly modified nature of the study area.

3.3.2 State

Fourteen state significant flora species have previously been recorded within a 10 kilometre radius of the study area (FIS) (Appendix 2.2). It is considered unlikely that such species would persist in the study area due to a lack of suitable habitat and the highly modified nature of the study area.

¹ Refer to Appendix 1 for definition of ‘significance’.

3.3.3 Regional and Local

Four regionally significant flora species were recorded within the study area during the present assessment. All indigenous species are considered to be of local significance, due to the depletion of native vegetation in the local area.

3.4 Ecological Significance of Study Area

The majority of vegetation within the study area is highly modified and dominated by weeds, and is considered to be of low ecological significance. Areas of remnant vegetation within the study area are considered to be of local ecological significance. Habitat for Growling Grass Frog occurs at two dams on the site (Ecology Partners 2010) and these are a nationally listed species under the EPBC Act 1999.

The significance assessment criteria of flora and fauna species and vegetation communities are presented in Appendix 1.

4 IMPLICATIONS OF THE FINDINGS

4.1 Legislative and Policy Implications

This section identifies biodiversity policy and legislation relevant to the proposed works, principally:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth);
- *Flora and Fauna Guarantee Act 1988* (FFG Act) (Victoria);
- *Planning and Environment Act 1987* (Victoria);
- *Catchment and Land Protection Act 1994* (CALP Act) (Victoria); and
- *Victoria's Native Vegetation Management Framework – A Framework for Action* (Net Gain policy).

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act establishes a Commonwealth process for assessment of proposed actions that are likely to have a significant impact on matters of national environmental significance, or on Commonwealth land. An action (i.e. project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Commonwealth Environment Minister if they are likely to have an impact on any matters of national environmental significance. A referral under the EPBC Act is required if a proposed action is likely to have a 'significant impact' on any of the following seven matters of national conservation significance:

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

Ramsar wetlands of international significance

There are no Ramsar listed wetlands within the study area. It is unlikely that the proposed works will impact any Ramsar sites.

Listed flora and fauna species, and ecological communities

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

Flora – No flora species listed under the EPBC Act were recorded during the current assessment. However, four species have the potential to occur within a 10 kilometre radius of the study area (EPBC Act Protected Matters Search Tool). The study area is highly unlikely to support a nationally significant population of flora species. As such, based on available information, an EPBC Act referral to the Commonwealth Environment Minister is not recommended for any proposed works relating to Pakenham Race Course.

Fauna – One fauna species listed under the EPBC Act, the Growling Grass-frog *Litoria raniformis* has been previously recorded within the study area. A Conservation management Plan and EPBC referral has been prepared for this species as part of the proposed development.

Communities – The remnant native vegetation within the study area is not part of a listed ecological community under the EPBC Act.

Listed migratory and marine species

Several migratory and marine species have been recorded from the local area (AVW). However, there is no important wetland or marine habitats within the study area, and therefore the study area is unlikely to support an ecologically significant population of any migratory and/or marine species.

Commonwealth marine area and nuclear actions

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

Implications for the proposed racecourse development

No EPBC Act-listed flora or vegetation communities were recorded during the current assessment, or are likely to occur on the study area. One fauna species, Growling Grass Frog has been recorded on the study area. An EPBC referral and Conservation Management Plan for this species has been prepared.

4.1.2 Flora and Fauna Guarantee Act 1988

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

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

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

Implications for proposed racecourse development

No threatened species or communities listed under the FFG Act were recorded in the study area during the assessment. The FFG Act only applies on public land, and so is only relevant to Chippendale Road. There are no FFG Act-listed species within vegetation in the Chippendale Road reserves, and as such no permit for the removal of indigenous flora is required.

4.1.3 Planning and Environment Act 1987

All planning schemes contain native vegetation provisions at Clause 52.17. A planning permit is required under the *Planning and Environment Act 1987* to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless:

- The application is exempt under the schedule to Clause 52.17
- A Native Vegetation Precinct Plan applies.

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

Implications for proposed racecourse development

A Planning Permit is required from the Priority Development Panel to clear/disturb native vegetation within the study area.

4.1.4 Catchment and Land Protection Act 1994

The *CALP Act* contains provisions relating to catchment planning, land management, noxious weeds and pest animals. This Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- Protect water resources;
- Conserve soil;
- Eradicate regionally prohibited weeds;

- Prevent the growth and spread of regionally controlled weeds; and
- Prevent the spread of, and as far as possible eradicate, established pest animals

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

The current freehold landowners are responsible for the control of listed noxious pest plants and animals within the study area.

Implications for proposed racecourse development

Isolated individuals to large infestations of Regionally Prohibited and Controlled weeds and Weeds of National Significance occur within the study area (i.e. Spear Thistle *Cirsium vulgare*, Spiny Broom *Calicotome spinosa*, Montpellier Broom *Genista monspessulana* and Blackberry *Rubus fruticosus* sp. agg) and should be appropriately controlled to minimise their spread (Appendix 2.1).

4.1.5 Cardinia Shire Council

The study area and surrounding land is a Green Wedge Zone (GWZ) within the Cardinia Shire. There is also a Land Subject to Inundation Overlay (LSIO) over the study area.

Implications for proposed racecourse development

Pakenham Racing Club is required to apply for a planning permit from Cardinia Shire Council to remove vegetation from within the study area.

4.1.6 The Native Vegetation Framework

Since 1989, most proposals to clear native vegetation have required a planning permit from the local Council (Responsible Authority), under the native vegetation provisions of Clause 52.17 of the Victoria Planning Provisions ("VPPs").

In 2002, the Victorian Government released *Victoria's Native Vegetation Management – A Framework for Action* (NRE 2002) ("the Framework"), which establishes a 'strategic direction for the protection, enhancement and revegetation of native vegetation across the State'.

Amendment (VC19) to Victoria's Planning Provisions introduced the Framework in July 2003 as an incorporated document for all Victorian Planning Schemes. Clauses 11 and 15.09 in the State Planning Policy Framework provide the framework for considering native vegetation issues in the planning system.

These clauses require planning and responsible authorities to have regard to the Framework, which establishes the strategic direction for the protection, enhancement and revegetation of native vegetation across Victoria.

A Net Gain Habitat Hectare assessment has been undertaken below.

5 NET GAIN ASSESSMENT

The relocation of the Pakenham Racing Club will trigger a requirement for Net Gain offsets. Therefore, this discussion is provided to assist with the ongoing design of the development plan.

