

EDITHVALE AND BONBEACH LEVEL CROSSING REMOVAL PROJECTS ENVIRONMENT EFFECTS STATEMENT

EES TECHNICAL REPORT D Ecological Impact Assessment: Project Areas

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Executive summary

The Victorian Government is removing 50 of Melbourne's most dangerous and congested level crossings. The Edithvale Road, Edithvale and Station Street/Bondi Road, Bonbeach level crossing removal projects were referred to the Minister for Planning who decided an Environment Effects Statement (EES) was required.

This report addresses the Scoping Requirements of the EES in relation to potential impacts to ecological values within the project areas resulting from construction and operational activity as a result of removing the level crossings.

Ecological context within project areas

Impacts to ecological values and the application of the legislation, frameworks and policies that relate to their protection are a key consideration of the EES process. Accordingly, an understanding of existing ecological values within the identified project areas for the removal of level crossing removals at Edithvale and Bonbeach is critical in order to determine the likelihood and extent of project related impacts on significant ecological values.

This report describes the existing ecological condition, and provides an assessment of direct impacts to ecological values within the works area associated with the level crossing removals on the Frankston rail line at Edithvale Road (Edithvale) and Station Street/Bondi Road (Bonbeach), hereafter referred to as the Edithvale and Bonbeach project areas.

Constructing the railway line in a trench to remove the level crossing will result in changes to groundwater that may impact the ecological condition of the Edithvale-Seaford Wetlands Ramsar site and/or other vegetation and habitats that are reliant on groundwater (Groundwater Dependent Ecosystems) beyond the project areas. Impacts on the ecological values they support are considered in a separate report – refer to EES Technical Report B *Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems*.

Existing conditions

The Edithvale and Bonbeach project areas are located within a modified, urban environment. Vegetation and habitat is limited in extent and generally of poor quality. Despite this, native vegetation (incorporating both scattered trees and patches) was recorded within the level crossing removal project areas. None of this vegetation was considered to represent either *Environment Protection and Biodiversity Conservation Act 1999* and/or *Flora and Fauna Guarantee Act 1988* listed ecological communities.

Habitat within the project areas was considered unlikely to support flora or fauna species listed as threatened and/or migratory under the *Environment Protection and Biodiversity Conservation Act 1999*, listed under the *Flora and Fauna Guarantee Act 1988* and/or as Victorian Rare or Threatened Species. The project areas were considered to provide habitat for non-threatened native and exotic fauna species. The vegetation along the rail corridor was considered to function as a habitat corridor facilitating the movement of fauna through the local landscape.

Impact assessment – Edithvale

It has been conservatively assumed that all vegetation within the project areas would be removed during the construction phase. Construction within the project area at Edithvale would result in:

- Removal of native vegetation as defined under the Guidelines for the removal, destruction or lopping of native vegetation of the Department of Environment, Land, Water and Planning and protected under the *Planning and Environment Act 1987* which would reduce the extent of native vegetation by more than one hectare. This is based on the presence of:
 - 21 patches of native vegetation comprising 1.147 hectares (0.2925 habitat hectares)
 - three scattered trees (which equate to 0.042 habitat hectares).
- Loss of native flora listed as 'protected' under the *Flora and Fauna Guarantee Act 1988,* which would reduce the abundance of that species within the project area.
- Loss of habitat resulting in the displacement, injury or death of non-threatened native wildlife protected under the *Wildlife Act 1975* which would have implications for individual animals of species that are common in the local area.

Construction of the level crossing removal at Edithvale may exacerbate:

- habitat fragmentation which is a 'potentially threatening process' under the *Flora and Fauna Guarantee Act 1988,* although fragmentation of habitat within the broader rail corridor is a continuing issue and the consequence of further fragmentation is considered to be minor.
- spread of weeds listed under the *Catchment and Land Protection Act 1994* resulting in the decline in quality of native vegetation in the rail corridor adjacent to the project area.

Construction within the project area is not expected to impact on:

- Matters of National Environmental Significance listed under the Australian *Environment Protection and Biodiversity Conservation Act 1999* as threatened species are unlikely to occur and the Edithvale-Seaford Wetlands Ramsar site is not within, or immediately adjacent to, the project area.
- flora or fauna species or communities listed as threatened under the *Flora and Fauna Guarantee Act 1988* as no communities are to occur and species have a low likelihood or are unlikely to occur in the project areas.

Impact assessment – Bonbeach

Similarly to Edithvale, it has been conservatively assumed that all vegetation within the project areas would be removed during the construction phase. Construction within the project area at Bonbeach would result in the same impacts to those identified for Edithvale. The only difference would be the specific extent of native vegetation which would be removed. This would be:

- 17 patches of remnant vegetation comprising 1.053 hectares (0.265 habitat hectares)
- one scattered tree (which equates to 0.014 habitat hectares).

Environmental performance requirements

Environmental Performance Requirements are recommended for the Edithvale and Bonbeach level crossing removal projects. Implementation of these would manage and/or mitigate the potential impacts of the Projects.

Abbreviations

Term	Definition
BCS	Bioregional Conservation Status
BIM	Biodiversity Interactive Map
CaLP Act	Catchment and Land Protection Act 1994
CAMBA	China-Australia Migratory Bird Agreement
СМА	Catchment Management Authority
DEPI	Department of Environment and Primary Industries (see DELWP)
DELWP	Department of Environment, Land, Water and Planning
DoE	Department of the Environment (see DoEE)
DoEE	Department of the Environment and Energy
DSE	Department of Sustainability and Environment (see DELWP)
EE Act	Environmental Effects Act 1978
EES	Environment Effects Statement
EnSym	Environmental Systems Modelling Platform
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPR	Environmental performance requirement
ESO	Environmental Significance Overlay
EVC	Ecological Vegetation Class
FFG Act	Flora and Fauna Guarantee Act 1988
GDE	Groundwater Dependent Ecosystems
На	Hectares
Hha	Habitat hectares
HZ	Habitat Zone
JAMBA	Japan-Australia Migratory Bird Agreement
JV	AECOM-GHD Joint Venture
km	kilometres
KBR	Kellogg, Brown and Root
LGA	Local government area
LXRA	Level Crossing Removal Authority

Term	Definition
m	metres
MNES	Matters of National Environmental Significance
NVIM	Native Vegetation Information Management
NVR report	Native Vegetation Removal report
P&E Act	Planning and Environment Act 1987
PMST	Protected Matters Search Tool
PPWCMA	Port Phillip and Westernport Catchment Management Authority
PSA	Planning scheme amendment
R	Restricted
Ramsar	The Convention of Wetlands, called the Ramsar Convention
RC	Regionally controlled
RNE	Register of the National Estate
ROKAMBA	Republic Of Korea-Australia Migratory Bird Agreement
RP	Regionally prohibited
SP	State prohibited
VBA	Victorian Biodiversity Atlas
Vic	Victoria
VPO	Vegetation Protection Overlay
VROTS	Victorian Rare or Threatened Species
VQA	Vegetation Quality Assessment
WoNS	Weeds of National Significance

Refer to the Glossary for a definition of terms used in this report.

Glossary

Term	Definition		
Biodiversity	The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part.		
Bioregion	A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.		
Bioregional Conservation Status	An assessment of the conservation status of the native vegetation type (EVC) in the context of a particular bioregion, taking account of how commonly it originally occurred, the current level of depletion and the level of degradation of condition typical of remaining stands.		
Ecological Vegetation Class	EVCs are the standard unit for classifying vegetation types in Victoria. EVCs are described through a combination of floristics, lifeforms and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.		
Ecology	Ecology is the study of the interrelationships between living organisms and their environments.		
Exotic vegetation	Any vegetation that is not native to Australia or its States and Territories. This can sometimes include native species established outside their natural range.		
Habitat Hectare	A site based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type.		
	For native vegetation:		
	Habitat hectares of patch = extent in hectares × condition multiplier		
	For scattered trees:		
	Habitat hectares of scattered trees = (number of trees \times standard extent) \times condition multiplier		
	Where: Standard extent is a circle with 15 metre radius		
Habitat Zone	A discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar averaged quality. This is the base spatial unit for conducting a habitat hectare assessment.		
High threat weed	Introduced species, including native species occurring outside their natural range ('non-indigenous'), with the ability to out-compete and substantially reduce one or more native life forms in the longer term assuming on-going current site characteristics and disturbance regime.		
Indigenous vegetation	Indigenous vegetation includes vegetation that is native to Australia as well as being native to a specific geographic region.		

Term	Definition
Matter of National Environmental Significance (MNES)	The EPBC Act defines and protects nine MNES: World Heritage properties, National Heritage places, wetlands of international importance (Ramsar sites), listed threatened species and ecological communities, migratory species protected under international agreements (JAMBA, CAMBA, ROKAMBA), Commonwealth marine areas, Great Barrier Reef Marine Park, nuclear actions (including uranium mines), and a water resource, in relation to coal seam gas development and large coal mining development.
Native vegetation	Native vegetation (as defined in Victorian planning schemes) are plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses
Non-indigenous vegetation or species	Vegetation or species that are native to Australia, but not to the geographic region within which a site is located.
Native Vegetation Offset	A native vegetation offset is any works or other actions to make reparation for the loss of native vegetation arising from the removal of native vegetation. This may include an area of existing remnant vegetation that is protected and managed, an area that is revegetated and protected, an area that is set aside for regeneration or restoration, or any combination of these. The relative size of an offset is graded according to its conservation significance.
Native vegetation patch	An area of native vegetation where at least 25% of the total perennial understorey plant cover is native, or is an area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or any mapped wetland included in the <i>current wetlands map</i> available in DELWP systems and tools.
Scattered tree	A scattered tree is a native canopy tree that does not form part of a patch.

1 Introduction

1.1 Purpose

The Victorian Government is removing 50 of Melbourne's most dangerous and congested level crossings, inclusive of the level crossings at Edithvale Road, Edithvale (Edithvale) and Station Street/Bondi Road, Bonbeach (Bonbeach).

The level crossing removal projects have three core objectives. To provide:

- improved productivity from more reliable and efficient transport networks
- better connected, liveable and thriving communities
- safer communities.

The Edithvale and Bonbeach level crossing removal projects were referred to the Minister for Planning on 9 March 2017. On 5 April 2017, the Minister issued a decision determining that an Environment Effects Statement (EES) is required for the projects due to the potential for a range of significant environmental effects.

This report provides an assessment of ecological impacts that occur within the project area for the Edithvale Road, Edithvale (Edithvale) and the Station Street/Bondi Road, Bonbeach (Bonbeach) level crossing removal projects.

1.2 Why understanding ecology is important

The study of ecology in the context of this EES technical report is focussed on identifying the biodiversity values of areas that may be impacted by the level crossing removals projects at Edithvale and Bonbeach. Such values are recognised by the State Government of Victoria and Australian Government in legislation, frameworks and policies designed to facilitate their conservation and include native vegetation, threatened species or communities, and habitat for threatened species.

Impacts to significant ecological values and the application of the legislation, frameworks and policies that relate to their protection are a key consideration of the EES process. Accordingly, an understanding of existing ecological values within the Edithvale and Bonbeach project areas is critical in order to determine the likelihood and extent of project related impacts on significant ecological values.

1.3 **Project description**

1.3.1 Overview

Edithvale

The Level Crossing Removal Authority (LXRA) proposes to remove the level crossing by lowering the Frankston railway line into a trench under Edithvale Road while maintaining Edithvale Road at the current road level. The trench would be located between Lochiel Avenue and Berry Avenue. It would be up to 1,300 metres in length and 14 metres wide at its narrowest point, widening to up to 24 metres (including pile widths) at the new Edithvale station platforms.

The rail track would be approximately eight metres below ground level, and sit above the trench base slab and infrastructure to collect and divert rain water from the trench. The maximum depth of the excavation would be 15 metres. Pile depths would be a maximum of 24 metres at the deepest point of the trench.

Barriers, fencing and screening would be erected along the trench at road level to prevent unauthorised access by vehicles or people. Decking above the rail trench would provide for the new station building, car parking and a new substation required to ensure sufficient power is available for passenger services on the Frankston railway line. New pedestrian bridges would be constructed to retain pedestrian access across the railway line. A new station is to be constructed with lift, ramp and stair access to the below-ground train platforms.

Bonbeach

LXRA proposes to remove the level crossing by lowering the Frankston railway line into a trench under Bondi Road while maintaining Bondi Road at the current road level. The trench would be located between Golden Avenue and The Glade. It would be up to 1,200 metres in length and 14 metres wide at its narrowest point, widening to up to 24 metres (including pile widths) at the new Bonbeach station platforms.

The rail track would be approximately eight metres below ground level, and sit above the trench base slab and infrastructure to collect and divert rain water from the trench. The maximum depth of the excavation would be 15 metres. Pile depths would be a maximum of 24 metres at the deepest point of the trench.

Barriers, fencing and screening would be erected along the trench at road level to prevent access by vehicles or people. Decking above the rail trench would provide for the new station building and car parking. New pedestrian bridges would be constructed to retain pedestrian access across the railway line. A new station building would be constructed with lift, ramp and stair access to the below-ground train platforms.

1.3.2 Construction

The key construction activities for the Edithvale and Bonbeach level crossing removal projects include:

- site establishment including:
 - o clearing of vegetation and ground levelling
 - establishment of site fencing, staff facilities and temporary construction areas
- protection and/or relocation of utility services
- excavation for piling, foundations and the rail trench
- on site waste management including removal, management and appropriate disposal of excavated soil, rock, stormwater and groundwater
- transport of spoil, excavated material and groundwater offsite
- demolition of existing stations and removal of existing rail and road infrastructure
- construction of bridge/deck structures to support Edithvale Road and Station Street/Bondi Road where they cross the railway line
- construction of base slab and waterproofing, including stormwater tanks
- construction of new station infrastructure including platforms and buildings
- construction of pedestrian overpasses and decking over the rail trench
- installation and commissioning of new rail infrastructure including ballast, overhead line equipment and rail.

In preparation for the main rail occupation, the existing Edithvale and Bonbeach train station would be closed approximately four weeks in advance. Both projects would be constructed concurrently under the same rail closure which is anticipated to take six weeks.

During the closure of the rail corridor, construction activities would occur 24 hours per day, seven days per week. Additional periodic road closures and lane closures would be required and access along adjacent streets could be restricted. Additional weekend rail shutdowns would likely be required prior to and after the main rail occupation. Construction is expected to be completed within an 18 month period.

1.3.3 Operations and maintenance

Following the construction of the Edithvale and Bonbeach level crossing removal projects, the key operation and maintenance phase activities would include:

- operation monitoring, controlling and operation of the asset in accordance with the rail and road network requirements
- maintenance routine inspection and monitoring of the condition of the asset, planned routine maintenance and refurbishment work, and unplanned intervention and repair of the asset.

Operation and maintenance activities would be consistent with existing practices and subject to the evolving operational demands of the road and rail networks.

1.4 Project areas

1.4.1 Edithvale

The Edithvale Road, Edithvale level crossing project investigation area (Edithvale project area) extends from Lincoln Parade, Aspendale to Chelsea Road, Chelsea. It includes the rail corridor and all of Station Street and Nepean Highway to the east and west of the rail corridor, and small sections of adjacent road reserves. Refer to Figure 1.

The project area is located solely within the Kingston Local Government Area, within the Gippsland Plain Bioregion, and within the jurisdiction of the Port Phillip and Westernport Catchment Management Authority (PPWCMA).

1.4.2 Bonbeach

The Station Street/Bondi Road, Bonbeach level crossing removal project area (Bonbeach project area) extends from Chelsea Road, Chelsea to Patterson River, Bonbeach. It includes the rail corridor and all of Station Street and Nepean Highway located to the east and west of the rail corridor, and small sections of adjacent road reserves. Refer to Figure 2.

The Bonbeach project area is located solely within the Kingston Local Government Area, within the Gippsland Plain Bioregion, and within the jurisdiction of the Port Phillip and Westernport Catchment Management Authority (PPWCMA).

1.4.3 Temporary construction areas

Specific temporary construction areas have not been identified at this time. These areas would be used for site offices, storing materials, plant and equipment, parking for construction works and construction traffic standby.



Figure 1 Edithvale project area



Figure 2 Bonbeach project area

2 Scoping Requirements

In order to meet statutory requirements, protect environmental values and sustain stakeholder confidence, the EES would include an Environmental Management Framework (EMF). The EMF would provide a transparent framework with clear accountabilities for managing and monitoring environmental effects and hazards associated with the construction and operational phases of the projects.

Section 3.5 of the Scoping Requirements (issued September 2017), states '*Environmental Performance Requirements (EPRs) ... should be clearly described in the EMF*'. The proposed objectives, indicators and monitoring requirements' to be described that are relevant to this study are set out below.

2.1 EES objectives

The following draft evaluation objective is relevant to ecology and identifies the desired outcomes in the context of potential project effects. The draft evaluation objectives provide a framework to guide integrated assessment of the environmental effects of the project, in accordance with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978*.

Draft evaluation objective for ecology

To avoid, minimise or offset adverse effects on native vegetation, listed threatened species and ecological communities, listed migratory species, the Ramsar listed Edithvale-Seaford Wetlands, other protected flora and fauna and groundwater dependent ecosystems.

2.2 EES Scoping Requirements

The following extracts from the Scoping Requirements, issued by the Minister for Planning, are relevant to the ecology draft evaluation objective.

Aspect	Scoping requirement	Refer to
Key issues	Loss of, or degradation to, habitat for threatened fauna species listed under the EPBC Act, FFG Act and/or DELWP Advisory List or for other protected species.	Section 5.3 Also refer to EES Technical Report B Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems
	Risk of impact to the Edithvale-Seaford Wetlands resulting directly or indirectly from changes to groundwater (e.g. levels or quality).	EES Technical Report B Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems
	Adverse impacts on any aspect of the ecological character of the Edithvale-Seaford Wetlands, in the context of the relevant Ramsar listing criteria, including indirect impacts upon the four components*, processes and services that are critical to the ecological character of the wetlands (at the time of the listing) such as the critical component of physical habitat for waterbirds.	EES Technical Report B Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems

Table 1 Scoping requirements for the ecological assessment

Aspect	Scoping requirement	Refer to
	*The four critical components are: waterbird diversity and abundance, waterbird breeding, physical habitat for waterbirds and threatened species (birds)	
	Direct loss of native vegetation and any associated listed threatened flora and fauna species and communities known or likely to occur in the project site.	Section 5.6
	Potential for other significant effects on biodiversity values including but not limited to effects associated with changes in hydrology or hydrogeology (under current and climate change scenarios) or threatening processes listed under the FFG Act.	Section 5.5 for listed threatening processes. Refer to EES Technical Report B <i>Ecological</i> <i>Impact Assessment:</i> <i>Wetlands and</i> <i>Groundwater</i> <i>Dependent Ecosystems</i> for changes to hydrology
	Understanding community values associated with the Edithvale-Seaford Wetlands and the potential for indirect impacts on the community brought about by the project.	Refer to EES Technical Report B <i>Ecological</i> <i>impact Assessment:</i> Wetlands and Groundwater Dependent Ecosystems, EES Technical Report L Social, EES Chapter 12 Stakeholder and community engagement
Existing environment	Characterise the distribution and quality of native vegetation and terrestrial habitat that could be impacted by the project, within the project area, associated works areas or in the broader area.	Section 5.6
	Identify the existing or likely presence of any species listed under the EPBC Act, FFG Act and/or DELWP Advisory List, as well as declared weeds and pathogens within the project area, associated works areas or in the broader area.	Section 5.3 (threatened species) Section 5.4 (weeds) Section 5.5 (pathogens as a threatening process) Also refer to EES Technical Report B <i>Ecological Impact</i> <i>Assessment: Wetlands</i> <i>and Groundwater</i> <i>Dependent Ecosystems</i>

Aspect	Scoping requirement	Refer to
	Describe the components of the ecological character of the Edithvale-Seaford Wetlands and the critical components, processes and services of the ecological character that could be impacted by the project**. **With reference to the Description of the ecological character of the Edithvale-Seaford Wetlands report, prepared by the Department of Sustainability and Environment, 2012	EES Technical Report B Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems
	Characterise the listed threatened and migratory species, other protected species, ecological communities and potentially threatening processes that are likely to be present in the Edithvale-Seaford Wetlands from the literature and available data, supported by seasonal or targeted surveys where necessary. Details of the scope, timing and method for studies or surveys used to provide information on the ecological values at the site (and in other areas that may be impacted by the project) should be outlined.	EES Technical Report B Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems
	Describe the biodiversity values that could be directly or indirectly affected by the project, including:	Section 5.6 (native vegetation)
	listed under the FFG Act and EPBC Act;	Section 5.2 (vegetation and habitat description)
	 presence of, or suitable habitats for, native flora and fauna species, in particular species listed under the FFG Act, and DSE Advisory List and EPBC Act; and 	Section 5.3 (likelihood of threatened flora and
	• use of the site and its environs for movement by FFG Act, and DSE Advisory List and EPBC Act listed fauna species.	fauna)
	Describe the threats posed directly or indirectly by the project to biodiversity values, including:	Section 6
	• direct removal or destruction of habitat;	Section 7
	 direct and indirect disturbance or alteration of habitat conditions (including groundwater mounding or drawdown effects on GDEs) or other sources of increased habitat threat; 	Report B Ecological Impact Assessment: Wetlands and
	 initiating and/or exacerbating potentially threatening processes under the EPBC Act and FFG Act; 	Groundwater Dependent Ecosystems
	 threats to mortality of listed threatened fauna; and 	for alteration to habitat conditions from
	• the presence of any declared weeds or pathogens within and in the vicinity of project area.	groundwater change

Aspect	Scoping requirement	Refer to
Design and mitigation measures	Identify potential and proposed design options and measures that could avoid or minimise significant direct and indirect effects on native vegetation and any listed ecological communities or flora and fauna species and their habitat including the ecological character of the Edithvale-Seaford Wetlands.	Section 6 Section 7 Refer to EES Technical Report B <i>Ecological</i> <i>Impact Assessment:</i> <i>Wetlands and</i> <i>Groundwater</i> <i>Dependent Ecosystems</i> in relation to the Edithvale-Seaford Wetlands
Assessment of likely effects	Identify and assess likely direct and indirect effects of the project and relevant alternatives on native vegetation, ecological communities and flora species, in particular any species listed under the FFG Act and EPBC Act.	Section 6 Section 7
	Identify and assess likely indirect effects of the project on the ecological character and habitat values of the Edithvale-Seaford Wetlands.	EES Technical Report B Ecological Impact Assessment: Wetlands and Groundwater Dependent Ecosystems
	Identify and assess likely direct and indirect effects of the project and relevant alternatives on protected fauna and their habitat, including listed (FFG Act/EPBC Act) threatened and migratory species, relative to existing hazards and risks where relevant.	Section 6 Section 7
Approach to manage performance	Describe and evaluate proposed measures to further mitigate or manage residual effects of the project on biodiversity values, including an outline of an offset strategy that sets out the offsets that have been secured or are proposed to satisfy offset policy requirements and the relevant provisions of the Kingston Planning Scheme.	Section 6 Section 7
	Describe and evaluate the approach to monitoring and subsequent contingency measures to be implemented in the event of adverse residual effects on flora and fauna values, including on the ecological character and habitat values of the Edithvale-Seaford Wetlands requiring further management.	Section 6 Section 7 Refer to EES Technical Report B <i>Ecological</i> <i>Impact Assessment:</i> <i>Wetlands and</i> <i>Groundwater</i> <i>Dependent Ecosystems</i> in relation to the Edithvale-Seaford Wetlands.

3 Legislation and policy

Table 2 summarises the relevant primary legislation that applies to the Edithvale and Bonbeach level crossing removal projects as well as the implications and required approvals. Descriptions of all relevant legislation are contained in Appendix A of this report.

Legislation/policy	Key policies/strategies	Implications for the projects	Approvals required	
Commonwealth				
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Significant Impact Guidelines 1.1 (DoE 2013)	Provides for the conservation of biodiversity and the protection of the environment, particularly Matters of National Environmental Significance (MNES).	Referral submitted to the Australian Government Minister for the Environment. Project determined to be a controlled action.	
			Proposed action is to be assessed via the accredited state process of an EES under an assessment bilateral agreement.	
			Potential impacts to MNES outside of the project areas (specifically the Edithvale-Seaford Wetlands Ramsar Site), is the subject of a separate technical report: Technical Report B <i>Ecological</i> <i>Impact Assessment -</i> <i>Groundwater</i> <i>Dependent</i> <i>Ecosystems.</i>	
State				
Planning and Environment Act 1987 (P&E Act)	Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017a).	The Guidelines are incorporated into the Victorian Planning Provisions and all planning schemes.	Offsets for loss of native vegetation patches and scattered trees would	
		They provide instruction on how an application for a permit to remove native vegetation is to be assessed under the P&E Act.	be required. Offsets determined by a Native Vegetation Removal report (NVR report) unless an	
		Sets the offsetting requirements for removal of native vegetation patches and scattered trees.	alternative approach is identified by DELWP.	

Table 2 Primary legislation and associated information

Legislation/policy	Key policies/strategies	Implications for the projects	Approvals required
	Kingston Planning Scheme: Environmental Significance Overlays (ESOs)	The broad intent of an ESO is to identify areas where the development of land may be affected by environmental constraints, and to ensure that if development does happen, it is compatible with the values that are highlighted in any schedule to the identified ESO.	Work with Kingston Council to determine the significance of the environment, vegetation or landscape to be impacted and consider mitigation measures via a condition in the
	Vegetation Protection Overlays (VPOs)	A VPO is specific to the removal of vegetation that has been deemed to be significant, and protects this vegetation against inappropriate development.	Any native vegetation loss would be offset in accordance with DELWP's Biodiversity Assessment Guidelines.
Flora and Fauna Guarantee Act 1988 (FFG Act)	Flora and Fauna Guarantee Regulations 2011	Provides a process for listing threatened native species and communities, protected flora and fauna, and processes and potentially threatening processes with respect to native flora and fauna. Protected flora controls.	Protected flora controls - permit to 'take' (kill, injure, disturb or collect) protected flora required if protected flora are impacted.
Wildlife Act 1975	Wildlife Act Regulations 2013 Translocation of non- threatened native wildlife (DELWP, 2017b) Procedure statement for translocation of threatened native fauna in Victoria - 2016 (DELWP, 2016).	Under the Act it is an offence to take or destroy protected or threatened wildlife without authorisation. Under the Wildlife Act Regulations it is an offence to damage, disturb (including removal or relocation of wildlife) or destroy any wildlife habitat unless authorised to do so under any Act.	Management Authorisation from DELWP required to undertake salvage, if salvage approved by DELWP.

Legislation/policy	Key policies/strategies	Implications for the projects	Approvals required
Catchment and Land Protection Act 1994 (CaLP Act)	List of declared noxious weeds List of established pest animals	Establishes a framework for management and protection of catchments, including responsibilities in relation to the management of pest plants and animals in Victoria.	Responsibility to take all reasonable steps to eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and, where possible, eradicate established pest animals declared under the CaLP Act.
Threatened species advisory lists	An advisory list of threatened species is maintained by DELWP. Species are broken into the following groupings: Advisory List of Rare or Threatened Plants in Victoria (DEPI, 2014)	There are no direct legal requirements or consequences that flow from inclusion of a species in advisory lists, although they are afforded some protection through Permitted Clearing of Native Vegetation - Biodiversity Assessment Guidelines.	No direct approvals required however advisory list status is considered when determining vegetation offsets in relation to <i>Guidelines</i> <i>for the removal,</i> <i>destruction or lopping</i> <i>of native vegetation</i>
	Advisory List of Threatened Vertebrate Fauna (DEPI, 2013b) Advisory list of Threatened invertebrate Fauna in Victoria (DSE, 2009)	Species included in the list may also be formally listed as threatened under the EPBC Act or FFG Act	

4 Methods

This section describes the methods that were used to assess the potential impacts of the Edithvale and Bonbeach level crossing removal projects.

A systematic risk based approach was applied to understand the existing environment, potential impacts of the projects and how to avoid, minimise or manage the risk of impact to an acceptable level.

The link between the risk and impact assessment is illustrated in Figure 3.



Figure 3 Overview of impact and risk assessment process

The following sections outline the methodology for the ecology impact assessment for the project areas.

4.1 Existing conditions assessment

An assessment was undertaken to understand the existing ecological condition to inform the environmental impact assessment for the works. This assessment incorporated:

- a desktop assessment and synthesis of government-curated biodiversity datasets
- flora and fauna field assessments
- determination of the likelihood of threatened species presence
- vegetation quality assessment of any native vegetation patches recorded.

4.1.1 Desktop assessment

A desktop assessment was undertaken to provide an account of the ecological values previously recorded or modelled to occur within the project areas:

- Victorian Biodiversity Atlas (VBA) administered by DELWP
- Biodiversity Interactive Map (BIM) administered by DELWP
- Australian Government Department of the Environment and Energy (DoEE) EPBC Act Protected Matters Search Tool (PMST)
- DELWP's Native Vegetation Information Management (NVIM) tool
- aerial photographs and topographic maps
- DELWP's Planning Schemes online.

The review of the VBA database and PMST included a five kilometre buffer around the Edithvale and Bonbeach project areas to capture highly mobile fauna species, and to account for the possible lack of historic survey effort in the project areas. One combined extract was completed as the Edithvale and Bonbeach project areas are contiguous and support almost identical habitat values.

Not all locations of records in the VBA are precise; the actual accuracy of a record can range from \pm 1m to \pm 500m. The VBA was last updated on 1 January 2017. The validity of records accepted by the VBA has not been assessed as part of this report.

Many records within the VBA are attributed to the same coordinate. For instance a bird surveyor may have recorded several species of bird at the same location, over multiple site visits spanning several years.

4.1.2 Field assessment

4.1.2.1 Edithvale and Bonbeach project areas

Field assessments for the Edithvale and Bonbeach project areas were undertaken in April 2016 and in January 2017.

The field assessments incorporated the following:

- native vegetation mapping and Vegetation Quality Assessments (VQA)
- habitat assessments to inform the determination of the likelihood of each site to support threatened flora and fauna species
- threatened ecological community assessments.

Further details of these assessments are provided in the subsections below.

No targeted surveys for any flora or fauna species listed under the EPBC-Act were undertaken within the project area. No suitable habitat for any significant flora or fauna species was identified within the project area, and consequently no species were considered to have greater than a low likelihood of occurrence.

Native vegetation mapping

Native vegetation was mapped throughout the project areas according to the *'Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a). Under the Guidelines, native vegetation is considered to be either a patch or scattered tree.

A patch of native vegetation is:

'an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or 'an area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy' (DELWP, 2017a, pg 6)'.

A scattered tree is:

'a native canopy tree that does not form part of a patch' (DELWP, 2017a, pg 6)'.

The location of patches and scattered trees was mapped using a Trimble Nomad handheld mapping unit which has a spatial accuracy of approximately five metres (dependent on access to satellites).

Vegetation quality assessment

All patches of native vegetation were subjected to a vegetation quality assessment using the Habitat Hectares (Hha) method as described by DSE (2004).

Habitat assessment

The suitability of the project areas to support threatened flora and fauna species was assessed, primarily through the consideration of habitats supported within the project areas, and historic records of significant species. This information was used as part of the likelihood assessment of the presence of threatened species.

Threatened ecological communities

All patches of native vegetation were assessed against the relevant listing advice and listing criteria for those communities listed as threatened under the EPBC Act or FFG Act, respectively. State and Federal government approved listing statements, conservation advice and policy statements were referred to in assisting with the identification of threatened ecological communities.

Targeted assessment for threatened species

The need for targeted assessment to determine the presence of threatened flora and fauna within the project areas was determined based on an assessment of available habitat and following the likelihood assessment as described in Section 4.1.3.

Given the paucity of threatened species records in the project area and the degraded and fragmented condition of vegetation and habitat present, it was determined that targeted surveys would not adequately inform the assessment. No targeted assessments were completed on this basis.

4.1.3 Likelihood of threatened and/or migratory species presence

An assessment was undertaken of the likelihood of threatened and/or migratory species occurring within the project areas. This included species:

- Listed as threatened under the EPBC Act
- Listed as migratory under the EPBC Act
- Listed as threatened in Victoria in the following:
 - FFG Act Threatened List (DELWP 2017c)
 - Advisory List of Rare or Threatened Plants in Victoria 2014 (DEPI, 2014).
 - Advisory List of Threatened Vertebrate Fauna in Victoria 2013 (DEPI, 2013b)
 - Advisory List of Threatened Invertebrate Fauna in Victoria 2009 (DSE, 2009).

This assessment was completed for species recorded on the VBA and/or predicted to occur by the PMST, within five kilometres of the project areas.

A number of species were eliminated from the VBA list based on their listing status, a review of relevant literature and an understanding of their preferred habitats. These species are not considered further in this report and include:

- Records older than 30 years (pre-1987)
- Fauna species considered 'near threatened' or 'data deficient' in the VROTS list unless they are also recognised under the EPBC Act and/or FFG Act.
- Flora listed as 'poorly known' in the VROTS list as the current knowledge of their distribution and abundance is not sufficient to determine whether these species should be considered as rare or threatened in Victoria.
- Some threatened flora species which are outside their natural range but are commonly used for landscaping and amenity, including Spotted Gum *Corymbia maculata* and Giant Honey-myrtle *Melaleuca armillaris*.
- Fauna reliant on marine environments, including albatross, petrel, cetaceans and marine turtles (which are in the database search results based on the proximity of the project areas to the Port Philip Bay marine environment) as no habitat for these species is present in the project areas.

The likelihood of occurrence assessment was based on the number of VBA records, year of most recent VBA record, species ecology and the habitat values observed during the field assessment.

Likelihood category definitions are:

- Unlikely No preferred habitat present within the project area.
- **Low** Some habitat is present in the project area but it is limited in extent and quality. In the case of fauna, the species may infrequently visit for foraging but would not reside, roost or otherwise depend on habitat in the project area for their survival.
- **Moderate** Habitat is available in the project area which partially meets the requirements of the species. In the case of fauna, the species may regularly visit the habitat.
- **High** Species has historically been recorded in the project area (or within very close proximity). The project area contains habitat that meets their habitat requirements and is likely to support a population of the species.

• **Present** – Species confirmed to be present within the project area either through direct observation of the species or recent records in the VBA output.

4.1.4 Likelihood of pest animals, declared weeds and pathogens

An assessment was undertaken of the likelihood of pest animals and declared weeds to occur in the project areas. For the purpose of the assessment declared weeds are those listed by the CaLP Act or Weeds of National Significance (WoNS) identified by the PMST.

This assessment was completed for species recorded on the VBA and/or predicted to occur by the PMST, within five kilometres of the project areas. Likelihood definitions are as per Section 4.1.3.

There is no method for identifying pathogens with likelihood to occur in the project areas. Key pathogens (those identified as threatening processes under the EPBC Act and/or FFG Act) have, however, been considered in this report.

4.1.5 Likelihood of threatening processes

An assessment was undertaken of the likelihood of potentially threatened processes listed under the FFG Act (DELWP, 2016a) and key threatening processes listed under the EPBC Act (DoEE, 2017) to occur in the project areas (refer to Appendix C). Likelihood definitions are as per Section 4.1.3.

Likelihood category definitions are:

- **Unlikely** Threatening process not recorded in the project areas.
- **Low** The project areas support conditions that could encourage or exacerbate threatening processes, however the impact of these processes is considered limited by the location of the project areas in an urban, fragmented environment.
- **Moderate** –The project areas support suitable conditions that could encourage or exacerbate threatening process.
- **High** –The project areas support suitable conditions that are likely to encourage and/or exacerbate threatening processes.
- **Present** Threatening process directly observed or recently recorded within the project areas.

4.2 Risk assessment

A risk-based approach is integral to the EES as required by Section 3 of the Scoping Requirements for the EES.

The risk management approach adopted for the Edithvale and Bonbeach EES is consistent with AS/NZS ISO 31000:2009 Risk Management Process and involves the following steps:

- establishment of the context of the risk assessment this identifies the boundaries of the projects including the project definition, the duration of construction and operation, the design and environmental controls that would be in place (initial Environmental Performance Requirements (EPRs) – refer to Section 8), and the location of the projects
- risk identification identification of risk pathways by specialists in each relevant discipline area
- risk analysis assessment of risk for each risk pathway, whereby risk is a combination of:
 - o the likelihood of an event and its associated consequences occurring
 - the magnitude of potential consequences of the event.

- risk evaluation review key risks posed by the projects to focus effort in terms of impact assessment and mitigation.
- risk treatment identification of additional management and mitigation where required to reduce risk levels where possible.