Remnants of two EVCs were identified within the study area – Swampy Woodland (EVC 937) and Swamp Scrub (EVC 53). This remnant native vegetation is considered to be of **High** conservation significance according to the Framework and *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006). Where appropriate, the details of the habitat hectare analysis and scattered tree assessment are provided below.

5.1 Habitat Hectare Assessment

Four remnant patches of remnant vegetation (i.e. areas where indigenous species provide at least 25% of the understorey vegetation cover) were identified within the study area and subject to habitat hectare assessments. In this context, a ‘Patch’ is defined as the combined area of smaller areas of vegetation of the same EVC and quality. These Patches were all identified as remnants Swampy Woodland (SW), and assessed according to different characteristics in regards to species quantity, composition and quality (Table 1).

The four Patches are:

SW1 – These patches of Swampy Woodland are located in the road reserves of Chippendale Road. They are in moderate to poor condition, and are the most diverse areas of remnant vegetation within the study area. Trees within these patches are Swamp Gum *Eucalyptus ovata* and Narrow-leaf Peppermint *Eucalyptus radiata*, and understorey vegetation contains indigenous species such as Swamp Paperbark, Thatch Saw-sedge *Gahnia radula*, Blackwood *Acacia melanoxylon* and Common Reed *Phragmites australis*.

SW2 – This patch of Swampy Woodland is located south of the Chippendale Road reserves, and contains immature Swamp Gums with an understorey containing species such as Swamp Paperbark and Rush *Juncus* spp. This area of Swampy Woodland is considered to be of poor quality.

SW3 – This area of Swampy Woodland is located in the north western portion of the study area, and contains several immature Swamp Gum trees, and an understorey of Swamp Paperbark. It is considered to be of poor quality.

SW4 – This area of Swampy Woodland is located in the south west corner of the study area adjacent Ararat Creek vegetation, and contains several large old Swamp Gum trees. However it is devoid of indigenous understorey vegetation.

There are approximately **0.48 habitat hectares** of High conservation significance Swampy Woodland present within the study area (Figure 2). Approximately **0.15 habitat hectares** of

Swampy Woodland is to be removed as a result of the proposed development. Five large old trees, two medium old trees and four small trees are also proposed to be removed (Figure 2).

Table 1. Habitat score of vegetation within the study area at Nar Nar Goon.

Quality			SW1	SW2	SW3	SW4
EVC name (initials)			SW	SW	SW	SW
EVC Number			937	937	937	937
		Max Score	Score	Score	Score	Score
Site Condition	Large Old Trees	10	4	0	0	9
	Canopy Cover	5	2	0	0	4
	Lack of Weeds	25	2	2	6	2
	Understorey	15	10	10	5	0
	Recruitment	10	6	3	3	0
	Organic Litter	5	5	3	5	5
	Logs	5	2	0	2	5
Swamp Scrub Multiplier (x1.15)			n/a	n/a	n/a	n/a
Landscape value	Patch Size	10	1	1	1	1
	Neighbourhood	10	0	0	0	0
	Distance to Core	5	1	1	0	0
Habitat points out of 100		100	33	20	22	26
Habitat Score (habitat points/100)			0.33	0.20	0.22	0.26
Area of habitat zone (ha)			1.17	0.32	0.037	0.094
Total habitat hectares*			0.39	0.06	0.01	0.02
Bioregion			GP	GP	GP	GP
EVC Conservation Status			Endangered	Endangered	Endangered	Endangered
Conservation Significance	Conservation status x Habitat Score		High	High	High	High
	Threatened Species		n/a	n/a	n/a	n/a
	Other Site Attributes		n/a	n/a	n/a	n/a
	Overall Conservation Significance (highest rating)		High	High	High	High
Number LOTs within study area			3	0	0	5

Notes: SW = Swampy Woodland, EVC = Ecological Vegetation Class, n/a= Not Applicable. Numbers have been rounded to two or three decimal places.

5.2 Scattered Tree Assessment

In relation to scattered old trees in parcels of land the Framework states:

For each medium or large old tree removed as part of permitted clearing an appropriate number of new trees must be recruited. The number of new trees that must be recruited will be specified in regional Native Vegetation Plans and may be graded according to conservation significance....However where it better suits their circumstances, landholders may use the 'protect other trees and ensure supplementary recruitment' approach to meet this criteria (NRE 2002).

The *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006) currently contains preferred offset ratios for any losses of small, medium, large or very large old trees (>150% of Benchmark tree DBH).

All scattered trees were identified within the study area. These were recorded by hand-held GPS and were measured at diameter at breast height (DBH). They are classified as very large, large, medium and small trees according to the Swampy Woodland EVC Benchmark and *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006).

Within the study area there are 19 scattered Old Trees including:

- One Very Large Old Tree;
- Ten Large Old Trees;
- Four Medium Old Trees; and,
- Four Small Trees (Figure 2)

5.3 Summary of Habitat Hectare and Scattered Tree Assessment

There are approximately **0.48 habitat hectares** of High conservation significance Swampy Woodland present within the study area. These patches contain eight LOTS. There are 19 scattered trees within the study area.

5.4 Net Gain Implications

5.4.1 Avoidance – Step 1 of the Net Gain policy

The Framework requires avoidance as the first step in considering the impacts of development on native vegetation. In light of this requirement, any proposed construction within the study area needs to demonstrate how native vegetation avoidance has been achieved in the design process. Avoidance may generally be interpreted as avoiding adverse impacts on trees or

habitat patches, particularly through vegetation clearance, with the vegetation being retained post construction (NRE 2002).

The proponent has avoided removal of all remnant vegetation within 200 metres of the Ararat Creek, and avoided removal of vegetation in the western side of the Chippendale Road reserve during the design phase of the development. Other vegetation removal within the study area cannot be avoided.

5.4.2 Minimisation – Step 2 of the Net Gain policy

This step is generally interpreted as minimising impacts on trees or remnant vegetation through appropriate consideration in planning processes and expert input to project design or management (NRE 2002).

Further mitigation measures to minimise the loss of ecological values within the study area during construction and development should also be considered. These include:

- Prevent machinery from disturbing existing vegetation (i.e. root zones of retained trees) within the study area;
- Inform contractors of ecologically sensitive areas and establish “no-go” zones;
- Where possible, retain and protect remnant vegetation zones during construction works; and,
- Temporary fencing should be installed around retained areas of remnant vegetation and any other ecologically sensitive areas to minimise disturbance.