An initial risk assessment was undertaken to assess potential risks to the environment arising from the implementation of the projects. Where risks were minor or above, further mitigation was explored. Risks were re-assessed to determine the residual risk based on further mitigation.

A more detailed description of each step in the risk assessment process is provided in EES Attachment II *Environmental Risk Report*.

This technical report describes the risks associated with the projects on ecological values within the project areas.

4.3 Impact assessment

This study outlines the impacts of the level crossing removal projects on ecological values identified within the project areas during the existing conditions assessment incorporating a VQA and assessment of the potential occurrence of threatened species. The approach to the existing conditions assessment is outlined in Section 4.1 and the results are presented in Section 5.

The impact assessment considers the ecological risk events identified during the risk assessment process, particularly those risks which rated as more than negligible. It outlines the management and mitigation measures which informed the likelihood ratings applied in the risk assessment in EES Attachment II *Environmental Risk Report* and in Section 7 of this report below and that are the basis of the Environmental Performance Requirements (EPRs) identified in Section 8.

The impact assessment does not consider impacts of temporary construction areas as these are yet to be identified. EPRs implemented through the EES process (refer to Section 8) would also be applied to any temporary construction area utilised for the projects in order to manage any ecological impacts.

4.4 Environmental Performance Requirements

The environmental outcomes that must be achieved during design, construction and operation of the projects are referred to throughout the EES as Environmental Performance Requirements (EPRs). EPRs must be achieved regardless of the construction methodology or design solutions adopted. Measures identified in this EES to avoid or minimise environmental impacts have formed part of the recommended EPRs for the projects.

The development of a final set of EPRs for the project has been iterative.

4.4.1 Initial EPRs

Environmental performance requirements were identified to inform the assessment of initial risk ratings (where appropriate). These initial EPRs were based on compliance with legislation and standard requirements that are typically incorporated into the delivery of construction contracts for rail projects.

4.4.2 Confirm or update EPRs

The risk assessment either confirmed that these EPRs were adequate or identified the need for further refinement.

EPRs were updated or new EPRs were developed for any initial risk that could not be appropriately managed by standard requirements. The risk and impact assessment processes confirmed the effectiveness of new or updated EPRs to determine the residual risk rating.

4.4.3 Final EPRs

The EPRs recommended for the projects are outlined in Section 8 of this report and are included in the EES Environmental Management Framework.

The EPRs are applicable to the final design, construction approach and operation and provide certainty regarding the environmental performance of the projects.

4.5 Linkage to other technical reports

This report relies on, or informs the following technical assessments:

- EES Technical Report B Ecology: Wetlands and Groundwater Dependent Ecosystems
- EES Technical Report F Land Use
- EES Attachment II Environmental Risk Report

5 Existing conditions

5.1 Desktop information

5.1.1 Protected Matters Search Tool

The Protected Matters Search Tool (PMST) identified a number of Matters of National Environmental Significance (MNES) that may occur, or for which suitable habitat may occur, within the project area and associated five kilometre buffer. Results of the PMST search are presented in Appendix B and summarised in Table 3.

Table 3 Summary of PMST results

MNES	
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar Sites)	1 Edithvale-Seaford Wetlands
Commonwealth Marine Area	None
Listed threatened ecological communities	2 Natural damp Grassland of the Victorian Coastal Plains Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
Listed threatened species	53 species consisting of:45 listed fauna species8 listed flora species.
Listed migratory species	43

A number of fauna species listed in the PMST search result are reliant on marine environments, (for example, albatross, petrel, cetaceans and marine turtles) and are not considered further in this report as there is no suitable habitat for those species.

All other threatened and/or migratory species predicted to occur by the PMST are combined with the VBA data (Section 5.1.2) in a list of threatened and/or migratory species in Appendix D. The likelihood of those species occurring in the project areas is considered in Section 5.3 and Appendix D.

5.1.2 Victorian Biodiversity Atlas (historical threatened species records)

The following section provides the results of the VBA search for records of flora and fauna listed as threatened under the EPBC Act, listed under the FFG Act and/or considered Victorian Rare or Threatened Species (VROTS) (DEPI, 2013b; 2014) after the exclusions outlined in Section 4.1.3 have been applied.

For the location of threatened species records refer to Figure 4 (flora) and Figure 5 (fauna). The likelihood of these species occurring in the project areas is considered in Section 5.3 and Appendix D.

Flora

Thirteen species of threatened flora have been historically recorded within five kilometres of both project areas. These include two species listed as threatened under the EPBC Act, three species listed as threatened under the FFG Act and 12 species considered rare or threatened in Victoria (DEPI, 2014).

The EPBC Act listed flora species are:

- River Swamp Wallaby Grass Amphibromus fluitans (listed as Vulnerable)
- Swamp Everlasting Xerochrysum palustre (listed as Vulnerable).

These species have been listed here as they are considered to pose the greatest legislative risk to the project. In most cases, EPBC Act listed species are also listed under the FFG Act and/or a DELWP VROTS advisory list.

Fauna

Fifty-six species of threatened fauna have been historically recorded within five kilometres of the combined project areas. Species recorded include 12 species listed as threatened under the EPBC Act, 31 species listed under the FFG Act and 77 species listed as VROTS.

Fauna species listed under the EPBC Act are:

- Australian Bittern Botaurus poiciloptilus (listed as Endangered)
- Curlew Sandpiper *Calidris ferruginea* (listed as Critically Endangered)
- Southern Brown Bandicoot Isoodon obesulus obesulus (listed as Endangered)
- Bar-tailed Godwit *Limosa lapponica baueri* (listed as Vulnerable)
- Growling Grass Frog *Litoria raniformis* (listed as Vulnerable)
- Orange-bellied Parrot Neophema chrysogaster (listed as Critically Endangered)
- Eastern Curlew *Numenius madagascariensis* (listed as Critically Endangered)
- Regent Parrot Polytelis anthopeplus monarchoides (listed as Vulnerable)
- Australian Painted Snipe Rostratula benghalensis australis (listed as Vulnerable).
- Grey-headed Flying-fox *Pteropus poliocephalus* (listed as Vulnerable)

These species have been listed here as they are considered to pose the greatest legislative risk the project. In most cases EPBC Act listed species are also listed under the FFG Act and/or a DELWP VROTS advisory list.

The VBA records also include 40 species listed as migratory under the EPBC Act, some of which are also recognised as threatened species.

5.1.3 Biodiversity Interactive Map (Modelled EVCs)

Based on DELWP Ecological Vegetation Class (EVC) modelling, there is potential for up to 14 EVCs to be present within five kilometres of the project areas. These EVCs and their Biodiversity Conservation Significance (BCS) in the Gippsland Plain bioregion are listed in Table 4 and mapped in Figure 6.

Table 4	EVCs within	five kilometres	of the	project	areas

EVC No.	EVC Name	BCS
1	Coast Dune Scrub/Coastal Dune Grassland Mosaic	Depleted
2	Coast Banksia Woodland	Vulnerable
48	Heathy Woodland	Least Concern
53	Swamp Scrub	Endangered
55	Plains Grassy Woodland	Endangered
68	Creekline Grassy Woodland	Endangered
125	Plains Grassy Wetland	Endangered
160	Coastal Dune Scrub	Depleted
418	Damp Sands Herb-rich Woodland/Heathy Woodland Complex	Vulnerable
719	Grassy Woodland/Damp Sands Herb-rich Woodland Mosaic	Vulnerable
881	Damp Sands Herb-rich Woodland/Heathy Woodland Mosaic	Vulnerable
904	Coast Banksia Woodland/Swamp Scrub Mosaic	Vulnerable
927	Plains Grassy Woodland/Swamp Scrub/Plains Grassy Wetland Mosaic	Endangered
935	Estuarine Wetland/Estuarine Swamp Scrub Mosaic	Depleted

5.1.4 Planning overlays

There are no Environmental Significance Overlays (ESOs) or Vegetation Protection Overlays (VPOs) within the Edithvale or Bonbeach project areas (DELWP, 2015a).

Planning overlays as they relate to the project areas are discussed in EES Technical Report F *Land Use.*

¹ Derived from DELWP BIM



Figure 4 VBA threatened flora species records



Figure 5 VBA threatened fauna species records


Figure 6 EVC mapping derived from DELWP BIM

5.2 Field assessment

5.2.1 Edithvale and Bonbeach project areas

This section details existing ecological conditions of the project areas. Ecological values within the Edithvale and Bonbeach project areas are similar, with vegetation structure and condition largely consistent and no apparent differentiation in faunal habitat features. Individual patches of native vegetation and scattered trees are unique to each project area and are therefore addressed separately (refer to Section 5.6).

5.2.1.1 Flora

Vegetation within the Edithvale and Bonbeach project areas is generally of poor quality – a consequence of their historical and continuing land use as an active rail line, and the intensification of land use in proximity to the rail corridor (see Plate 1 and Plate 2). Roadways line both sides of the rail corridor, with residential and (to a lesser extent) commercial land uses beyond the roadways. Vegetation quality within the project areas reflects the continuing pressure from both weed infestations and from regular disturbance through management and maintenance within the rail corridor.





Plate 1 - View of rail corridor Edithvale

Plate 2 - View of rail corridor Bonbeach

Within the rail corridor itself, grassy and broad-leaf weed species dominate the vegetation. Panic Veldt Grass *Ehrharta erecta*, Wild Oats *Avena fatua*, Ribwort *Plantago lanceolata*, Wild Turnip *Brassica rapa*, and Couch *Cynodon dactylon* were regularly observed. Gazania *Gazania* sp. has colonised large tracts of land within the rail corridor (see Plate 3), and may have spread to the site following the dumping of household green waste. The occasional records of Raphis Palms *Raphis* sp, juvenile Cypress *Cupressus* sp. and Norfolk Island Hibiscus *Lagunaria patersonii* are also likely to be garden escapes. Large infestations of Galenia Galenia *pubescens* were also common within the rail corridor. Isolated individual Flax-leaf Broom *Genista linifolia* (a regionally controlled weed in the Port Phillip and Western Port Catchment) were also recorded (see Plate 4).





Plate 3 – Large patches of *Gazania* sp are common within the rail corridor

Plate 4 - Flax-leaf Broom

Amenity plantings, comprised of both indigenous and non-indigenous native species, are present within proximity to the Edithvale Station buildings, and appear to be regularly maintained. Indigenous vegetation such as Coast Tea-tree *Leptospermum laevigatum* and Coast Banksia *Banksia integrifolia* were occasionally a component of these plantings, with juvenile Silver Princess *Eucalyptus caesia* and Red-flowering Gum *Corymbia ficifolia* planted above a ground layer comprised of Mat-rush *Lomandra* sp. (likely a nursery cultivar) and Tussock-grass *Poa sp.* Shrubs such as Common Correa *Correa reflexa* and Creeping Saltbush *Rhagodia spinescens* occasionally provided structural diversity (see Plate 5).

The Chelsea Bonbeach Train Station Group is responsible for the amenity plantings that line the rail corridor within proximity to Bonbeach Station. These plantings comprise indigenous native, non-indigenous and exotic species. Silver Princess *Eucalyptus caesia* and Red-flowering Gum *Corymbia ficifolia* have been planted above a ground layer comprised of Mat-rush *Lomandra* sp (likely a nursery cultivar), Tussock-grass *Poa* sp. and Flag Iris *Iris pseudacorus* (see Plate 6). Shrubs such as Common Correa *Correa reflexa* and Creeping Saltbush *Rhagodia spinescens* occasionally provided structural diversity. These amenity plantings often exist beneath indigenous species such as Coast Banksia and Coast Tea-tree.



Plate 5 – Amenity plantings, Edithvale Station



Plate 6 – Amenity plantings, Bonbeach Station

Regardless of the history of disturbance evident within the rail corridor, a number of scattered trees and patches of native vegetation were recorded representing two EVCs:

- EVC 2 Coast Banksia Woodland (vulnerable BCS in the Gippsland Plain Bioregion)
- EVC 160 Coastal Dune Scrub (depleted BCS in the Gippsland Plain Bioregion)

The following provides a description of the EVCs as they were observed in the field.

The number and location of patches of native vegetation and scattered trees within the Edithvale and Bonbeach project areas is outlined in Section 5.6 and Section 5.6.2 respectively.

EVC 2 – Coast Banksia Woodland

Coast Banksia Woodland (see Plate 7 and Plate 8) was the most prevalent vegetation class encountered in the project areas, with 34 patches recorded (20 in Edithvale and 14 in Bonbeach). This EVC is typically identified by an overstorey of Coast Banksia, growing above a mid-stratum of Coast Tea-tree and occasionally Drooping She-oak Allocasuarina verticillata. The ground layer vegetation was typically dominated by grassy and broad-leaf weed species. Occasional native species Wallaby Grass Rytidosperma sp. and small patches of Black-anther Flax-lily Dianella admixta were observed. Coast Banksia Woodland was usually restricted to long, linear patches of vegetation, outside of the rail corridor.





Plate 7 - EVC 2: Coast Banksia Woodland Plate 8 - EVC 2: Coast Banksia Woodland within the Edithvale project area

within the Bonbeach project area

EVC 160 – Coastal Dune Scrub

Four patches of remnant Coastal Dune Scrub were recorded from within the project areas (one in Edithvale and three in Bonbeach). This EVC was typically species-poor, and often comprised only of Coast Tea-tree, with a sparse ground layer consisting of introduced species (see Plate 9 and Plate 10). The differentiation of this EVC from Coast Banksia Woodland was often difficult and open to interpretation, given that both EVCs are growing on the same sandy soil type, and are often represented by similar species. The presence of Coast Banksia was considered to preclude a patch from being representative of Coastal Dune Scrub for the purposes of this assessment.

Ground layer vegetation within this EVC was dominated by exotic grass species such as Hare's-tail Grass Lagurus ovatus and Wild Oats and broad-leaf weeds such as Galenia and Gazania.

Like Coast Banksia Woodland, this vegetation was restricted to linear strips, mostly outside the rail corridor, although some natural regeneration of Coast Tea-tree is beginning to occur within the rail corridor.



Plate 9 - EVC 160: Coastal Dune Scrub within the Edithvale project area



Plate 10 - EVC 160: Coastal Dune Scrub within the Bonbeach project area

A list of flora observed during the field assessment is provided in Appendix C. No species listed as threatened under the EPBC Act and/or FFG Act were recorded.

5.2.1.2 Fauna

Terrestrial fauna habitat within the project areas is limited in both extent and quality (see Plate 11). The history of disturbance and modification of land within and adjacent to the rail corridor has reduced the availability and quality of habitat for fauna species. Habitat consisted of two narrow linear strips of vegetation either side of the rail tracks bounded by Nepean Highway (west) and Station Street/Bondi Road (east). The vegetation cover was predominantly dense shrubs (mainly Coast Tea-tree) with occasional emergent banksias and she-oaks. The amenity plantings at Edithvale and Bonbeach stations and open areas of regularly mown exotic grasses provided structural differentiation from the dense native vegetation.

Fauna species observed utilising the vegetation of the rail corridor included Australian Magpie *Gymnorhina tibicen*, Australian Raven *Corvus coronoides*, Magpie-lark *Grallina cyanoleuca*, Rainbow Lorikeet *Trichoglossus haematodus*, Red Wattlebird *Anthochaera carunculata* and the introduced Common Myna *Acridotheres tristis* and Common Starling *Sturnus vulgaris*. A list of fauna species observed is provided in Appendix C.

No habitat considered suitable for threatened fauna was identified and the project areas were considered to provide habitat for non-threatened native and exotic fauna species only. Scattered trees and shrub cover within the project areas may provide roosting and feeding habitat for arboreal mammal and avian species. The linear habitat extends along the rail corridor beyond the project areas and may facilitate movement of mobile fauna species through the local landscape.



Plate 11 – Typical example of the habitat typical within the project area

5.2.2 Threatened species and ecological communities

Environment Protection and Biodiversity Conservation Act 1999

No flora or fauna or ecological communities listed as threatened and/or migratory (fauna) under the EPBC Act were recorded.

Flora and Fauna Guarantee Act 1988

No species or ecological communities listed as threatened under the FFG Act were recorded.

A number of species of protected flora were recorded in the project areas that may be impacted by the works for the level crossing removals. Refer to Appendix C.

5.3 Likelihood of threatened and/or migratory species presence

The likelihood of occurrence of threatened and/or migratory species recorded on the VBA and/or predicted by the PMST to occur within five kilometres of the project areas (excluding some species not considered of relevance to the project, as outlined in Section 5.1) is presented in Appendix D and summarised below.

No flora or fauna species listed as threatened and/or migratory under the EPBC Act, listed under the FFG Act and/or as Victorian Rare or Threatened Species (VROTS) were assessed as having a moderate or greater likelihood of occurrence in either project area. Low threatened species likelihood is attributable to the heavily disturbed nature of the project areas and the intensive land use (primarily transport) in proximity to the rail corridor.

5.4 Likelihood of pest animals, declared weeds and pathogens

The likelihood of occurrence of weeds declared under the CaLP Act recorded on the VBA and/or invasive species predicted by the PMST to occur within five kilometres of the project areas is presented in Appendix D. Species either recorded in the project areas during the field assessment or considered to have a high likelihood of occurrence are listed in Table 5 below.

Weed management within the rail corridor is restricted by safety considerations. Management requirements for declared noxious weed species are outlined in Appendix A.

Scientific Name	Common Name	CaLP	WoNS	Likelihood
Allium triquetrum	Angled Onion	Restricted	No	High
Asparagus asparagoides	Bridal Creeper	Restricted	Yes	Present
Cirsium vulgare	Spear Thistle	Regionally controlled	No	Present
Cytisus scoparius	English Broom	Regionally controlled	Yes	Present
Echium plantagineum	Paterson's Curse	Regionally controlled	No	Present
Foeniculum vulgare	Fennel	Restricted	No	High
Genista linifolia	Flax-leaf Broom	Regionally controlled	Yes	Present

Table 5 Declared weeds present or likely to occur

Scientific Name	Common Name	CaLP	WoNS	Likelihood
Lycium ferocissimum	African Box-thorn	Regionally controlled	Yes	High
Oxalis pes- caprae	Soursob	Restricted	No	High
Rubus fruticosus spp. agg.	Blackberry	Regionally controlled	Yes	Present
Ulex europaeus	Gorse	Regionally controlled	Yes	Present

It is considered the two pathogens most relevant to the ecological impact assessment of the project areas are Chytrid Fungus *Batrachochytrium dendrobatidis* and Cinnamon Fungus *Phytophthora cinnamomi*. These pathogens are listed as potentially threatening processes and as such are dealt with in Section 5.5.