5.4.3 Offset Calculations - Step 3 of the Net Gain Policy

Once steps 1 and 2 have been considered, then offsets or Net Gain targets can be calculated for any permitted vegetation clearance. Net Gain targets or offsets can be calculated according to the Framework (NRE 2002).

The Framework sets out responses, including like for like criteria and Net Gain ratios, to proposals to clear and offset native vegetation, based on the conservation significance of the vegetation, which is determined by the habitat score and bioregional conservation status (NRE 2002). The Net Gain ratios from this table have been utilised to calculate the required offsets or Net Gain targets.

Habitat Hectares

To meet the objectives of the Net Gain policy, offset criteria must be met, and at least 1.5 times the habitat hectare loss for high conservation significance patches is required.

Based on this assessment, approximately 0.15 habitat hectares of native vegetation require removal to allow the construction of the proposed new racecourse.

Swampy Woodland is of High conservation significance, which requires an equivalent gain of at least 1.5 times the calculated loss in habitat hectares. Therefore 0.23 habitat hectares of High conservation significance Swampy Woodland, or vegetation of Very High conservation significance within the Gippsland Plain bioregion are required to be generated (Table 2).

Table 2: Net Gain habitat hectare targets for remnant patches of vegetation

Habitat Hectares Target					
Target No.	Conservation Significance	Target EVC	Total Losses in Habitat Ha	Net Gain Multiplier*	Net Gain Target (Habitat Ha)
1	High	SW	0.15	1.5	0.23
Total habitat hectares					0.23

Notes: *These multipliers relate to Table 6 of the Framework; SW = Swampy Woodland,

Trees within Remnant Patches

The Port Phillip and Westernport Native Vegetation Plan (PPWCMA 2006) states the offsets that are required to be achieved for the permitted removal of trees. The proponent has two options for achieving Net Gain, which are detailed below and in Table 3:

- Protect and recruitment, which is DSEs preferred methodology; OR
- Recruitment only (PPWCMA 2006).

The offset from the loss of 2 trees within the patches is to either:

- Protect 8 other large old trees and recruit 40 new plants/ trees; OR
- Recruit 240 new plants/trees.

Table 3. Offsets for the loss of large trees within remnant patches of Vegetation

Conservation Significance	Target EVC	Total Losses	Protect and Recruit Offset ¹				Recruitment Only Offset ²	
			Multiplier	Total to be Protected	To be Recruited (per tree removed)	Total to be Recruited	To be Recruited (per tree removed)	Total to be Recruited
High	SW	2	4	8	20	40	120	240
Total				8		40		

¹ Is the preferred option wherever possible

² May be permitted on a case-by-case basis at the discretion of the planning authority

Scattered Trees

The scattered trees are assigned the lowest conservation status rating from the EVC in which they would have originated. As these trees represent EVC 937: Swampy Woodland which has a conservation status of endangered within the Gippsland Plain bioregion, they are assigned a conservation significance rating of ‘high’ (NRE 2002).

Protect and Recruit

Table 4 Protect and Recruit Offset Requirements for scattered trees within the study area

Scattered Trees within the study area					
Size Class	No. proposed to be Removed	No. proposed to be Retained	Offset Requirement per tree	Total trees required for offset	Credit/Deficit
VLOT	0	1	Protect 5 other VLOT and recruit 30 new trees	0	+1 VLOT
LOT	2	8	Protect 4 other LOT and recruit 20 new trees	Protect 8 other LOT and recruit 40 new plants or trees	Even. Recruit 40 new plants or trees
MOT	1	3	Protect 2 other MOT and recruit 20 new trees	Protect 2 other MOT and recruit 20 new plants or trees	+1 MOT Recruit 20 new plants or trees
ST	2	2	Not Applicable	2 new trees	Recruit 2 new trees

Notes: LOT = Large Old Tree, MOT = Medium Old Tree, ST = Small Tree.

As shown in Table 4, the proponent proposes to retain:

- 1 VLOT;
- 8 LOT;
- 3 MOT; and
- 2 ST.

The proponent proposes to remove:

- 2 LOTs
- 1 MOT; and
- 2 ST (Figure 2).

Total Offset

For the loss of 5 scattered trees and 2 trees within patches of vegetation there are 16 LOTs, 2 MOTs and 2 Small Trees required to be offset. The VLOT can contribute towards the deficit of LOTs, and there are 12 other LOTs and several MOTs within the study area which can contribute towards the required offset. This means that 13 of the 16 LOTs and both of the 2 MOTs required to be offset, can be offset within the study area. There is still a deficit of 3 LOTs required to be protected, and a requirement to recruit 102 new trees or plants.

This remaining offset deficit cannot be met on-site, so may need to be secured off-site. Alternatively, the offset for loss of 1 of the 4 LOTs to be removed may be permitted to be undertaken through the ‘recruitment only’ offset method.

The offset requirement for the loss of a LOT is 120 new plants or trees. The total recruitment only offset for the loss of the 4 LOTS would therefore be 480 new plants and trees.

5.4.4 Summary of Net Gain Position

Offset requirements for the racecourse development include the protection of 0.23 habitat hectares of High conservation significance Swampy Woodland, and the protection of 16 LOTs, 2 MOTs and the recruitment of 102 new trees or plants. Alternatively, the recruitment only option for the loss of all trees within the study area would be 480 new trees for the loss of 4 LOTs, 60 new trees for the loss of 1 MOT, and the recruitment of 2 new trees for the loss of 2 Small Trees. This comes to a total of 542 new trees or plants which would need to be recruited.

5.4.5 Offset Options

Vegetation offsets must be achieved in accordance with a Vegetation Offset Management Plan over the stipulated 10-year offset period (and beyond). These may be achieved on-site or off-site, subject to meeting a number of criteria stipulated within PPWCMA (2006).

The 0.23 habitat hectares of Swampy Woodland cannot be offset by vegetation within the study area, and so off-site offsets must be sought. Thirteen of the 16 LOTs, and both of the MOTs required to be protected can be offset by retaining existing trees within the study area.

One LOT still requires offsetting, and offsets for this may need to be sourced outside of the study area, or through the recruitment only offset option (subject to approval form teh

responsible authority). . The proponent may decide it is possible to retain 1 or 2 scattered LOTs within the study area, in which case all tree offsets could be met on site.