Red Fox *Vulpes vulpes*, European Rabbit *Oryctolagus cuniculus* and Feral Cat *Felis catus* are pest animals that are likely to occur in the project areas. Of these species, Red Fox and European Rabbit are declared as established pest animals under the CaLP Act.

The introduction, proliferation and impact associated with these species are considered to be threatening processes under the FFG Act and/or EPBC Act and are therefore considered in Appendix F. The project is unlikely to create habitat for these species with a loss of their habitat and contraction in their range considered a more likely outcome of construction.

5.5 Likelihood of potentially threatening processes

Appendix F provides a list of key threatening processes identified under the EPBC Act (DoEE, 2017a) or FFG Act (DELWP, 2016a), an assessment of the likelihood of the threatening process occurring within the project areas and whether the project is likely to exacerbate the threat.

Key threatening processes that are not applicable to the project are excluded from Appendix F. The applicability of threatening processes to the project has been determined based on the location of the project, values within the project area and relevance to the proposed works.

Of the threatening processes determined to be of relevance to the project only one is considered to be have a moderate or above likelihood of occurrence and is considered likely to be exacerbated by the project. This is 'habitat fragmentation as a threatening process for fauna in Victoria' which is a potentially threatening process listed under the FFG Act. It is considered that this process is present within the project areas and broader landscape due to historic and ongoing habitat fragmentation include land use for residential, industrial and transport purposes. The project areas. This vegetation forms a highly disturbed and narrow linear corridor of habitat that loosely connects to fragmented habitat of similar value to the north and south of the project areas. The fauna species observed within the project areas are species considered particularly resilient to inhabiting modified landscapes, and would likely persist despite the level crossing removals.

5.6 Native vegetation patches and scattered trees

The following section presents the location, extent and quality of native vegetation and scattered trees within the Edithvale and Bonbeach project areas.

5.6.1 Edithvale

A total of 21 native vegetation patches comprising 1.147 hectares (0.2925 habitat hectares) and three scattered trees were identified within the Edithvale project area. None of the patches represent either FFG Act or EPBC Act listed vegetation communities. The patches are comprised of:

- twenty patches (1.120 hectares) of EVC 2 Coast Banksia Woodland
- one patch (0.027 hectares) of EVC 160 Coastal Dune Scrub.

Figure 7 shows the location of patches and scattered trees within the Edithvale project area and details of the vegetation quality assessment for each patch is provided in Table 6.

5.6.2 Bonbeach

At total of 17 patches comprising 1.053 hectares (and 0.2654 habitat hectares) of vegetation and one scattered tree were identified within the Bonbeach project area. None of these patches represent either Victorian or Australian-listed vegetation communities. The patches are comprised of:

- fourteen patches (1.003 hectares) of EVC 2 Coast Banksia Woodland
- three patches (0.050 hectares) of EVC 160 Coastal Dune Scrub.

Figure 8 shows the location of patches and scattered trees within the Bonbeach project area and details of the vegetation quality assessment for each patch is provided in Table 7.



Figure 7 Mapped ecological values - Edithvale (Figure 1 of 3)



Figure 7 Mapped ecological values - Edithvale (Figure 2 of 3)





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Habita	t Zone (HZ)		HZ1	HZ2	HZ3	HZ4	HZ5	HZ6	HZ7	HZ8	HZ9	HZ10
Bioreg	ion		GipP									
EVC			N	0	N	N	N	0	2	0	N	7
Bioreg	ional Conservation Status (BCS)		>	>	>	>	>	>	>	>	>	>
	Large Old Trees	10	0	0	0	0	10	0	0	0	10	0
	Tree Canopy Cover	5	5	5	5	5	5	0	0	5	5	0
u	Lack of weeds	25	4	7	7	7	11	0	4	7	7	0
oitibn	Understorey	15	5	5	5	5	5	5	5	5	5	5
o) ət	Recruitment	10	e	e	e	3	5	0	5	5	e	0
!S	Organic Litter	5	N	N	N	N	N	N	2	0	N	2
	sbor	5	0	0	0	0	0	0	0	0	0	0
	Total Site Score	75	19	22	22	22	38	7	16	22	32	7
Stands	ardiser (X 1.36)		NA	AN	NA							
Lands	cape Context Score	25	N	4	2	N	N	N	N	N	N	5
Habita	t Score	100	21	26	24	24	40	o	18	24	34	6
Habita	t Points = Score/100	~	0.21	0.26	0.24	0.24	0.40	0.09	0.18	0.24	0.34	0.09
Area o	of habitat zone removals		0.077	0.053	0.118	0.039	0.084	0.026	0.005	0.021	0.040	0.036
Habita	t Hectares to be removed		0.0162	0.0138	0.0283	0.0094	0.0336	0.0023	0.0009	0.0050	0.0136	0.0032

Habita	t Zone (HZ)		HZ11	HZ12	HZ13	HZ14	HZ15	HZ16	HZ17	HZ18	HZ19	HZ20	HZ21
Bioregi	ion		GipP										
EVC			2	160	7	ю	2	2	7	2	2	2	7
Bioregi	ional Conservation Status (BCS)		>	D	>	>	>	>	>	>	>	>	>
	Large Old Trees	10	ø	0	ø	0	0	10	0	0	0	0	0
	Tree Canopy Cover	5	5	0	5	5	5	5	0	0	5	5	5
u	Lack of weeds	25	7	7	7	7	7	7	0	0	4	4	4
oitibn	Understorey	15	5	5	5	5	5	5	5	5	5	5	5
oD ət	Recruitment	10	e	5	e	S	3	3	0	0	3	с	3
IS	Organic Litter	5	0	2	7	2	2	2	2	2	2	2	2
	Logs	5	0	0	0	0	0	0	0	0	0	0	0
	Total Site Score	75	28	14	30	22	22	32	7	7	19	19	19
Standa	ardiser (X 1.36)	ı	NA	1.36	NA	NA	NA	NA	N/A	NA	NA	NA	NA
Landso	cape Context Score	25	7	7	2	2	2	3	7	2	7	7	7
Habitat	t Score	100	30	21	32	24	24	34	0	6	21	21	21
Habitat	t Points = Score/100	-	0.30	0.21	0.32	0.24	0.24	0.34	0.09	0.09	0.21	0.21	0.21
Area o	if habitat zone removals		0.067	0.027	0.085	0.081	0.060	0.129	0.014	0.016	0.074	0.022	0.073
Habitat	t Hectares to be removed		0.0201	0.0057	0.0272	0.0194	0.0144	0.0439	0.0013	0.0014	0.0155	0.0020	0.0153

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Figure 8 Mapped ecological values - Bonbeach (Figure 1 of 3)



Figure 8 Mapped ecological values - Bonbeach (Figure 2 of 3)



Figure 8 Mapped ecological values - Bonbeach (Figure 3 of 3)

Habita	t Zone (HZ)		HZ22	HZ23	HZ24	HZ25	HZ26	HZ27	HZ28	HZ29	HZ30	HZ31
Bioreg	ion		GipP									
EVC			N	N	N	160	N	N	N	N	N	N
Bioreg	ional Conservation Status (BCS)		>	>	>	Ω	>	>	>	>	>	>
	Large Old Trees	10	10	10	10	0	0	0	10	0	0	0
	Tree Canopy Cover	5	5	2	5	0	0	0	5	0	0	З
u	Lack of weeds	25	7	7	7	N	0	0	Q	0	0	4
oitibn	Understorey	15	5	2	5	2	5	5	5	5	5	5
oʻ) ət	Recruitment	10	e	e	e	ى ک	0	e	5	e	0	e
is	Organic Litter	5	N	N	7	N	7	N	N	N	N	7
	Logs	£	0	0	0	0	0	0	0	0	0	0
	Total Site Score	75	32	32	32	14	7	10	33	10	7	17
Stands	ardiser (X 1.36)		NA	AN	NA	1.36	NA	NA	AN	NA	NA	NA
Lands	cape Context Score	25	N	N	7	N	7	N	N	N	N	7
Habita	t Score	100	34	34	34	21	6	12	35	12	6	19
Habita	it Points = Score/100	-	0.34	0.34	0.34	0.21	0.09	0.12	0.35	0.12	0.09	0.19
Area o	of habitat zone removals		0.038	0.026	0.046	0.013	0.024	0.025	0.047	0.032	0.066	0.032
Habita	t Hectares to be removed		0.0129	0.0088	0.0156	0.0027	0.0022	0.0030	0.0165	0.0038	0.0059	0.0061

Table 7 Habitat hectare assessment - Bonbeach

Habitat	t Zone (HZ)		HZ32	HZ33	HZ34	HZ35	HZ36	HZ37	HZ38
Bioregi	ion		GipP						
EVC			N	7	2	2	160	2	160
Bioregi	ional Conservation Status (BCS)		>	>	>	>	>	>	D
	Large Old Trees	10	0	0	0	10	0	0	0
	Tree Canopy Cover	5	0	5	0	5	0	5	0
u	Lack of weeds	25	0	9	0	9	2	7	2
oitibn	Understorey	15	5	5	5	5	5	5	5
oጋ ət	Recruitment	10	0	5	0	5	5	3	5
!S	Organic Litter	5	2	2	2	2	2	2	2
	Logs	5	0	0	0	0	0	0	0
	Total Site Score	75	7	23	7	33	14	22	14
Standa	ardiser (X 1.36)		NA	NA	NA	NA	1.36	N/A	1.36
Landsc	cape Context Score	25	3	2	2	2	2	2	2
Habitat	t Score	100	6	25	6	35	21	24	21
Habitat	t Points = Score/100	~	0.09	0.25	0.09	0.35	0.21	0.24	0.21
Area o	f habitat zone removals		0.014	0.398	0.015	0.185	0.018	0.055	0.019
Habitat	t Hectares to be removed		0.0013	0.0995	0.0014	0.0648	0.0038	0.0132	0.0040

6 Risk assessment

A risk assessment of project activities was performed in accordance with the methodology described in Section 4.2. Risks were assessed for the construction and design/operation phases (where relevant).

The residual ecology (within project area) risks associated with the projects are listed in Table 8. The likelihood and consequence ratings applied during the risk assessment process are provided in Appendix I. There was no change in the initial risk and final risk levels for ecology within the project areas.

Risk ID	Risk name	Risk pathway	Final EPR	Residual Risk level
E42	Native vegetation removal	Removal of native vegetation (patches and scattered trees) within the project area, impacting native vegetation extent.	EPR FF1 Native vegetation and habitat	Minor
E43	Removal of protected flora	Loss of protected flora species reducing the abundance of that species.	EPR FF2 FFG permits	Minor
E44	Removal of habitat for threatened species	Removal of habitat for threatened flora and/or fauna species within the project area affecting the persistence of the species.	No EPR specified	Negligible
E45	Removal of habitat (non- threatened fauna)	Removal of habitat resulting in the displacement, injury or death of wildlife protected under the Wildlife Act causing animal welfare concerns.	EPR FF4 Fauna EPR FF6 Landscaping for wildlife EPR UD1 Urban Design Guidelines	Minor
E46	Disturbance to fauna (project areas)	Increase in noise, vibration and artificial light affecting fauna behaviour within or adjacent to project area resulting in a decline in fauna abundance and/or diversity.	EPR AQ1 Air quality (construction) EPR AQ2 Air quality management EPR NV2 Construction noise EPR SW1 Stormwater management – construction EPR LV2 Lighting EPR LV3 Light spillage	Negligible

Table 8 Ecological risks

Risk ID	Risk name	Risk pathway	Final EPR	Residual Risk level
E47	Threatening processes (weeds, pathogens, pests)	Spread of weeds listed under the CaLP Act resulting in the decline in quality of native vegetation in the rail corridor adjacent to the project area. Spread or introduction of pathogens / pest animals resulting in the exacerbation of a threatening process listed under the FFG Act and EPBC Act.	EPR FF3 Weeds and pathogens	Negligible
E48	Threatening process (habitat fragmentation)	Fragmentation of the narrow habitat corridor within and beyond the rail reserve, resulting in the exacerbation of a threatening process listed under the FFG Act.	EPR FF1 Native vegetation and habitat EPR FF6 Landscaping for wildlife EPR UD1 Urban Design Guidelines	Minor
E49	Unintended impacts on vegetation and habitat	 Unintended impacts on adjacent/retained vegetation and habitat resulting from: Inappropriate placement of construction stockpiling resulting in unintended impacts to native vegetation and habitat. Soil compaction or excavation causing root damage and vegetation loss within (or adjacent to) the project area. Dust generation during construction impacting the health of vegetation. Spills of chemicals resulting in pollution of native vegetation or habitat (particularly Edithvale Wetland and/or Wannarkladdin Wetland) either through surface or groundwater flows. Unintended loss of vegetation to be retained from accidental plant / personnel access to designated 'No Go Areas' or areas outside of the defined and anticipated project area. 	EPR FF5 Protection of retained/adjacent vegetation and habitat	Negligible

No risks were identified for ecological values within the project areas during the operation phase of the projects.

For further details refer to the EES Attachment II *Environmental Risk Report* which includes the full risk register, with initial EPRs and the final EPRs assigned to each risk.

7 Impact assessment

Construction works for the project would result in the removal of areas of native vegetation (patches and scattered trees) (risk E42) and planted vegetation (Australian or exotic species) which provide habitat for common native and introduced fauna. Removal of vegetation and habitat would result in the loss of plants listed as protected under the FFG Act (risk E43) and displacement, injury or death of wildlife protected under the Wildlife Act (risk E45). The loss of vegetation is a direct and unavoidable consequence of construction and it is conservatively assumed that all vegetation and habitat would be removed within the project area to facilitate construction works.

Construction works could introduce or spread weeds and/or pathogens (risk E47) and could also indirectly impact on adjacent vegetation and habitat through compaction or spoil, dust and/or spills (risk E49), and displacement of fauna through disturbance (noise, vibration, and light-spill) (risk E46). Risks that are assigned a rating of negligible are not dealt with in detail.

There are no threatened species considered to have greater than low likelihood of occurrence (**risk E44)** and subsequently no EPR has been developed to address this negligible risk. As such, no further assessment of this impact has been undertaken.

The project is unlikely to create habitat for pest animal species (**risk E47**) with a loss of habitat and contraction in range of pest animals considered a more likely outcome of construction. As such, no further discussion of this impact is provided.

Impacts are discussed separately in relation to Edithvale and Bonbeach level crossing removals rather than as one project area. Cumulative impacts for these areas combined are also described.

Management and mitigation measures to reduce impacts and therefore minimise the risks are identified and form the basis of the EPRs outlined in Section 8 below. Implementation of these measures informs the outcomes of the risk assessment outlined in Section 6 above.

7.1 Edithvale

7.1.1 Removal of native vegetation and scattered trees

Removal of native vegetation (patches and scattered trees) within the project area would reduce the extent of native vegetation by more than one hectare **(risk E42)**. This assumes that all native vegetation identified within the project area (refer to Section 5.6.1) would be directly impacted (removed) by the construction phase of the project.

Native vegetation provides habitat for wildlife and delivers a range of ecosystem services that make agricultural land more productive and contribute to human wellbeing (Council of Australian Governments Standing Council on Environment and Water 2012). Native vegetation is protected under the P&E Act and its removal usually requires a permit in Victoria.

Management and mitigation

The extent of native vegetation to be removed would be subject to the detailed design, which would likely result in unavoidable losses of native vegetation that would need be offset in accordance with the Guidelines for removal, destruction or lopping of native vegetation (DELWP, 2017a) or in agreement with DELWP (EPR_FF1).

Habitat hectares calculations for the patches of native vegetation and scattered trees are provided in Table 6. Based on a precautionary approach that all native vegetation would be removed during the construction phase of the project, a total of 0.3433 habitat hectares would require offsetting, and is comprised of:

- 0.2925 habitat hectares (patches)
- 0.042 habitat hectares (scattered trees).

Offset requirements are discussed below, based on the figures presented above. The ecological risk assessment level for removal of native vegetation remains minor after the implementation of offsets. The loss of native vegetation cannot be avoided.

Offset requirements

The process DELWP applies for determining offsets for loss of native vegetation is outlined in Appendix A.

The extent and quality of the patches and the location of the three scattered trees would be provided to DELWP to generate a Native Vegetation Removal (NVR) report once the project design is finalised and the project area and extent of vegetation removal is confirmed. In the interim, the patches and trees were run through the Environmental Systems Modelling Platform (EnSym) Native Vegetation Regulations Tool which determined the Edithvale level crossing removal project is to be assessed via the detailed pathway, since more than one hectare of native vegetation would be removed (Appendix G). A habitat hectare assessment of vegetation within the Edithvale project area has been used to generate the EnSym report.

A summary of offset requirements calculated by the EnSym (Appendix G) is provided in Table 9.

Risk-based	Offset type	Biodiversity	Risk multiplier	Offset req	uirements
pathway		equivalence score		Offset amount (biodiversity equivalence units)	Offset attributes
Detailed	General	0.036	1.5	0.308 general units	Must be within the PPWCMA or Kingston City Council Must have minimum strategic biodiversity

Table 9 Offset requirements - Edithvale

7.1.2 Removal of protected flora species

A number of species listed under the FFG Act protected flora controls are present that may be impacted by the works for the level crossing removal (Appendix C). Three species listed under the FFG Act protected flora controls were observed during the field assessment: White Sallow-wattle *Acacia floribunda*, Coast Wattle *Acacia longifolia subsp. sophorae* and Cotton Fireweed *Senecio quadridentalis*. Loss of individuals of protected flora would reduce the abundance of that species in the project area (**risk E43**).

Management and mitigation

A permit to take (kill, injure, disturb or collect) flora species protected under the FFG Act is required from DELWP and would be acquired under the precautionary approach (EPR_FF2).

While the permit is required, it will not reduce the loss of protected flora. However, due to the low abundance of protected flora within the project area this is considered to be a minor risk.

7.1.3 Displacement, injury or death of non-threatened fauna species (habitat removal)

Potential exists for trees and shrubs (including Australian and exotic species) present within the project area to provide habitat for non-threatened fauna, particularly arboreal mammals (possums) and birds. This has implications for individual animals which are species that are common in the local area and, as such, the ecological consequence of losing these individuals will occur at a project area scale and has therefore been assessed as a minor risk (refer to Section 6).

Construction would remove habitat for those species and individuals could be displaced, injured or killed, particularly during site clearance if vegetation and habitat is removed. Displaced animals are vulnerable to collision with vehicles and susceptible to predation. The displacement, injury or death of non-threatened fauna is an animal welfare concern (risk E45).

Management and mitigation

Loss of fauna habitat is an unavoidable consequence of the level crossing removals. The potential displacement, injury or death of animals during the removal of habitat can be managed through salvage. Salvage would involve measures such as identifying hollows or nests prior to site clearance and the engagement of a wildlife salvage expert to be onsite at the time of site clearing works to capture and manage any fauna encountered.

Translocation is not recommended as part of the salvage works as the relocation of nonthreatened native wildlife from an area to be disturbed to an area reserved or protected from future development is generally not supported by DELWP for wildlife welfare reasons (DELWP 2017b).

Should salvage of wildlife for animal welfare reasons be required authorised by DELWP), a Management Authorisation would be obtained under the Wildlife Act and salvage would be undertaken by a wildlife salvage expert **(EPR_FF4)**.

Opportunities to reinstate habitat for individual animals displaced by the project are limited due to the constraints of the narrow rail corridor and project area. Landscape design could utilise native species which provide foraging or shelter resources for wildlife likely to be impacted by the project (**EPR_FF6** and **EPR_UD1**). Landscaping is considered further in Attachment V *Urban Design Guidelines – Edithvale.*

7.1.4 Spreading declared weeds and/or pathogens

Construction could spread weeds listed under the CaLP Act resulting in the decline in quality of native vegetation in the rail corridor adjacent to the project area (risk E47).

The seeds of weed species and other pathogens can become lodged in plant and equipment (particularly in the mud of tyre treads) when driven through infested areas. The seeds or and/or pathogens may then be carried some distance before being unintentionally deposited in areas free from previous infestations of the species or pathogens. Conversely, plant and/or equipment moving from the LXRA project area could result in off-site infestations of those species present within the project area.

CaLP Act listed weed species identified as present or likely to occur within the project areas are listed in Table 5 along with their status within the PPWCMA area. Management requirements for declared noxious weed species are outlined in Appendix A (Table A3).

Management and mitigation

LXRA is committed to delivering projects with no overall increase in the diversity, coverage or spread of weed species within the project areas. The project would prepare and implement plans and procedures in order to prevent the spread of pest species and pathogens, with priority given to controlling of weeds of national significance, identified by the Federal Government, and species listed under the CaLP Act (EPR_FF3). Specific measures to manage this risk may include wash-down procedures to remove weed seeds and soil from plant and equipment and measures to contain runoff from spoil and prevent spread of soil into native vegetation in the rail corridor adjacent to the project area. Such measures with be detailed in an Environmental Management Plan (or similar) for the works.

While considered a negligible risk, the potential spread of pest species and pathogens in the project areas would be addressed by these management and mitigation measures (**EPR_FF3**).

7.1.5 Exacerbating potentially threatening processes under the FFG Act (habitat fragmentation)

Removal of vegetation within the rail corridor would fragment the narrow corridor of habitat which extends along the rail corridor beyond the rail reserve resulting in the exacerbation of a threatening process listed under the FFG Act (risk E48).

Whilst habitat fragmentation would be exacerbated by this project, fragmentation of habitat within the rail corridor is a long-term and continuing issue and therefore the consequence of further fragmentation is considered minor.

Management and mitigation

Native vegetation clearance would be offset in accordance with the biodiversity assessment guidelines or in agreement with DELWP (EPR_FF1).

Opportunities to reinstate the habitat corridor through landscaping are limited due to the constraints of the narrow rail corridor and project area, however where possible, landscape design could utilise native species which provide foraging or shelter resources for wildlife likely to be impacted by the project (**EPR_FF6 and EPR_UD1**). Landscaping is considered further in Attachment V *Urban Design Guidelines – Edithvale.*

This risk level therefore remains minor after the implementation of offsets as the loss of habitat cannot be avoided or mitigated.

7.1.6 Unintended impact on ecological values to be retained

Construction works in the project area may unintentionally impact on vegetation and habitat adjacent to the project area. This could occur as a result of:

- Inappropriate placement of construction stockpiling resulting in smothering of native vegetation within, or adjacent to, the project area (risk E49).
- Soil compaction or excavation causing root damage and vegetation loss within, or adjacent to, the project area (risk E49).
- Dust generated during constructions settling on, and impacting the health of, vegetation (risk E49).
- Noise, vibration, dust and/or light disturbing and displacing native wildlife (risk E46).

Management and mitigation

The risk associated with these unintentional impacts on vegetation and habitat adjacent to the project area would be negligible with the implementation of measures such as robust tree/ecological protection zones, 'no go' zone fencing with appropriate signage, best practice spill, sedimentation and water runoff measures, and noise, dust and light-spill control measures **(EPR_FF5).**

7.2 Bonbeach

Impacts associated with Bonbeach are closely aligned with Edithvale and, with the exception of specific details relating to removal of native vegetation (patches and scattered trees) within the Bonbeach project area, these impacts and associated management and mitigation measures are not repeated below.

7.2.1 Removal of native vegetation

Removal of native vegetation (patches and scattered trees) within the project area would reduce the extent of native vegetation by more than one hectare **(risk E42)**. This is based on the assumption that all native vegetation identified within the project area (refer to Section 5.6.2) would be directly impacted (removed) by the construction phase of the project. Limited opportunities are available to minimise the loss of native vegetation.

Native vegetation provides habitat for wildlife and delivers a range of ecosystem services that make land more productive and contribute to human wellbeing (Council of Australian Governments Standing Council on Environment and Water 2012). Native vegetation is protected under the P&E Act and its removal usually requires a permit in Victoria.

Management and mitigation

The extent of native vegetation to be removed would be subject to the detailed design, which would likely result in unavoidable losses of native vegetation that would need to be offset in accordance with the biodiversity assessment guidelines or in agreement with DELWP (EPR_FF1).

Habitat hectares calculations for the native vegetation patches and scattered tree are provided in Table 7. A total of 0.2794 habitat hectares require offsetting comprised of:

- 0.2654 habitat hectares (patches)
- 0.014 habitat hectares (scattered tree).

Offset requirements are discussed below, based on the figures presented above. The ecological risk assessment level for removal of native vegetation remains minor for the project after the implementation of offsets. The loss of native vegetation cannot be avoided.

Offset requirements

The process DELWP applies for determining offsets for loss of native vegetation is outlined in Appendix A.

The extent and quality of the patches and the location of the single scattered tree would be provided to DELWP to generate a NVR report once the project design is finalised and the project area and vegetation extents are confirmed. In the interim, the patches and trees were run through the EnSym tool which determined that the Bonbeach level crossing removal should be assessed via the detailed pathway, given that just over one hectare of native vegetation would be removed (Appendix H).

A summary of offset requirements calculated by the EnSym is provided in Table 10.

Risk-based	Offset type	Biodiversity	Risk multiplier	Offset req	uirements
-patriway		equivalence score		Offset amount (biodiversity equivalence units)	Offset attributes
Detailed	General	0.042	1.5	0.262 general units	Must be within the PPWCMA or Kingston City Council Must have minimum strategic biodiversity score of 0.111

Table 10 Offset requirements - Bonbeach

8 Environmental Performance Requirements

The EPRs required for the projects are summarised in Table 11 below. The EPRs are applicable to the final design and construction approach and provide certainty regarding the environmental performance of the projects.

EPR ID	Environmental Performance Requirement	Stage
FF1	Native vegetation and habitat	Design
	Any native vegetation removal must be avoided, minimised and managed in accordance with the Permitted Clearing of Native Vegetation - Biodiversity Assessment Guidelines.	Construction
FF2	Flora and Fauna Guarantee Act 1988 permits	Construction
	A permit to take and destroy flora species protected under the <i>Flora and Fauna Guarantee Act 1988</i> is required. All permits must be obtained prior to the commencement of works which require approval under the Act.	
FF3	Weeds and pathogens	Construction
	Develop and implement measures to avoid the spread or introduction of weeds and pathogens during construction, including vehicle and equipment hygiene.	
FF4	Fauna	Design
	Minimise the removal of habitat for fauna.	Construction
	Where fauna habitat is identified for removal, engage a suitably qualified wildlife handler and recovery specialist to check for fauna occupancy and ensure compliance with the <i>Wildlife Act 1975</i> . All necessary authorisations must be obtained prior to commencement of works.	
FF5	Protection of retained/adjacent vegetation and habitat	Construction
	Minimise or avoid unintended impacts on retained and/or adjacent vegetation and habitat by including measures in the Construction Environmental Management Plan(s) and other plans including tree protection zones, environmental no-go zones, fencing and signage, directional lighting, and best practice spill, sedimentation and water runoff management.	
FF6	Landscaping for wildlife	Design
	Incorporate native plant species into landscaping that provide wildlife habitat within level crossing removal project areas where appropriate.	Construction
UD1	Urban Design Guidelines	Design
	Design projects in accordance with the LXRA Urban Design Framework and project specific Urban Design Guidelines. The Urban Design Guidelines must consider:	

Table 11 Edithvale and Bonbeach environmental performance requirements

EPR ID	Environmental Performance Requirement	Stage
	 a. identity b. connectivity and wayfinding c. urban integration d. resilience and sustainability e. amenity f. vibrancy g. safety h. accessibility 	
	Seek the advice of the LXRA Urban Design Advisory Panel (chaired by the Office of the Victorian Government Architect, and includes officers of Kingston City Council) during the preparation of detailed design to ensure an appropriate response to the LXRA Urban Design Framework.	

9 Matters of National Environmental Significance

9.1 Overview

In order to provide necessary commentary on the likelihood of significant impacts specific to MNES, the section below consolidates the discussion within this technical report and provides an assessment of the potential mechanisms through which impact on those matters as a result of the level crossing removal projects at Edithvale and Bonbeach could have been realised.

The likelihood of significant impacts to these MNES within the level crossing removal GDE study area at Edithvale and Bonbeach is considered in EES Technical Report B *Ecology: Wetlands and Groundwater Dependant Ecosystems.*

9.1.1 Listed migratory species

The project areas are not considered to provide habitat for listed migratory species. Fauna habitat present within the project areas is discussed in Section 5.2.1.2. Migratory species are considered and discussed in EES Technical Report B *Wetlands and Groundwater Dependant Ecosystems.*

9.1.2 Listed threatened species

The likelihood of occurrence of threatened species recorded on the VBA and/or predicted to occur by the PMST (excluding some species not considered of relevance to the project, as outlined in Section 4.1.2) is presented in Appendix D.

No species listed under the EPBC Act are considered to have at least a moderate likelihood of occurrence in the project areas. Flora and fauna habitat present within the project areas is discussed in Section 5.2. It is acknowledged that foraging habitat for Grey-headed Flying-Fox occurs throughout suburban Melbourne and is likely to occur in neighbouring areas on an occasional and opportunistic basis however as the project areas are typically devoid of foraging trees the species is considered to have a low likelihood of occurrence.

9.1.3 Ramsar wetlands

No declared Ramsar wetlands occur within the project areas. The Edithvale-Seaford Wetland occurs within the GDE study area. Impacts on the ecological character of a declared Ramsar wetland are discussed in EES Technical Report B *Ecology: Wetlands and Groundwater Dependant Ecosystems.*

9.2 Significant impact assessment

The project areas are not considered to support MNES and as such the project is unlikely to result in a significant impact to a MNES listed under the EPBC Act. Potential for the project works to indirectly affect MNES are considered in EES Technical Report B *Ecology: Wetlands and Groundwater Dependant Ecosystems*.

10Conclusion

This ecological impact assessment of the Edithvale and Bonbeach level crossing removal projects has detailed the likely ecological impacts as a result of the project. Management and mitigation options in order to reduce these impacts have also been identified.

Existing conditions

The Edithvale and Bonbeach project areas are located within a modified, urban environment. Vegetation and habitat is limited in extent and generally of poor quality. Despite this, native vegetation (both patches and scattered trees) was recorded within the project areas. None of this vegetation was considered to represent either EPBC Act and/or FFG Act listed ecological communities.

Habitat within the project areas was considered unlikely to support flora or fauna species listed as threatened and/or migratory under the EPBC Act, listed under the FFG Act and/or as Victorian Rare or Threatened Species (VROTS). The project areas were considered to provide habitat for non-threatened native and exotic fauna species. The vegetation along the rail corridor was considered to function as a habitat corridor facilitating the movement of fauna through the local landscape.

Impact assessment

Construction within the project areas (Edithvale and Bonbeach) would impact:

- Removal of native vegetation which would reduce the extent of native vegetation by more than 2 hectares. This is based on the presence of:
 - o 38 patches of native vegetation comprising:
 - 21 patches (1.147 hectares) in the Edithvale project area
 - 17 patches (1.053 hectares) in the Bonbeach project area
 - four scattered trees comprising:
 - three scattered trees in the Edithvale project area
 - one scattered trees in the Bonbeach project area
- Loss of native flora listed as 'protected' under the *Flora and Fauna Guarantee Act 1988* which would reduce the abundance of that species within the project areas.
- Loss of habitat resulting in the displacement, injury or death of non-threatened native wildlife protected under the *Wildlife Act 1975* which has implications for individual animals of species that are common in the local area.

Construction of the level crossing removals may exacerbate:

- habitat fragmentation which is a 'potentially threatening process' under the *Flora and Fauna Guarantee Act 1988,* although fragmentation of habitat within the broader rail corridor is a continuing issue and the consequence of further fragmentation is considered to be minor.
- spread of weeds listed under the *Catchment and Land Protection Act 1994* resulting in the decline in quality of native vegetation in the rail corridor adjacent to the project areas.

Construction within the project areas is not expected to impact on:

- Matters of National Environmental Significance (MNES) listed under the Australian *Environment Protection and Biodiversity Conservation Act 1999* as threatened species are unlikely to occur and the Edithvale-Seaford Wetlands Ramsar site is not within, or immediately adjacent to, the project areas.
- flora or fauna species or communities listed as threatened under the *Flora and Fauna Guarantee Act 1988* as no communities are to occur and species have a low likelihood or are unlikely to occur in the project areas.

Management and mitigation

Impacts associated with construction would be managed or mitigated by:

- offsets for removal of native vegetation in accordance with the biodiversity assessment guidelines or in agreement with DELWP
- permit to take (kill, injure, disturb or collect) flora species protected under the FFG Act from DELWP
- implementation of measures to avoid, minimise or mitigate the:
 - spread of weeds, pest animals or pathogens
 - unintentional impacts of compaction, dust, spills, noise, light and dust on retained and/or adjacent vegetation, habitat and wildlife
 - o displacement, injury or death of native wildlife (animal welfare).

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Appendix A – Outline of relevant legislation and policy

This section provides an outline of environmental legislation and/or policies relevant to the level crossing removal project.

Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

One of the main aims of the EPBC Act is to provide for the conservation of biodiversity and the protection of the environment, particularly those aspects that are considered to be Matters of National Environmental Significance (MNES).

Matters of National Environmental Significance

The Act defines nine MNES:

- World Heritage properties
- National Heritage places
- Wetlands of International Importance (Ramsar sites)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements (JAMBA, CAMBA, ROKAMBA)
- Commonwealth Marine Areas
- Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development.

The MNES relevant to the Edithvale and Bonbeach level crossing removals are:

- listed and threatened species and ecological communities
- migratory species protected under international agreements
- Wetlands of International Importance (Ramsar sites)

Under the Act, actions that are likely to have a significant impact upon MNES require approval from the Australian Government Minister for the Environment. An action may include any project, development, undertaking, activity or series of activities that may or do affect MNES.

Other matters protected by the EPBC Act

The EPBC Act also protects other matters for which approval may be required for a proposed activity that significantly affects the environment on Commonwealth land or if an action is likely to significantly impact on the environment anywhere if the action is proposed by the Australian Government or Australian Government agencies. These 'other matters' are: listed marine species, whales and other cetaceans, critical habitats, Commonwealth reserves (terrestrial or marine), Commonwealth heritage places or Commonwealth land.

The project areas do not occur on, or adjacent to, Commonwealth land and are not likely to significantly impact on the environment of Commonwealth land. Further, and as mentioned previously, no impacts on listed marine species, whales and other cetaceans are likely as a result of the project, so these matters have not been considered further.
Listed key threatening processes

The EPBC Act also provides for the identification and listing of key threatening processes. A threatening process is defined as a key threatening process if 'it threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community' (DoEE, 2017a). Threat abatement plans may be prepared for key threatening processes.

Key threatening processes do not trigger the EPBC Act as they are not MNES and they also do not regulate or prevent actions undertaken by the states, territories or individual property managers (DoEE, 2017b).

Victorian

Environment Effects Act 1978

Under the EE Act, projects that could have a 'significant effect' on Victoria's environment can require an Environment Effects Statement (EES) to be developed. This Act applies to any works 'reasonably considered to have or be capable of having a significant effect on the environment'.

The EES referral criteria for impacts to ecological values (Table A1) were considered as part of the preliminary assessments for the Edithvale and Bonbeach level crossing removal projects. The projects were referred to the Minister for Planning who determined that an Environment Effects Statement (EES) was required for the project, particularly as the project is likely to have significant effects on:

- the regional groundwater regime resulting in potential changes to hydrological conditions at the Ramsar listed Edithvale-Seaford Wetlands
- the ecological character and habitat values of the Edithvale-Seaford Wetlands due to alterations in the groundwater regime
- the protected beneficial uses of groundwater, due to alterations in the groundwater regime, along with risks to human health, recreation and ecosystems due to changes in water quality from activation and excavation of potentially acid sulphate soils and from interception/movement of existing contaminated soil and groundwater.

Criteria type	Criteria
Individual mandatory referral criteria for ecological matters	 Potential clearing of 10 hectares or more of native vegetation from an area that: is of an EVC identified as endangered by the DELWP, or is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework), and is not authorised under an approved Forest Management Plan or Fire Protection Plan.
	Potential long-term loss of a significant proportion (e.g. 1 to 5% depending on the conservation status of the species) or known remaining habitat or population of a threatened species within Victoria
	Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long term.
	Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia' (Environment Australia 2001).