The proponent may wish to pursue a vegetation offset through:

- Acquiring and managing land elsewhere;
- DSE's 'Bush Broker' program; or
- Working with 'Trust for Nature', to identify and secure the offset.

These options are subject to regulatory approval.

6 POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1 Potential Impacts

Due to the highly modified nature of the study area, there are few potential ecological impacts. However, relevant impacts include:

- Loss and/or disturbance to scattered indigenous trees;
- Loss of potential fauna refuge and foraging substrate through the removal of trees;
- Loss of habitat for locally common native fauna species;
- Possible introduction and further spread of exotic weed species through ground clearance works; and
- Increased sedimentation into the drain south of the site and potentially Ararat Creek to the west of the site.

6.2 Mitigation Measures

Measures to mitigate/ameliorate impacts of the proposed development upon the ecological values in and adjacent to the study area include:

- Retain trees and indigenous vegetation where safe and practical;
- Undertake salvage works of native fauna present on the site e.g. nesting birds and translocate animals to a nearby suitable recipient site;
- Ensure any future plantings utilise locally indigenous species;
- Ensure construction workers, machinery and incoming clean fill are not carrying weed seed or soil pathogens into the study area;
- Ensure the reinstatement of landscape plants is undertaken shortly after the completion of earthworks to reduce the likelihood of weed invasion; and,
- Best practice sedimentation control measures should be implemented during the construction phase and ‘water sensitive urban design’ principles should be followed to protect local drainage lines and waterways such as Ararat Creek.

7 CONCLUSION

During the present assessment, no significant flora and fauna species or ecological communities were recorded, however three Growling Grass Frogs, a nationally significant species, has previously been recorded on the study area (Ecology Partners 2010).

The majority of the study area is highly modified and generally comprises of pasture grasses and exotic weeds. Some indigenous patches of vegetation persist along fence lines, in road reserves and adjacent Ararat Creek.

A total of 48 taxa of plants (14 indigenous, 34 exotics) were recorded during the present assessment within the study area. Four of these are considered to be regionally significant.

The study area is considered to be of **Local** conservation significance. A planning permit from Cardinia Shire Council is required for the removal native vegetation within the study area.

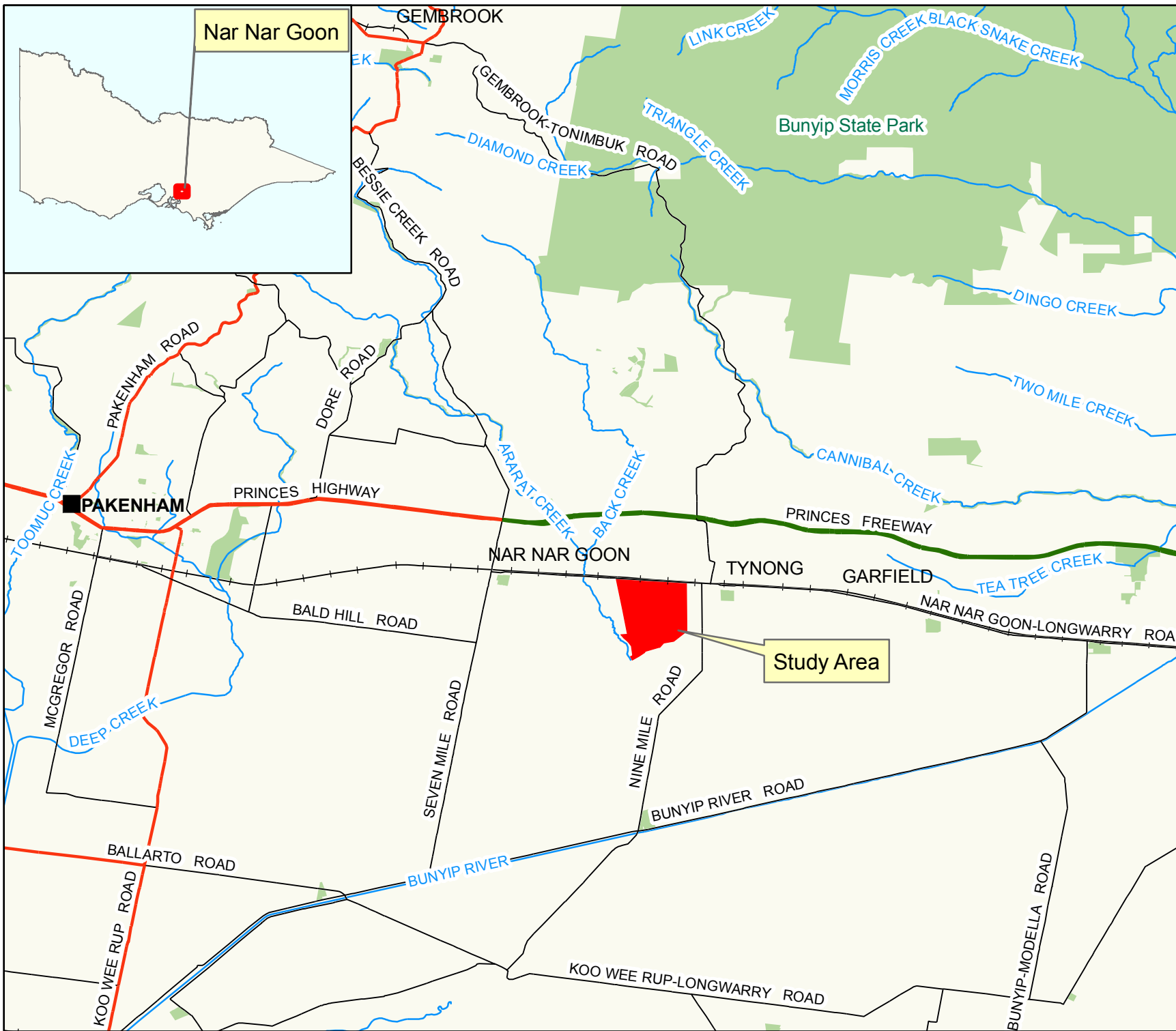
The study area contains a total of **0.48 habitat hectares** of High conservation significance Swampy Woodland (EVC 937). The development plan for the proposed racecourse indicates that approximately 0.15 habitat hectares of vegetation is likely to be removed. In order to offset this loss of vegetation, approximately **0.23 habitat hectares** of Swampy Woodland, or vegetation of Very High significance within the Gippsland Plain bioregion **must be protected**. This vegetation is unable to be offset on site, and therefore the proponent must look for offsets outside the study area, or through revegetation within the study area. Three of the four LOTS to be removed can be offset within the study area.