Table A1 EES referral criteria for ecological matters (from DSE, 2006)

Criteria type	Criteria
Combination referral criteria for ecological matters	Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Plan
	Matters listed under the Flora and Fauna Guarantee Act 1988:
	 potential loss of a significant area of a listed ecological community, or potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listed), including as a result of loss of fragmentation of habitats, or potential loss of critical habitat, or potential significant effects on habitat values of a wetland supporting migratory bird species.
	Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the <i>National Parks Act</i> 1975

Planning and Environment Act 1987

The P&E Act establishes the framework for the use, development and protection of land in Victoria. The Act provides the standard provisions for planning schemes which are typically administered by local government but can also be administered by the state in certain circumstances.

Guidelines for the removal, destruction or lopping of native vegetation

The Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a) are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria. The Guidelines replace the previous incorporated document titled Permitted clearing of native vegetation – Biodiversity assessment guidelines (DEPI, 2013a). The Guidelines provide instructions on how an application for a permit to remove native vegetation is to be assessed under the P&E Act, including requirements to undertake a site assessment, the required site-assessment methodology, and any specific conditions that may form part of a granted permit, such as offsetting.

Under the Guidelines, there are three pathways under which an application to remove native vegetation can be assessed as – basic, intermediate and detailed. The assessment pathway determines the types of offsets that are required to be implemented for the removals. This is determined via an assessment of location, whether any large trees are to be removed and the extent risk to biodiversity by a particular project:

- Location risk is determined by assessing the likelihood that the removal of a small amount of native vegetation may impact the persistence of a rare or threatened species. Location risk has been determined for all of Victoria with areas being categorised as Location 1, Location 2 or Location 3. The location risk of a particular site is determined using the native vegetation location risk map available from the NVIM tool found on the DELWP website.
- Extent risk is determined by the extent of the native vegetation including the presence or absence of large trees that is proposed to be removed.

Together, these two types of risk are used to determine the assessment pathway for a permit application to remove native vegetation (DELWP 2017a).

Table A2 presents the assessment pathways for native vegetation removal.

Table A2 Assessment pathways for native vegetation removal

	Location category		
Extent of native vegetation	Location 1	Location 2	Location 3
Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
0.5 hectares or more	Detailed	Detailed	Detailed

The assessment pathway determines the assessment process to be followed when applying to remove native vegetation:

- Basic and intermediate pathway applications do not require a site assessment by an accredited native vegetation assessor.
- Detailed pathway applications require a site assessment.

Offset requirements

The biodiversity loss from the removal of native vegetation is required tobe offset in accordance with the Guidelines (DELWP, 2017a). Offsets are designed to compensate for the loss of biodiversity value.

A combination of site-based and landscape scale information is used to calculate the biodiversity value of the vegetation to be removed. This information is used to determine the loss in biodiversity value that needs to be compensated for with an offset that provides equivalent gain in biodiversity value. Biodiversity value is represented by a general or species habitat score.

Either a species offset or a general offset is required to compensate for any removals:

- A species offset is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species. Species offsets must compensate for the removal of that particular species' habitat.
- A general offset is required when the removal of native vegetation does not have a significant impact on any habitat for rare or threatened species.

Offsets are determined via a Native Vegetation Removal (NVR) report which is generated by DELWP following the submission of habitat hectare assessment field data.. Prior to submitting final areas of native vegetation to be removed to DELWP for processing the NVR report, the Environmental Systems Modelling Platform (EnSym) Native Vegetation Regulations Tool can be used to test clearing scenarios and therefore provide an indication of offset expectations.

Planning overlays

For the purpose of this report, implications of the planning overlays assessed are limited to those categorised as:

• Environmental Significance Overlays (ESOs). The broad intent of an ESO is to identify areas where the development of land may be affected by environmental constraints, and to ensure that if development does happen, it is compatible with the values that are highlighted in any schedule to the identified ESO.

 Vegetation Protection Overlays (VPOs). A VPO is specific to the removal of vegetation that has been deemed to be significant, and protects this vegetation against inappropriate development.

A schedule to an ESO or VPO would contain a statement of the significance of the environmental, vegetation or landscape value that is protected by the overlay, and the objective to be achieved. Approval is typically required to remove most vegetation within an ESO or VPO, and the application for an approval for vegetation removal must show that the proponent has been cognisant of the intent of each overlay.

In considering any application for vegetation removal, the decision guidelines of ESOs and VPOs must be considered. Decision guidelines include but are not limited to:

- the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies
- the statement of environmental, vegetation and/or landscape significance and the environmental objective contained in a schedule to the relevant overlay
- the need to remove, destroy or lop vegetation to create defendable space to reduce the risk of bushfire to life and property
- any other matters specified in a schedule to the relevant ESO or VPO.

Flora and Fauna Guarantee Act 1988

The FFG Act was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. One of the main features of the Act is the listing process, whereby native species and communities of flora and fauna, and the processes that threaten native flora and fauna, are listed in the schedules of the Act. This assists in identifying those species and communities that require management to survive and identifies the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.

The species and communities of flora and fauna and the potentially threatening processes listed under the FFG Act are published on the DELWP website at

https://www.environment.vic.gov.au/conserving-threatened-species/flora-and-fauna-guaranteeact-1988.

The website provides links to three lists:

- Threatened list (DELWP 2017c) which includes taxa and communities of flora and fauna that have been listed as threatened in accordance with Section 10 of the FFG Act.
- Protected flora list (DELWP 2017d) which includes:
 - o plant taxa listed as threatened under the FFG Act
 - o plant taxa belonging to communities listed as threatened under the FFG Act
 - o plant taxa which are not threatened but require protection for other reasons.
- Processes list (DELWP 2016) which includes processes that have been listed as potentially threatening processes in accordance with Section 10 of the FFG Act.

The FFG Act also enables habitat critical to the survival of native flora and fauna to be declared and requires permits for activities that could harm threatened plants, fish and communities.

Protected flora controls under the FFG Act means it is an offence to take, trade in, keep, move or process protected flora without a permit. 'Take' is defined as to kill, injure, disturb or collect.

Protected flora controls do not apply on private land, unless the land is identified as critical habitat for the species. There are currently no critical habitat determinations under the FFG Act.

It is also an offence under the FFG Act to take, trade in or keep listed fish species.

Species relevant to the project are considered as part of the VBA data output in the desktop assessment and in the subsequent likelihood of occurrence assessment (Appendix D).

None of the communities listed as threatened under the FFG Act occur in the Kingston City Council area.

Potentially threatening processes listed under the FFG Act of relevance to the project are listed in Appendix F and discussed in Section 5.5.

Catchment and Land Protection Act 1994

The CaLP Act establishes a framework for management and protection of catchments through the management of land and water resources. The CaLP Act is the principle legislation relating to the management of pest plants and animals in Victoria. Under the Act, landowners have a responsibility to avoid causing or contributing to land degradation, including taking all reasonable steps to conserve soil, protect water resources, eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and where possible, eradicate established pest animals as declared under the CaLP Act.

Weed categories and their respective management requirements under the CaLP Act are summarised in Table A3.

Weed category	Enforceable management requirement
State prohibited weeds	These include weeds that either do not occur in Victoria but are a significant threat if they do invade, or are weeds that are present and pose a serious threat but are expected to be eradicated as infestations are generally small. The Victorian Government is responsible for the eradication of these weeds and may direct land owners to prevent growth and spread.
Regionally prohibited weeds	Regionally prohibited weeds are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land.
Regionally controlled weeds	These invasive plants are usually widespread in a region. To prevent their spread, ongoing control measures are required. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of regionally controlled weeds on their land.
Restricted weeds	This category includes plants that pose an unacceptable risk of spreading in this State and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials, is prohibited.

Table A3 CaLP Act declared noxious weed management requirements

Lists of noxious weeds and declared pest animals under the CaLP Act are published on the Agriculture Victoria website at http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds/protecting-victoria-from-pest-animals-and-weeds/legislation-policy-and-permits/declared-noxious-weeds-and-pest-animals-in-victoria

Established pest animals are species that should be eradicated or controlled or its spread in the wild should be prevented. These species are:

- Dingo-Dog hybrids Canis lupus dingo x Canis lupis familiaris
- Dog Canis lupus familiaris
- European Hare Lepus europaeus
- European Rabbit Oryctolagus cuniculus
- Goat Capra hircus
- Pig Sus scrofa
- Red Fox Vulpes vulpes

Wildlife Act 1975

The Wildlife Act forms the procedural, administrative and operational basis for the protection and conservation of native wildlife within Victoria. The purposes of the Act are to establish procedures in order to promote:

- the protection and conservation of wildlife
- the prevention of taxa of wildlife from becoming extinct
- the sustainable use of and access to wildlife.

This Act often sits as the default reference for other associated policies regarding wildlife. For example, the operation of the FFG Act often needs to be considered in conjunction with the provisions and procedures of the Wildlife Act as some wildlife would be both protected wildlife under the Wildlife Act and listed threatened species under the FFG Act.

With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, the Wildlife Act makes it an offence to hunt, take or destroy protected or threatened wildlife without authorisation. Appendix B – PMST search results

Australian Government

Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about <u>Environment Assessments</u> and the EPBC Act including significance guidelines, forms and application process details.

Report created: 23/06/17 16:47:22

Summary Details Matters of NES Other Matters Protected by the EPBC Act Extra Information Caveat Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the <u>Administrative Guidelines on Significance</u>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	53
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A <u>permit</u> may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	57
Whales and Other Cetaceans:	8
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	49
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Edithvale-seaford wetlands	Within Ramsar site

Listed Threatened Ecological Communities

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur

Diomedea antipodensis gibsoni Gibson's Albatross [82270]

Diomedea epomophora Southern Royal Albatross [89221]

Diomedea exulans Wandering Albatross [89223]

Diomedea sanfordi Northern Royal Albatross [64456]

Grantiella picta Painted Honeyeater [470] within area

Foraging, feeding or related behaviour likely to occur within area

[Resource Information]

Foraging, feeding or related behaviour likely to occur within area

Foraging, feeding or related behaviour likely to occur within area

Foraging, feeding or related behaviour likely to occur within area

Vulnerable

Endangered

Vulnerable

Vulnerable

Vulnerable

Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri		
Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri		
Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster		
Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica		
Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera		
Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area

Sternula nereis nereis Australian Fairy Tern [82950] Vulnerable Breeding likely to occur within area Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460] Vulnerable Species or species habitat may occur within area Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273] Vulnerable Species or species habitat may occur within area Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345] Foraging, feeding or related Vulnerable behaviour likely to occur within area Thalassarche cauta steadi White-capped Albatross [82344] Vulnerable Foraging, feeding or related behaviour likely to occur within area Thalassarche chrysostoma Grey-headed Albatross [66491] Endangered Species or species habitat may occur within area Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross Vulnerable Foraging, feeding or related [64459]

behaviour likely to occur within area

Name	Status	Type of Presence
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fish		
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat known to occur within area
Nannoperca obscura		
Yarra Pygmy Perch [26177]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat may occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat

Pseudomys fumeus		
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Amphibromus fluitans		
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Caladenia orientalis		
Eastern Spider Orchid [83410]	Endangered	Species or species habitat may occur within area
Dianella amoena		
Matted Flax-lily [64886]	Endangered	Species or species habitat likely to occur within area
Glycine latrobeana		
Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat likely to occur within area

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Name	Status	Type of Presence
Prasophyllum frenchii		
Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-	Endangered	Species or species habitat
orchid, French's Leek-orchid, Swamp Leek-orchid	-	likely to occur within area
[9704]		
Pterostylis cucullata		
Leafy Greenbood [15459]	Vulnerable	Species or species habitat
	Vaniorabio	likely to occur within area
Thelymitra eninactoides		
Matallia Sun arabid [11900]	Frada na sa sa d	Creation or or or other habitat
Metallic Sun-orchid [11896]	Endangered	Species or species nabitat
		may occur within area
<u>Xerocnrysum palustre</u>		
Swamp Everlasting [76215]	Vulnerable	Species or species habitat
		likely to occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat
	C	known to occur within area
<u>Chelonia mydas</u>		
Green Turtle [1765]	Vulnerable	Species or species habitat
		known to occur within area
Dermochelys coriacea		
Losthorback Turtle Losthory Turtle Luth [1768]	Endongorod	Spacios or spacios babitat
Leatherback furthe, Leathery furthe, Luth [1700]	Endangered	Species of species habitat
		known to occur within area
Sharke		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat
		known to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on t	he EPBC Act - Threatened	Species list.
Name	Threatened	Type of Presence
Migratory Marine Birds		, , , , , , , , , , , , , , , , , , ,
Fork-tailed Swift [678]		Species or species habitat
		likely to occur within area
Ardenna carneipes		

Floop footod Sh _ . .

Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons		

Little Tern [82849]

Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta		
Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Grav based Albetrass [66401]	Endangered	Spacios or spacios habitat
Grey-headed Albatross [66491]	Endangered	may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Balaena glacialis australis		
Southern Right Whale [75529]	Endangered*	Species or species habitat known to occur within area
Caperea marginata		
Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat may occur within area

Lamna nasus Porbeagle, Mackerel Shark [83288]

Megaptera novaeangliae Humpback Whale [38]

Migratory Terrestrial Species Hirundapus caudacutus White-throated Needletail [682]

Monarcha melanopsis Black-faced Monarch [609]

Motacilla flava Yellow Wagtail [644]

Myiagra cyanoleuca Satin Flycatcher [612]

Rhipidura rufifrons Rufous Fantail [592]

Species or species habitat likely to occur within area

Vulnerable

Species or species habitat likely to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Breeding known to occur within area

Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Migratory Wetlands Species		
<u>Actitis hypoleucos</u> Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<u>Calidris canutus</u> Red Knot, Knot [855]	Endangered	Species or species habitat
<u>Calidris ferruginea</u> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat
Calidris melanotos		known to occur within area
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
<u>Charadrius bicinctus</u> Double-banded Plover [895]		Species or species habitat known to occur within area
<u>Gallinago hardwickii</u> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area

Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]

Pandion haliaetus Osprey [952]

Philomachus pugnax Ruff (Reeve) [850]

Tringa glareola Wood Sandpiper [829]

Tringa nebularia Common Greenshank, Greenshank [832]

Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833] Critically Endangered

Species or species habitat known to occur within area

Species or species habitat likely to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information] The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information. Name Defence - Airport Builidng **Listed Marine Species** [Resource Information] Species is listed under a different scientific name on the EPBC Act - Threatened Species list. Name Threatened Type of Presence **Birds** Actitis hypoleucos Common Sandpiper [59309] Species or species habitat known to occur within area Apus pacificus Fork-tailed Swift [678] Species or species habitat likely to occur within area Ardea alba Great Egret, White Egret [59541] Species or species habitat known to occur within area Ardea ibis Cattle Egret [59542] Species or species habitat may occur within area Calidris acuminata Sharp-tailed Sandpiper [874] Species or species habitat known to occur within area Calidris canutus Red Knot, Knot [855] Species or species habitat Endangered known to occur within area Calidris ferruginea Curlew Sandpiper [856] Critically Endangered Species or species habitat known to occur within area Calidris melanotos Pectoral Sandpiper [858] Species or species habitat

Calidris ruficollis Red-necked Stint [860]

Calidris subminuta Long-toed Stint [861]

<u>Charadrius bicinctus</u> Double-banded Plover [895]

<u>Charadrius ruficapillus</u> Red-capped Plover [881]

Diomedea antipodensis Antipodean Albatross [64458]

Diomedea epomophora Southern Royal Albatross [89221] Vulnerable

Vulnerable

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Foraging, feeding or related behaviour likely to occur within area

Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<u>Diomedea gibsoni</u>		
Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Latham's Sping Japanese Sping [962]		Spacing or spacing habitat
Lathan s Shipe, Japanese Shipe [005]		known to occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus		
Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa		
Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
	. <i>.</i>	

Northern Giant Petrel [1061]

Merops ornatus Rainbow Bee-eater [670]

Monarcha melanopsis Black-faced Monarch [609]

Motacilla flava Yellow Wagtail [644]

Myiagra cyanoleuca Satin Flycatcher [612]

Neophema chrysogaster Orange-bellied Parrot [747]

Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]

Pachyptila turtur Fairy Prion [1066] Vulnerable

Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Breeding known to occur within area

Critically Endangered Spec

Species or species habitat likely to occur within area

Critically Endangered

Species or species habitat known to occur within area

Species or species

Name	Threatened	Type of Presence
Pandion baliaetus		habitat known to occur within area
Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax		
Ruff (Reeve) [850]		Species or species habitat known to occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae		
Red-necked Avocet [871]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons		
Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta		
Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma		Opening opening hebitst
Grey-neaded Albatross [66491]	⊏naangerea	Species or species habitat may occur within area

Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross Vulnerable Foraging, feeding or related behaviour likely to occur [64459] within area Thalassarche melanophris Black-browed Albatross [66472] Vulnerable Species or species habitat may occur within area Thalassarche salvini Salvin's Albatross [64463] Vulnerable Foraging, feeding or related behaviour likely to occur within area Thalassarche sp. nov. Pacific Albatross [66511] Species or species habitat Vulnerable* may occur within area Thalassarche steadi White-capped Albatross [64462] Vulnerable* Foraging, feeding or related behaviour likely to occur within area Tringa glareola Wood Sandpiper [829] Species or species habitat known to occur within area

Tringa nebularia

Common Greenshank, Greenshank [832]

Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat
		known to occur within area
Mammals		
Arctocephalus forsteri		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat
		may occur within area
Arctocephalus pusillus		
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat
		may occur within area
Dentilee		
Reptiles Carotta carotta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat
	Endangered	known to occur within area
<u>Chelonia mydas</u>		
Green Turtle [1765]	Vulnerable	Species or species habitat
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat
		known to occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
<u>Caperea marginata</u>		On a size on an a size habitat
Pygmy Right Whale [39]		Species or species habitat
		may occur within area
<u>Delphinus delphis</u>		
Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat
		may occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat
	-	known to occur within area
Crompus grissus		
Risso's Dolphin, Gramous [64]		Species or species habitat
		epooloo or opooloo nubitut

may occur within area

may occur within area

Lagenorhynchus obscurus Dusky Dolphin [43]

Megaptera novaeangliae Humpback Whale [38]

<u>Tursiops aduncus</u> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]

<u>Tursiops truncatus s. str.</u> Bottlenose Dolphin [68417] Vulnerable

Species or species habitat likely to occur within area

Species or species habitat

Species or species habitat likely to occur within area

Species or species habitat may occur within area

Extra Information

Invasive Species

State and Territory Reserves	[Resource Information]
Name	State
Seaford Wetlands N.F.R.	VIC

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis		
Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris		
European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus		
Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area

Pycnonotus jocosus Red-whiskered Bulbul [631]

Streptopelia chinensis Spotted Turtle-Dove [780]

Sturnus vulgaris Common Starling [389]

Turdus merula Common Blackbird, Eurasian Blackbird [596]

Turdus philomelos Song Thrush [597]

Mammals

Bos taurus Domestic Cattle [16] Species or species habitat likely to occur within area

[Resource Information]

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur

Name	Status	Type of Presence
Canis lupus familiaris		within area
Domestic Dog [82654]		Species of species habitat likely to occur within area
Capra hircus		
Goat [2]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis		
Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus		
Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa		
Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides		

Species or species habitat likely to occur within area

Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425] Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]

Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]

Austrocylindropuntia spp. Prickly Pears [85132]

Alligator Weed [11620]

Carrichtera annua Ward's Weed [9511]

Chrysanthemoides monilifera Bitou Bush, Boneseed [18983] Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat may occur within area

Species or species habitat may occur within

Name	Status	Type of Presence
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		area Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]	1	Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock Nassella Tussock (NZ) [18884]	9	Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat

Opuntia spp.