Where possible, indigenous trees should be retained *in situ*. If this cannot be achieved, the vegetation offsets for the loss of the 7 indigenous trees from the site are to either:

- Protect 16 large old trees, 2 medium old trees and recruit 102 new plants; or
- Recruit 542 new plants.

Such offsets should be undertaken in accordance within a Vegetation Offset Management Plan and are subject to regulatory approval.

FIGURES



 Study Area

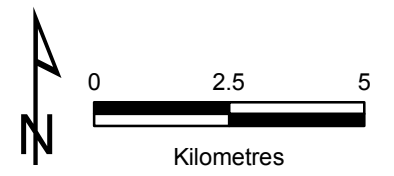


Figure 1
Location of the Study Area,
Nar Nar Goon Racecourse



EP Map #: 1895 Fig 1
 Issue Date: 12/03/2010

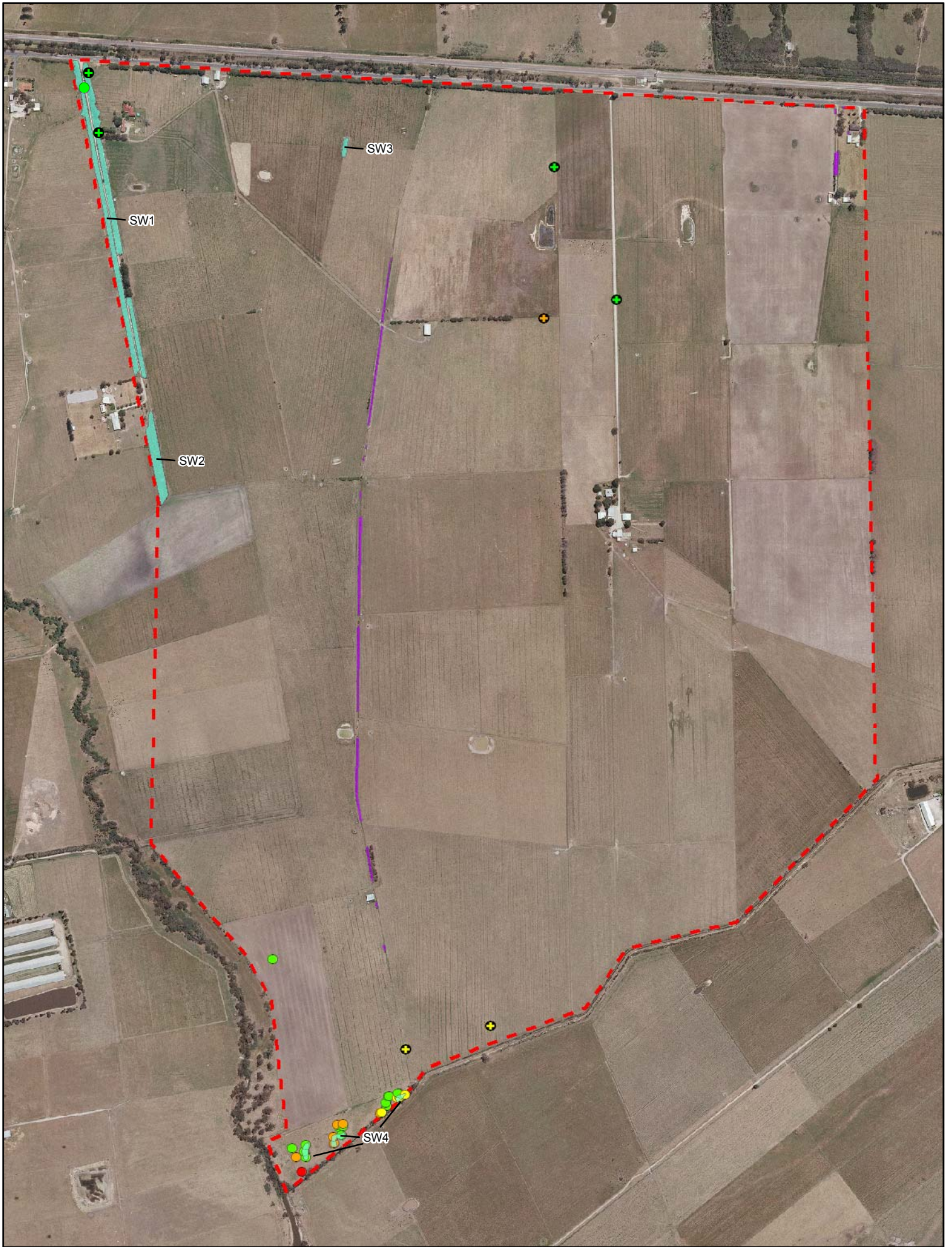
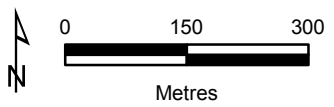
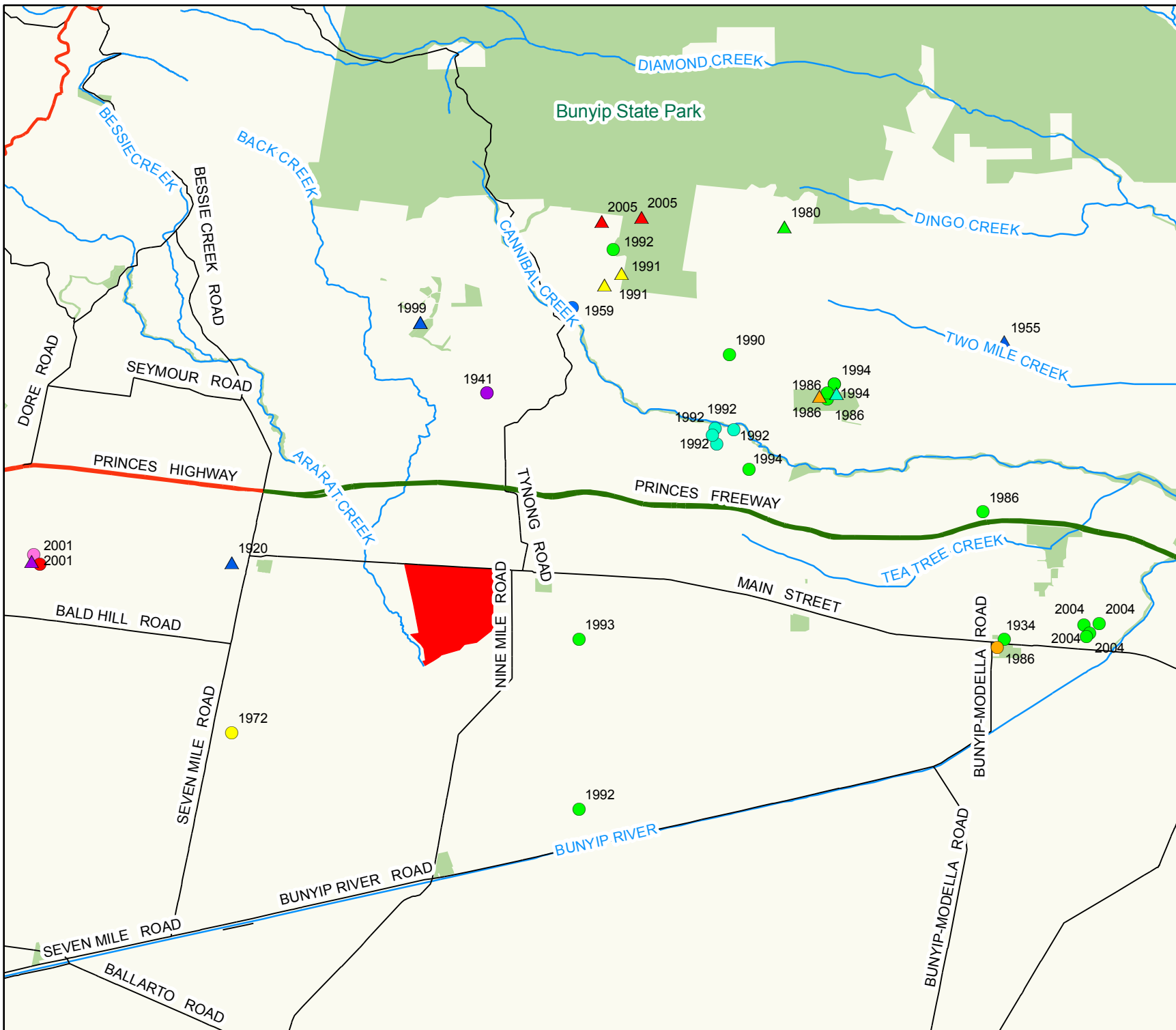


Figure 2
Ecological features
within the study area,
Nar Nar Goon
Racecourse.

- Trees proposed to be lost
- Swamy Woodland
- Degraded Treeless Vegetation
- VLOT
- LOT
- MOT
- ST
- Study Area



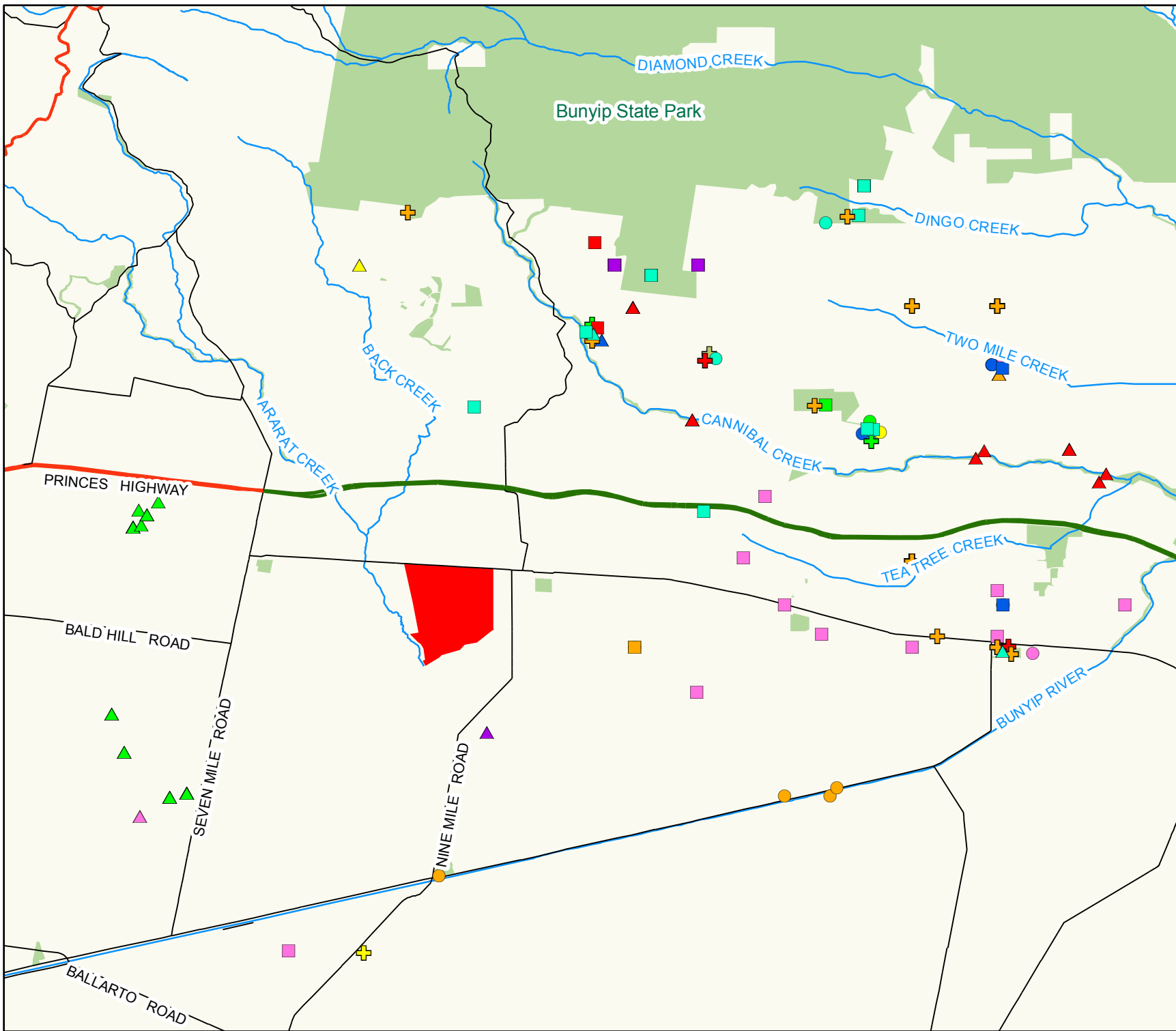


- Austral Crane's-bill
- Bristly Shield-fern
- Filmy Maidenhair
- Green Scentbark
- Hoary Rapier-sedge
- Long Pink-bells
- Marsh Sun-orchid
- Matted Flax-lily
- ▲ Powelltown Correa
- ▲ River Leafless Bossiaea
- ▲ Slender Tick-trefoil
- ▲ Small Fork-fern
- ▲ Summer Spider-orchid
- ▲ Swamp Bush-pea
- ▲ Veined Spear-grass
- Study Area

0 2 4
Kilometres

Figure 3
Significant flora records,
Nar Nar Goon Racecourse





- Australasian Shoveler
- Australian Grayling
- Azure Kingfisher
- Barking Owl
- Broad-toothed Rat
- Brown Quail
- Common Bent-wing Bat
- Dandenong Burrowing Cray
- ▲ Dwarf Galaxias
- ▲ Eastern Great Egret
- ▲ Eastern Pygmy-possum
- ▲ Growling Grass Frog
- ▲ Lace Goanna
- ▲ Latham's Snipe
- ▲ Leadbeaters Possum
- ▲ Little Egret
- Masked Owl
- Musk Duck
- Nankeen Night Heron
- Pied Cormorant
- Powerful Owl
- Royal Spoonbill
- Sooty Owl
- Southern Brown Bandicoot
- + Southern Bullfrog (south-eastern form)
- + Southern Toadlet
- + Spotted Marsh Frog SCR
- + Spotted Quail-thrush
- + White-footed Dunnart
- Study Area



Figure 4
Significant fauna records,
Nar Nar Goon Racecourse



APPENDICES

Appendix 1 – Significance Assessment

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

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

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

Rare or Threatened Categories
CONSERVATION STATUS IN AUSTRALIA (Based on the EPBC Act 1999, Briggs and Leigh 1996*)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
CONSERVATION STATUS IN VICTORIA (Based on DSE 2005, DSE 2003, FIS)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

A1.2. Defining Ecological Significance

Table A1.2. Defining Ecological Significance.

Criteria for defining Ecological Significance	
NATIONAL SIGNIFICANCE	
Flora	National conservation status is based on the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
	Flora listed as rare in Australia in <i>Rare or Threatened Australian Plants</i> (Briggs and Leigh 1996).
Fauna	National conservation status is based on the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
	Fauna listed as extinct, critically endangered, endangered, vulnerable, Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans for terrestrial taxon prepared for the Department of Environment and Water Resources: threatened marsupials and monotremes (Maxwell <i>et al.</i> 1996), bats (Duncan <i>et al.</i> 1999), birds (Garnett and Crowley 2000), reptiles (Cogger <i>et al.</i> 1993), amphibians (Tyler 1997), and butterflies (Sands and New 2002)
	Species that have not been included on the EPBC Act but listed as significance according to the <i>IUCN 2006 Red List of Threatened Species</i> (IUCN 2006).
Communities	Vegetation communities considered critically endangered, endangered or vulnerable under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and considering vegetation condition.
STATE SIGNIFICANCE	
Flora	Threatened taxa listed under the provisions of the <i>Flora and Fauna Guarantee Act 1988</i> .
	Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System (most recent Version).
	Flora listed in the State Government's <i>Advisory List of Rare or Threatened Plants in Victoria, 2005</i> (DSE 2005).
	Flora listed as poorly known in Australia in <i>Rare or Threatened Australian Plants</i> (Briggs and Leigh 1996).
Fauna	Threatened taxon listed under Schedule 2 of the <i>Flora and Fauna Guarantee Act 1988</i> .
	Fauna listed as extinct, critically endangered, endangered and vulnerable on the State Government's <i>Advisory List of Threatened Vertebrate Fauna in Victoria - 2003</i> (DSE 2003).
	Listed as Data Deficient, Insufficiently Known or Near-threatened under National Action Plans for terrestrial species prepared for the Department of the Environment and Water Resources: threatened marsupials and monotremes (Maxwell <i>et al.</i> 1996), bats (Duncan <i>et al.</i> 1999), birds (Garnett and Crowley 2000), reptiles (Cogger <i>et al.</i> 1993), amphibians (Tyler 1997), and butterflies (Sands and New 2002).

Criteria for defining Ecological Significance	
Communities	Ecological communities listed as threatened under the <i>Flora and Fauna Guarantee Act 1988</i> .
	Ecological vegetation class listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (DSE Website) and considering vegetation condition.
REGIONAL SIGNIFICANCE	
Flora	Flora considered rare in any regional native vegetation plan for a particular bioregion.
	Flora considered rare by the author for a particular bioregion.
Fauna	Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the bioregion.
	A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government’s Advisory List of <i>Threatened Vertebrate Fauna in Victoria - 2003</i> (DSE 2003).
Communities	Ecological vegetation class listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (DSE Website) and considering vegetation condition.
	Ecological vegetation class considered rare by the author for a particular bioregion.
LOCAL SIGNIFICANCE	
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.	

A1.3 Defining Site Significance

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

- National:** Australia
State: Victoria
Regional: Gippsland Plain bioregion
Local: Within 10 kilometres surrounding the study area

Table A1.3. Defining Site Significance.

Criteria for defining Site Significance
NATIONAL SIGNIFICANCE
<p>A site is of National significance if:</p> <ul style="list-style-type: none"> - it regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and/or under National Action Plans for terrestrial taxon prepared for the Department of the Environment and Water Resources. - it regularly supports, or has a high probability of supporting, an 'important population' as defined under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> of one or more nationally 'vulnerable' flora and fauna taxon. - it is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. - it is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. - it contains an area, or part thereof designated as 'critical habitat' under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. - it is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
STATE SIGNIFICANCE

Criteria for defining Site Significance
<p>A site is of State significance if:</p> <ul style="list-style-type: none"> - it occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and/or under National Action Plans. - it regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (DSE 2003, 2005), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. - it contains an area, or part thereof designated as 'critical habitat' under the <i>Flora and Fauna Guarantee Act 1988</i>. - it supports, or likely to support a high proportion of any Victorian flora and fauna taxa. - it contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. - it is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.
REGIONAL SIGNIFICANCE
<p>A site is of Regional significance if:</p> <ul style="list-style-type: none"> - it regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. - is contains a large population (i.e. greater than 1%) of flora considered rare in any regional native vegetation plan for a particular bioregion. - it supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. - it is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
LOCAL SIGNIFICANCE
<p>Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as:</p> <ul style="list-style-type: none"> - an area which supports indigenous flora species and/or a remnant Ecological Vegetation Class, and habitats used by locally significant fauna species. - an area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

A1.4. Defining Vegetation Condition

Table A1.4. Defining Vegetation Condition.

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

A1.5. Defining Habitat Quality

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

Table A1.5. Defining Habitat Quality.

Criteria for defining Habitat Quality
HIGH QUALITY
High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups).
High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity).
High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat.
Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2003.
MODERATE QUALITY
Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups.
Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes.
Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat.
Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2003.
LOW QUALITY
Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups).
Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes.
Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat.
Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2003.

Appendix 2.1 – Flora Results

Table A2.1. Flora recorded from the study area during the present survey .

Species in bold are of regional significance.

Scientific Name	Common Name
INDIGENOUS SPECIES	
<i>Acacia melanoxylon</i>	Blackwood
<i>Austrostipa</i> spp.	Spear-grass
<i>Dichondra repens</i>	Kidney Weed
<i>Eleocharis acuta</i>	Common Spike-sedge
<i>Eucalyptus ovata</i>	Swamp Gum
<i>Eucalyptus radiata</i>	Narrow-leaf Peppermint
<i>Eucalyptus</i> spp.	Eucalypt
<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum
<i>Gahnia radula</i>	Thatch Saw-sedge
<i>Juncus</i> spp.	Rush
<i>Melaleuca ericifolia</i>	Swamp Paperbark
<i>Phragmites australis</i>	Common Reed
<i>Urtica incisa</i>	Stinging Nettle
<i>Typha</i> spp.	Cumbungi
INTRODUCED SPECIES	
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Avena fatua</i>	Wild Oat
<i>Briza maxima</i>	Quaking Grass
<i>Bromus catharticus</i>	Prairie Grass
<i>Bromus diandrus</i>	Great Brome
<i>Calicotome spinosa</i>	Spiny Broom
<i>Cirsium vulgare</i>	Spear Thistle
<i>Critesion</i> spp.	Barley Grass
<i>Cynodon dactylon</i>	Couch
<i>Cytisus scoparius</i>	English Broom
<i>Dactylis glomerata</i>	Cocksfoot
<i>Daucus carota</i>	Wild Carrot
<i>Ehrharta erecta</i>	Panic Veldt-grass
<i>Genista monspessulana</i>	Montpellier Broom
<i>Foeniculum vulgare</i>	Fennel
<i>Hedera helix</i>	English Ivy
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Hypochoeris radicata</i>	Cat's Ear
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Lotus angustissimus</i>	Slender Bird's foot-trefoil
<i>Malva parviflora</i>	Small-flower Mallow
<i>Paspalum dilatatum</i>	Paspalum
<i>Pennisetum clandestinum</i>	Kikuyu
<i>Phalaris aquatica</i>	Toowoomba Canary-grass
<i>Pinus radiata</i>	Radiata Pine
<i>Polygonum aviculare</i>	Wireweed
<i>Prunus cerasifera</i>	Cherry Plum
<i>Rubus fruticosus</i> sp. agg.	Blackberry
<i>Rumex</i> spp.	Dock
<i>Solanum nigrum</i>	Black Nightshade

Sonchus oleraceus

Sporobolous africanus

Stenotaphrum secundatum

Watsonia meriana var. *bulbillifera*

Milk Thistle

Rat-tail Grass

Buffalo Grass

Bulbil Watsonia

Appendix 2.2 – Flora database results

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

Sources used to determine species status:

EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
DSE	Advisory List of Threatened Flora in Victoria (DSE 2005)
FFG	Flora and Fauna Guarantee Act 1988 (Victoria)

National status of species is designated by:

X	Extinct
CR	Critically endangered
EN	Endangered
VU	Vulnerable
K	Poorly Known (Briggs and Leigh 1996)
#	Records identified from EPBC Act Protected Matters Search Tool.
*	Native non-indigenous species

State status of species is designated by:

X	Extinct
e	Endangered
v	Vulnerable
r	Rare
k	Poorly Known
L	Listed

Likelihood of occurrence:

1	known occurrence
2	habitat present
3	habitat present, but low likelihood
4	unlikely
5	no suitable habitat

Scientific Name	Common Name	Total number of documented records (FIS)	EPBC	VROTS	FFG	Likely occurrence within the study area
NATIONAL SIGNIFICANCE						
# <i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	-	VU	-	-	3
# <i>Dianella amoena</i>	Matted Flax-lily	1	EN	e	L	4
# <i>Prasophyllum frenchii</i>	Maroon Leek-orchid	-	EN	e	L	5
# <i>Xerochrysum palustre</i>	Swamp Everlasting	-	VU	v	L	5
STATE SIGNIFICANCE						
<i>Adiantum diaphanum</i>	Filmy Maidenhair	1	-	e	L	5
<i>Bossiaea riparia</i>	River Leafless Bossiaea	1	-	r	-	5
<i>Caladenia flavovirens</i>	Summer Spider-orchid	1	-	r	-	4
<i>Lastreopsis hispida</i>	Bristly Shield-fern	1	-	r	-	5
<i>Lepidosperma canescens</i>	Hoary Rapier-sedge	4	-	r	-	4
<i>Pultenaea weindorferi</i>	Swamp Bush-pea	4	-	r	-	5
<i>Tetratheca stenocarpa</i>	Long Pink-bells	1	-	r	-	5
<i>Tmesipteris parva</i>	Small Fork-fern	1	-	r	-	5
<i>Desmodium varians</i>	Slender Tick-trefoil	2	-	k	-	5
<i>Austrostipa rudis subsp. australis</i>	Veined Spear-grass	1	-	r	-	3
<i>Thelymitra longiloba</i>	Marsh Sun-orchid	2	-	e	-	5
<i>Eucalyptus fulgens</i>	Green Scentbark	15	-	r	-	5
<i>Geranium solanderi var. solanderi s.s.</i>	Austral Crane's-bill	1	-	v	-	4
<i>Correa reflexa var. lobata</i>	Powelltown Correa	2	-	r	-	5

Source: DSE Flora Information System (FIS 2007); DEWHA Protected Matters Search Tool (<http://www.environment.gov.au/erin/ert/epbc/index.html>)

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