Prickly Pears [82753]

Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]

Rubus fruticosus aggregate Blackberry, European Blackberry [68406]

Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]

Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]

Ulex europaeus Gorse, Furze [7693]

Nationally Important Wetlands

Name

Edithvale-Seaford Wetlands

Species or species habitat likely to occur within area

may occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

[Resource Information]
State
VIC

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-38.026236 145.102417,-38.026031 145.103076,-38.026031 145.103076,-38.026031 145.103076,-38.03529 145.10864,-38.043716 145.113161,-38.051211 145.117146,-38.053758 145.118679,-38.055798 145.119231,-38.057958 145.120089,-38.061554 145.12084,-38.06468 145.121085,-38.065573 145.121162,-38.068432 145.121683,-38.070134 145.122311,-38.071944 145.122771,-38.072088 145.12248,-38.072245 145.122036,-38.072402 145.121683,-38.072571 145.120978,-38.069591 145.119798,-38.065597 145.118556,-38.059129 145.116318,-38.051622 145.113651,-38.050777 145.1131,-38.048339 145.111797,-38.03494 145.104915,-38.031898 145.103091,-38.027093 145.100286,-38.026236 145.102417

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales -Department of Environment and Primary Industries, Victoria -Department of Primary Industries, Parks, Water and Environment, Tasmania -Department of Environment, Water and Natural Resources, South Australia -Department of Land and Resource Management, Northern Territory -Department of Environmental and Heritage Protection, Queensland -Department of Parks and Wildlife, Western Australia -Environment and Planning Directorate, ACT -Birdlife Australia -Australian Bird and Bat Banding Scheme -Australian National Wildlife Collection -Natural history museums of Australia -Museum Victoria -Australian Museum -South Australian Museum -Queensland Museum -Online Zoological Collections of Australian Museums -Queensland Herbarium -National Herbarium of NSW -Royal Botanic Gardens and National Herbarium of Victoria -Tasmanian Herbarium -State Herbarium of South Australia -Northern Territory Herbarium -Western Australian Herbarium -Australian National Herbarium, Canberra -University of New England -Ocean Biogeographic Information System -Australian Government, Department of Defence Forestry Corporation, NSW -Geoscience Australia -CSIRO -Australian Tropical Herbarium, Cairns -eBird Australia -Australian Government – Australian Antarctic Data Centre -Museum and Art Gallery of the Northern Territory -Australian Government National Environmental Science Program

-Australian Government National Environmental Scien

-Australian Institute of Marine Science

-Reef Life Survey Australia

-American Museum of Natural History

-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania

-Tasmanian Museum and Art Gallery, Hobart, Tasmania

-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Table C1 Flora species observed within the project areas

Scientific Name	Common Name	EPBC	FFG	VROT
Acacia floribunda#	White Sallow-wattle		Р	
Acacia longifolia subsp. sophorae	Coast Wattle		Р	
Acacia melanoxylon	Blackwood			
Acetosella vulgaris*	Sheep Sorrel			
Agapanthus praecox subsp. orientalis*	Agapanthus			
Agrostis capillaris*	Brown-top Bent			
Allocasuarina littoralis#	Black Sheoak			
Allocasuarina verticillata	Drooping Sheoak			
Arctotheca calendula*	Cape Weed			
Avena fatua*	Wild Oat			
Banksia integrifolia	Coast Banksia			
Brassica fruticulosa*	Twiggy Turnip			
Brassica juncea*	Indian Mustard			
Brassica spp.*	Turnip			
Briza maxima*	Large Quaking-grass			
Briza minor*	Lesser Quaking-grass			
Callistemon sp.#	Bottlebrush			
Chenopodium album	Fat Hen			
Conyza sp.*	Fleabane			
Conyza bonariensis#	Flax-leaf Fleabane			
Coprosma repens*	Mirror Bush			
Correa reflexa	Common Correa			
Corymbia ficifolia#	Red-flowering Gum			
Cotoneaster glaucophyllus var. serotinus*	Large-leaf Cotoneaster			
Cupressus macrocarpa*	Monterey Cypress			
Cynodon dactylon*	Couch			
Cyperus eragrostis*	Drain Flat-sedge			
Dactylis glomerata*	Cocksfoot			
Dianella admixta	Black-anther Flax-lily			

Scientific Name	Common Name	EPBC	FFG	VROT
Ehrharta erecta*	Panic Veldt-grass			
Ehrharta longiflora*	Annual Veldt-grass			
Ehrharta spp.*	Veldt Grass			
Eucalyptus caesia#	Silver Princess			
Fumaria capreolata*	White Fumitory			
Galenia pubescens var. pubescens*	Blanket Weed			
Gazania sp*	Gazania			
Genista linifolia*	Flax-leaf Broom			
Goodenia ovata	Hop Goodenia			
Hakea sericea#	Needlebush			
Helminthotheca echioides*	Ox-tongue			
Hypochaeris radicata*	Flatweed			
Hypochaeris spp.*	Cat's Ear			
Iris pseudacorus	Flag Iris			
Juncus sp.	Rush			
Lagunaria patersonii#	Norfolk Island Hibiscus			
Lagurus ovatus#	Hare's-tail Grass			
Lepidium africanum*	Common Peppercress			
Leptospermum laevigatum	Coast Tea-tree			
Lolium rigidum*	Annual Rye-grass			
Lolium spp.*	Rye Grass			
Lomandra sp.	Mat-rush			
Lomandra filiformis	Wattle Mat-rush			
Lomandra longifolia	Spiny-headed Mat-rush			
Melaleuca armillaris#	Giant Honey-myrtle			
Oxalis pes-caprae*	Soursob			
Oxalis purpurea*	Large-flowered Wood-sorrel			
Paspalum distichum*	Water Couch			
Phalaris minor*	Lesser Canary-grass			
Phoenix canariensis#	Canary Island Date Palm			

Scientific Name	Common Name	EPBC	FFG	VROT
Plantago lanceolata*	Ribwort			
Plantago major*	Greater Plantain			
Poa annua*	Annual Meadow-grass			
Poa labillardieri	Common Tussock-grass			
Poa sp.	Tussock-grass			
Raphis sp.*	Raphis palm			
Rhagodia spinescens	Creeping Saltbush			
Romulea rosea*	Onion Grass			
Rytidosperma sp.	Wallaby Grass			
Senecio jacobaea*	Ragwort			
Senecio quadridentalis	Cotton Fireweed		Р	
Sonchus asper*	Rough Sow-thistle			
Sonchus oleraceus*	Common Sow-thistle			
Sporobolus africanus	Parramatta Grass			
Tetragonia implexicoma	Ice Plant			
Vulpia spp.*	Fescue			

denotes native species outside of natural range

* denotes exotic species

P – Protected

Table C2 Fauna species observed within the project areas

Scientific Name	EPBC	FFG	VROT
Gymnorhina tibicen			
Corvus coronoides			
Elanus axillaris			
Acridotheres tristis			
Sturnus vulgaris			
Ocyphaps lophotes			
Platycercus eximius			
Eolophus roseicapilla			
Cacatua tenuirostris			
Grallina cyanoleuca			
Manorina melanocephala			
Trichoglossus haematodus			
Anthochaera carunculata			
Columba livia			
Chroicocephalus novaehollandiae			
Pardalotus punctatus			
Streptopelia chinensis			
Hirundo neoxena			
Lichenostomus penicillatus			
Rhipidura leucophrys			
Phseudocheirus penicillatus			
	Scientific Name Gymnorhina tibicen Gymnorhina tibicen Corvus coronoides Elanus axillaris Acridotheres tristis Sturnus vulgaris Ocyphaps lophotes Platycercus eximius Eolophus roseicapilla Cacatua tenuirostris Grallina cyanoleuca Manorina melanocephala Trichoglossus haematodus Anthochaera carunculata Columba livia Chroicocephalus novaehollandiae Pardalotus punctatus Streptopelia chinensis Hirundo neoxena Lichenostomus penicillatus Rhipidura leucophrys	Scientific NameEPBCGymnorhina tibicenICorvus coronoidesIElanus axillarisIAcridotheres tristisISturnus vulgarisIOcyphaps lophotesIPlatycercus eximiusIEolophus roseicapillaICacatua tenuirostrisIGrallina cyanoleucaIManorina melanocephalaITrichoglossus haematodusIColumba liviaIChroicocephalus novaehollandiaeIPardalotus punctatusIStreptopelia chinensisIHirundo neoxenaILichenostomus penicillatusIPhseudocheirus penicillatusIPhseudocheirus penicillatusI	Scientific NameEPBCFFGGymnorhina tibicenIICorvus coronoidesIIElanus axillarisIIAcridotheres tristisIISturnus vulgarisIIOcyphaps lophotesIIPlatycercus eximiusIIEolophus roseicapillaIICacatua tenuirostrisIIGrallina cyanoleucaIIManorina melanocephalaIIChroicocephalus novaehollandiaeIIPardalotus punctatusIIStreptopelia chinensisIIHirundo neoxenaIILichenostomus penicillatusIIPhseudocheirus penicillatusIIPhnoreirus penicillatusIIPhseudocheirus penicillatusIIStreptopelia chinensisIIFinipidura leucophrysIIStreptopelia chinensisIIStreptopelia ch

* denotes exotic species

Appendix D – Threatened and/or migratory species likelihood of occurrence assessment

mon name EPBC Act Act Act Swamp Wallaby- VU sis ed Spear-grass	Act G	DELWP advisory list	Records 2 (1993) PMST 1 (1985) 1 (2010)	Habitat requirements Inhabits both natural and man-made water-bodies, including swamps, lagoons, billabongs and dams. Numerous populations exist in northern Victoria, near the Murray River and its tributaries, such as Ovens River and Broken River between Kerang and Tallangatta. In southern Victoria, it is known from several localities in south Gippsland, including Rosedale, Meeniyan and Wonthaggi areas, as well as in the Melbourne (Lysterfield), Ballarat, and Portland–Casterton areas. Moist to dry soils in open forests.	Likelihood of occurrence in project area Unlikely Unlikely
υ 5 τ			1 (1902)	Dense, wet, heathy, vegetation in near-coastal areas from near Portland in the west to Mallacoota areas in the east. Disjunct occurrence near the Grampians	Unlikely
er Orchid VU		υ	PMST	Coastal heathland and heathy woodlands between the Mornington Peninsula and Yarram, on well drained sandy soils.	Unlikely
pider-		-	1 (1887)	Typically coastal woodlands but also found in the Grampians.	Unlikely
verlasting		>	3 (2001)	Occurs within lowland swamps and wetlands, usually on black cracking clay soils.	Unlikely

Table D1 Threatened flora species likelihood of occurrence assessment

Likelihood of occurrence in project area	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Habitat requirements	Coastal areas from the lower Glenelg River to Port Phillip Bay, usually on calcareous substrates.	Associated with plains grassland, grassy wetland and plains woodlands (red gum woodland). Most records are north-west and west of Melbourne. Also occurs north-east of Melbourne around Yarra Glen and in the south-east near Cranbourne.	Moist areas in box, red gum and sclerophyll woodlands, grassy low open forest.	Endemic in Victoria and sporadically dispersed. Grows mainly in grasslands and grassy woodlands. Native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer	Scattered in wet marshes and slightly saline swamps and depressions across the Victorian Volcanic Plain	Scattered and very localised throughout lowland Victoria in shallow freshwater swamps. Considered extinct from suburban areas.	Aquatic or semi-aquatic perennial, scattered through Victoria, but mostly in the south-west in stream verges or swamps.	Grasslands, grassy woodlands and heaths. Predominantly in or near coastal swamps. Rarely occupies sites more than 10 km inland.
Records	1 (1904)	PMST	2 (1998)	PMST	9 (2001)	2 (2007)	3 (2005)	PMST
DELWP advisory list	<u>ب</u>	۵	>	>	<u>ب</u>	>	<u>ب</u>	۵
FFG Act			_					_
EPBC Act		Z U		Z U				Z Ш
Common name	Velvet White Correa	Matted Flax-lily	Purple Diuris	Purple Clover, Clover Glycine	Purple Blown-grass	Woolly Waterlily	Lacey River Buttercup	Maroon Leek-orchid
Scientific name	Correa alba var. pannosa	Dianella amoena	Diuris punctata	Glycine latrobeana	Lachnagrostis punicea subsp. filifolia	Philydrum lanuginosum	Ranunculus amplus	Prasophyllum frenchii

Scientific name	Common name	EPBC Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
Pterostylis cucullata	Leafy Greenhood	٦		>	PMST	Widely distributed but disjunct, mostly occurring in coastal areas, rarely inland. Recent records from volcanic soils. Coastal populations occur on stabilised sand dunes under open to closed scrub of Coast Tea-tree or Moonah.	Unlikely
Salsola tragus subsp. pontica	Coast Saltwort			L	1 (1938)	Grows in saline coastal areas.	Unlikely
Thelymitra epipactoides	Metallic Sun-orchid	Z Ш		Û	PMST	Small colonies in mainly coastal areas on fertile loams, but also inland in scrubby heaths, grassland and woodlands or near swampy depressions.	Unlikely
Xerochrysum palustre	Swamp Everlasting	٨U		>	1 (2005) PMST	Sedge-rich lowland swamps and wetlands, usually on black cracking clay soils.	Unlikely
Legend EPBC Act CR - Critically Endangered EN - Endangered VU - Vulnerable Note: The descriptions of prefe database of DoEE (<u>http://www</u>	<u>FFG Act</u> L – Listed N – Nominated for listing I – Invalid or ineligible D – Delisted Prred habitat for threatened flor environe: A Guide to the Indicent	<u>VROTS</u> c - Critical e - Endan v - Vulner, r - Rare r - Rare a species fr	ly Endang gered able ave been <u>prat.p(</u>) an	ered # generated bas d Flora of Vict	Records # (####) – VBA I PMST – Protecte Sed on publishec fortia available or ortia available or	esults: number of records (year of last record) d Matters Search Tool species accounts – particularly from the Species Profile and Threats Databa line via the VicFlora website (<u>https://vicflora.rbg.vic.gov.au/</u>) - and reference t	ase (SPRAT) books including,

Records column represents the number of records of a species within the VBA output rather than a count of individuals recorded. This approach was taken for consistency as not all records include count data.

	Likelihood of occurrence in project area		Low	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
	Habitat requirements		Various forests and woodlands, especially tall closed forests, including rainforests, tall woodlands and timbered watercourses; disperse to more open country in autumn-winter	Edges of saltwater to fresh waterbodies and wetlands, including estuaries, lakes, drainage lines, tidal watercourses and mudflats; occasionally beaches and rocky headlands; mainly spring-summer non-breeding migrant	Inhabits various wetlands, preferring large, well-vegetated freshwater swamps and wetlands.	Inhabits various wetlands, preferring large, well-vegetated freshwater swamps and wetlands. Also estuaries, coastal inlets and artificial waterbodies (e.g. dams, sewage ponds).	Natural populations no longer occur in Victoria. Birds released back into the wild favour wetter coastal plains, large seasonal wetlands and open pastures. Breed colonially in platform nests over open water.	Widespread but with an extremely patchy distribution. Its range extends from south-east Queensland to central Victoria. Most sightings originate from a few sites in north-east Victoria, along the western slopes of the Great Dividing Range in NSW, and the Central Coast of NSW. Depends on nectar and insects from Box Ironbark eucalypt forests. Only breeding habitat lies in north-east Victoria (Chiltern-Albury) and more eastern parts of NSW at Capertee Valley and the Bundarra-Barraba region.
	Records		2 (1990)	41 (2013)	1 (2003)	240 (2013)	73 (2013)	1 (1947)
	DELWP advisory list		Ň	٨٩		٨u	nt	5
speci	FFG Act						_	
launa	EPB C Act			Ä	Ä			ск
	Common name		Grey Goshawk	Common Sandpiper	Northern Shoveler	Australasian Shoveler	Magpie Goose	Regent Honeyeater
	Scientific name	Birds	Accipiter novaehollandiae novaehollandiae	Actitis hypoleucos	Anas clypeata	Anas rhynchotis	Anseranas semipalmata	Anthochaera phrygia

assessment ILLANCO snecies likelihood of occi migratory fauna and/or Table D2 Threatened

Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
Apus pacificus	Fork-tailed Swift	Mi			7 (2008) PMST	Aerial over a wide range of habitats, from inland to coast; spring-summer non-breeding migrant	Low
Ardea ibis	Cattle Egret	Ä			109 (2013) PMST	Freshwater wetlands and watercourses, pastures and croplands, especially where drainage is poor. Occasionally also tidal flats and estuaries.	Unlikely
Ardea intermedia	Intermediate Egret		_J	eu	16 (2008)	Freshwater swamps, intertidal mudflats, inland lakes and floodplains, well vegetated rivers; also farm dams, pastures and artificial wetlands	Unlikely
Ardea alba / Ardea modesta	Great Egret / Eastern Great Egret		_	٨U	136 (2015) PMST	Freshwater and brackish wetlands and watercourses, intertidal mudflats, inland lakes, swamps and rivers; also farm dams, irrigation drainages and artificial wetlands.	Unlikely
Arenaria interpres	Ruddy Turnstone	Mi		٨U	3 (1988)	Typically only found in coastal areas along beaches and on exposed rocks / reef.	Unlikely
Aythya australis	Hardhead			٨u	163 (2013)	Deep, permanent open freshwater wetlands and waterbodies with dense fringing vegetation. Sometimes artificial wetlands (dams, sewage ponds), especially during dry periods inland.	Unlikely
Biziura lobata	Musk Duck			'n	119 (2013)	Permanent freshwater and brackish swamps and wetlands with dense vegetation, more open waters in non-breeding season; occasionally coastal areas and estuaries.	Unlikely
Botaurus poiciloptilus	Australasian Bittern	Z W		ē	101 (2014) PMST	Occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. Favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. Prefers permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds growing over muddy or peaty substrate.	Unlikely
Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
------------------------	----------------------------	--------------	------------	---------------------------	--------------------	---	--
Calidris acuminata	Sharp-tailed Sandpiper	Āi			312 (2010) PMST	Margins of brackish waterbodies with emergent sedges grassland, saltmarsh or similar vegetation	Unlikely
Calidris alba	Sanderling	ž		pt	2 (2001)	Found only on the coast on sandy beaches exposed to open swell, sandbars, pits and shingle banks. They roost behind bare sand on the beach, clumps of seaweed, coastal dunes and rocky reefs.	Unlikely
Calidris canutus	Red Knot	RI,			PMST	Usually associated with coastal intertidal habitats such as mudflats, sandy beaches and inlets. Less commonly observed in terrestrial saline wetlands.	Unlikely
Calidris ferruginea	Curlew Sandpiper	Mi ,		en	63 (2006) PMST	Margins of freshwater and brackish wetlands, sewage ponds, saltmarshes, dams and sometimes tidal flats and estuaries.	Unlikely
Calidris melanotos	Pectoral Sandpiper	Ä		nt	35 (2008) PMST	Shallow freshwater or brackish wetlands, including swamps, flooded grasslands, sewage ponds, occasionally tidal flats and saltmarshes.	Unlikely
Calidris ruficollis	Red-necked Stint	Ä			126 (2010) PMST	Typically found in coastal areas in a diversity of habitats from sheltered beaches, rocky reefs and shallow wetlands. Forages on intertidal mudflats or in very shallow areas.	Unlikely
Calidris subminuta	Long-toed Stint	Ä		nt	7 (2008) PMST	Mainly margins of shallow, freshwater or brackish, vegetated wetlands, including sewage ponds and occasionally tidal mudflats and estuaries; spring-summer non-breeding migrant.	Unlikely
Charadrius bicinctus	Double-banded Plover	Ä			36 (2010) PMST	Typically found in proximity to coastal and riverine areas. Occurs across a diversity of habitats including beaches, dunes, open grassland and muddy margins of lakes, lagoons, swamps and rivers.	Unlikely
Chlidonias leucopterus	White-winged Black Tern	Ä		ŧ	16 (2010)	Estuaries, freshwater lakes and wetlands, sewage ponds, coastal lakes and salt fields; spring-summer non-breeding migrant.	Unlikely

Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
Coturnix chinensis victoriae	King Quail			e	1 (1899)	Dense grasslands, shrublands or heathy vegetation, often near or on edges of wetlands, sometimes in more disturbed areas such as pastures.	Unlikely
Egretta garzetta nigripes	Little Egret			en	17 (2008)	Tidal mudflats, brackish and saltwater wetlands, including saltmarshes, estuaries, littoral habitat and mangroves; less often freshwater wetlands and occasionally sewage ponds.	Unlikely
Falco subniger	Black Falcon			٨u	5 (2008)	Woodland, scrub, shrubland and grassland types in arid and semi-arid zones.	Unlikely
Gallinago hardwickii	Latham's Snipe	Mi		nt	135 (2013) PMST	Wet grasslands and pastures, open and wooded swamps; spring-summer non-breeding migrant	Unlikely
Grantiella picta	Painted Honeyeater	Ŋ		٨u	PMST	Open box-ironbark forests, eucalypt and casuarina woodlands and well vegetated watercourses, particularly where trees are infested with mistletoe; mainly spring-summer migrant to south- eastern Australia	Unlikely
Grus rubicunda	Brolga			Ŋ	1 (1899) PMST	Largely associated with ephemeral freshwater and brackish wetlands, grasslands, floodplains, irrigated pastures and saltmarsh.	Unlikely
Haliaeetus leucogaster	White-bellied Sea- Eagle			٨	6 (2008) PMST	Found through India, south-east Asia and Australia. In Australia it occupies all coastal areas extending inland through main waterways, coastal islands, coastal lakes and along some inland rivers. It forages primarily for fish over large areas of open water.	Low
Himantopus himantopus	Black-winged Stilt				PMST	Fresh, brackish and saline lakes, rivers, mudflats and marshes. Usually found in small groups	Unlikely
Hirundapus caudacutus	White-throated Needletail	Ā		Ŋ	27 (1999) PMST	Aerial, mainly eastern Australia often associated with coastal and mountain regions; spring-summer non-breeding migrant.	Low

Likelihood of occurrence in project area	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely		
Habitat requirements	Coastal, sub-coastal and inland saltwater, brackish and fresh waterbodies and waterways, beaches, lakes and sheltered estuaries. Occasionally reservoirs and artificial wetlands.	Shallow well-vegetated freshwater swamps, fresh or brackish lakes and rivers, favouring water with low emergent vegetation.	Breeds in Tasmania, late spring-summer; occurs as non- breeding migrant to mainland south-eastern Australia mainly autumn-early spring. Generally prefers Box-Ironbark forests and woodlands inland of the Great Dividing Range; sometimes also other forests and woodlands in coastal and sub-coastal areas.	Well vegetated wetlands and waterbodies, particularly swampy woodlands and wet heathlands, estuaries, saltmarshes, sedgelands, reedbeds and densely vegetated swamps.	Bar-tailed Godwit is a non-breeding migratory visitor to Australia. The species occurs in coastal areas around Australia	mainly on intertidal sand and muditats and beaches. More than one subspecies of Bar-tailed Godwit exists; the nominate species, <i>L. lapponica</i> , and two sub-species – <i>L. I. baueri</i> and <i>L.</i> <i>I. menzbieri</i> . Birds that occur in south-eastern Australia and New	Zealand are thought to be subspecies baueri. One of the nine sites of identified in Australia as being of international importance for this species is Corner Inlet in Victoria.	#It is not possible to distinguish records on the VBA as to whether they are <i>L. I. menzbieri</i> or <i>L. I. baueri.</i> However, the EPBC Act listing status nominated in the VBA for Bar-tailed Godwit is vulnerable which is consistent with birds in south- eastern Australia being considered to be <i>L. I. baueri.</i>	The PMST search lists both subspecies with potential to occur in the search area. <i>L. I. menzbieri</i> is listed as critically
Records	15 (2008)	18 (2008)	2 (1984) PMST	4 (2007)	11 (1988)# PMST	PMST	PMST		
DELWP advisory list	ŧ	en	en	Ŋ					
FFG Act		_		_					
EPB C Act	Mi		CR		Mi	٨U	CR		
Common name	Caspian Tern	Little Bittern	Swift Parrot	Lewin's Rail	Bar-tailed Godwit	Bar-tailed Godwit (Western Alaskan)	Bar-tailed Godwit (northern Siberia)		
Scientific name	Hydroprogne caspia	lxobrychus minutus dubius	Lathamus discolor	Lewinia pectoralis pectoralis	Limosa lapponica	Limosa lapponica baueri	Limosa lapponica menzbieri		

Likelihood of occurrence in project area		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Habitat requirements	endangered under the EPBC Act. For the purpose of this assessment, Bar-tailed Godwit records are considered to represent Bar-tailed Godwit (Western Alaskan) <i>Limosa lapponica baueri</i>	Coastal, sub-coastal and inland wetlands and waterbodies, including estuaries, lakes, tidal flats, sewage ponds and saltworks, river margins and spits; mainly spring-summer non- breeding migrant	Singly, in pairs or small flocks in arid eucalypt, mulga, casuarina or native pine woodlands and shrublands of arid and semi-arid areas; occasionally in saltbush and grasslands adjacent to woodlands. Often near fresh water; require large hollow trees for breeding.	Lowlands and foothills. Inhabit a range of vegetation, particularly with fallen timber and logs, including open eucalypt forests and box-ironbark woodlands, mallee and mulga woodlands, cypress pine woodlands, mallee heaths with scattered trees and often clearings adjacent to woodlands and forests.	An insectivorous monarch normally found foraging in denser mid-level parts of forests. The species is typically noted for rainforest, vine thickets and similar closed forests, though known also for softwood scrub dominated by Brigalow (Leach 1995) and for mangroves. Upland and lowland rainforests and gully forests with tall, dense midstorey shrubs. Spring-summer migrant to south-eastern Australia.	Grassland habitat subject to inundation
Records		7 (1996) PMST	1 (1986)	13 (1988)	1 (2007) PMST	2 (2006) PMST
DELWP advisory list		٨u	nv	t		
FFG Act			_			
EPB C Act		Mi			Ē	Mi
Common name		Black-tailed Godwit	Major Mitchell's Cockatoo	Hooded Robin	Black-faced Monarch	Yellow Wagtail
Scientific name		Limosa limosa	Lophocroa leadbeateri	Melanodryas cucullata cucullata	Monarcha melanopsis	Motacilla flava

Likelihood of occurrence in project area	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Habitat requirements	Mainly in wet forests and dense woodlands, particularly with tall canopy of eucalypts with an understorey of tea-trees and wattles along streams. Seasonal visitor (mainly spring) to drier inland woodlands, coastal areas and occasionally gardens and parklands.	Coastal saltmarshes, small islands and peninsulas, sometimes on adjacent dunes, grasslands or shrublands; sometimes on golf courses and coastal pastures; autumn-winter non-breeding visitor to mainland south-eastern Australia; in wild breeds only in Tasmania.	Foothill and coastal forests where they favour gullies with Peppermint and Manna Gum forests; some dispersal to lowland areas, including parks and gardens with large trees in autumn- winter	Coastal lakes, estuaries, tidal mudflats and sandflats, mangroves and saltmarshes; occasionally fresh or brackish lakes near coast; mainly spring-summer non-breeding migrant	Rarely occurs in Victoria and there are widespread but scattered records on the east coast of Australia. Most often found feeding in short grassland / sedgelands with scattered, shallow freshwater pools or areas seasonally inundated.	Coastal lakes, estuaries, tidal mudflats and sandflats, mangroves and saltmarshes; occasionally fresh or brackish lakes near coast; mainly spring-summer non-breeding migrant	Marine, pelagic and occasionally coastal habitats	Well vegetated freshwater swamps, large dams, lakes. Typically on more open waters in winter.
Records	2 (1991)	3 (1988) PMST	1 (1995)	7 (2001) PMST	2 (1988)	2 (1988)	2 (1998)	193 (2014)
DELWP advisory list		ರ	٨U	۸u		۸u		en
FFG Act		L						_
EPB C Act		CR		Mi Mi	W	Mi	Mi	
Common name	Satin Flycatcher	Orange-bellied Parrot	Powerful Owl	Eastern Curlew	Little Curlew	Whimbrel	Bridled Tern	Blue-billed Duck
Scientific name	Myiagra cyanoleuca	Neophema chrysogaster	Ninox strenua	Numenius madagascariensis	Numenius minutus	Numenius phaeopus	Onychoprion anaethetus	Oxyura australis

Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
Pandion haliaetus	Osprey	M			PMST	Coastal wetlands	Unlikely
Pezoporus wallicus wallicus	Ground Parrot		_	eu	1 (1854)	Coastal and near-coastal heathlands and heathy woodlands, swampy areas, moorlands and adjacent grasslands, including recently burnt areas; seriously declined in south-eastern Australia	Unlikely
Phalaropus lobatus	Red-necked Phalarope	M			2 (2006)	Mainly at sea but sometimes recorded at coastal and inland lakes and swamps including highly saline artificial waterbodies such as salt-works.	Unlikely
Philomachus pugnax	Ruff	Mi			6 (1988) PMST	Fresh brackish and saline wetlands, swamps, pools and tidal rivers. Species has been observed at sewage farms and saltworks. Typically forages on exposed mudflats	Unlikely
Plegadis falcinellus	Glossy Ibis	M		ŧ	41 (2008)	Mainly margins of freshwater wetlands and nearby grasslands and pastures; sometimes estuaries and brackish lakes. Mainly spring-summer breeding migrant to south-eastern Australia.	Unlikely
Pluvialis fulva	Pacific Golden Plover	Mi		'n	14 (2005)	Coastal lakes, estuaries, tidal mudflats and sandflats, mangroves and saltmarshes; occasionally fresh or brackish lakes near coast; mainly spring-summer non-breeding migrant	Unlikely
Pluvialis squatarola	Grey Plover	M		en	1 (1988)	Coastal estuaries, tidal mudflats and reefs, rocky shorelines and saltmarshes; mainly spring-summer non-breeding migrant	Unlikely
Polytelis anthopeplus monarchoides	Regent Parrot	٨	_	٨U	1 (2008)	Mallee, River Red Gum and other eucalypt woodlands and timbered watercourses; sometimes in orchards, clearings and wooded farmland and often killed on roads when feeding on spilt grain	Unlikely
Pomatostomus temporalis temporalis	Grey-crowned Babbler			eu	31 (2002)	Inland open forests, woodlands and scrublands, particularly with an open shrub layer, little ground cover and plenty of fallen timber and leaf litter, including along roadsides and around	Unlikely

Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
						better vegetated farms. Serious declines in settled areas of south-eastern Australia.	
Porzana pusilla palustris	Baillon's Crake			٨U	53 (2008)	Well vegetated freshwater to brackish swamps, typically with dense floating vegetation.	Unlikely
Rhipidura rufifrons	Rufous Fantail	Ϊ			15 (2013) PMST	Typically occurs in dense forests such as rainforests, wet sclerophyll forests, mangroves and riparian vegetation with a preference for a shrubby understory. Inhabits and breeds in wet eucalypt forests and rainforests, particularly gullies and in dense undergrowth. Seasonal (mainly autumn-winter) dispersal to more open habitat (e.g. woodlands, parklands with areas of dense undergrowth, box ironbark forests).	Unlikely
Rostratula australis	Australian Painted Snipe	Z Ш		ซ	5 (2008) PMST	Lowland shallow freshwater swamps and wetlands with dense emergent vegetation, including lignum swamps; sometimes in flooded saltmarshes.	Unlikely
Stagonopleura guttata	Diamond Firetail			t	2 (1990)	Open grassy eucalypt or cypress pine woodlands, acacia shrublands and edges of farmland or grassland close to wooded or lightly timbered areas. Often in wooded areas close to watercourses.	Unlikely
Sterna albifrons	Little Tern	Mi		'n	PMST	Coastal estuaries, bays and inlets, saltwater and brackish lakes; also coastal saltfields and sewage ponds; mainly spring- summer migrant to south-eastern Australia	Unlikely
Sterna hirundo	Common Tern	Mi			14 (2005)	Marine, pelagic and coastal habitats	Unlikely
Sternula nereis nereis	Australian Fairy Tern	٧U	_	eu	PMST	Coastal estuaries, bays and inlets, saltwater and brackish lakes; also coastal saltfields and sewage ponds	Unlikely
Stictonetta naevosa	Freckled Duck			eu	16 (2008)	Large, well vegetated swamps and wetlands, including ephemeral open lakes when inundated	Unlikely

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Likel occu proje	Unlik	Unlik	Unlik	Unlik	Unli	Unli			Unlik	Unlik
Habitat requirements	Margins of freshwater and brackish wetlands, sewage ponds, saltmarshes, dams and sometimes tidal flats and estuaries; spring-summer non-breeding migrant.	Margins of freshwater and brackish wetlands, sewage ponds, saltmarshes, dams and sometimes tidal flats and estuaries	Margins of freshwater and brackish wetlands, sewage ponds, saltmarshes, dams and sometimes tidal flats and estuaries	Dry open pasture, grassland, saltmarsh, sometimes near swampy areas. Rarely observed on mudflats.	Typically found in inland regions and rarely in south East Victoria. Preferred habitat consists of grasslands and woodlands in arid and semi-arid areas/	Coastal estuaries, sand spits, rocky headlands, mangroves, tidal mudflats, sandflats and low tidal samphire herblands; spring-summer non-breeding migrant; uncommon in southern Australia		Located in the south of the central highlands, Wimmera and alpine regions of Victoria and the extreme south of SA around Mt Gambier. Some also range through Tasmania including Sunday Island, King Island and Flinders Island. Habitat includes closed health, wet dense health, open forest, open health, swampy drainages and tussock grassland with bracken and sedge growth	Heathy forest, heath and coastal scrub.	Eucalypt forests and woodlands. Typically found in old growth, hollow bearing. montane. moist diverse eucalvot forests.
Records	55 (2008) PMST	65 (2002) PMST	44 (2006) PMST	2 (1987)	1 (2000)	1 (1988)		PMST	5 (1989) PMST	PMST
DELWP advisory list	۸u	٨U	٨U		٨u	eu		t	Ħ	٨u
FFG Act					_	_				
EPB C Act	M	Mi	Mi	Mi		M		٧U	N	٧u
Common name	Wood Sandpiper	Common Greenshank	Marsh Sandpiper	Buff-breasted Sandpiper	Red-chested Button- quail	Terek Sandpiper		Swamp Antechinus	Southern Brown Bandicoot	Greater Glider
Scientific name	Tringa glareola	Tringa nebularia	Tringa stagnatilis	Tryngites subruficollis	Turnix pyrrhothorax	Xenus cinereus	Mammals	Antechinus minimus martimus	Isoodon obesulus obesulus	Petauroides volans

Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
Pseudomys fumeus	Smoky Mouse	ш		e	PMST	A variety of vegetation communities, ranging from coastal heath to dry ridgeline forest, sub-alpine heath and, occasionally, wetter gullies. Except for the wetter sites, a consistent feature of Smoky Mouse habitats is the diversity of heath and bush-pea species present, combined with potential shelter sites in the form of woody debris or rocks. The vegetation at capture sites varies widely in age post-fire.	Unlikely
Pteropus poliocephalus	Grey-headed Flying- fox	2		2	6 (2016) PMST	Requires foraging resources and roost sites which differ in their characteristics and therefore location. Roost sites commonly occur in gullies, in vegetation with dense canopy cover and close to water. Foraging resources include blossom from eucalypts (preferred food) and a range of rainforest fruits, commercial fruit crops and introduced trees in urban areas. The species is highly mobile and commutes daily from roost sites to for for any for any from roost sites to for any from roost sites to for any for any from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to for a species is highly mobile and commutes daily from roost sites to species is highly mobile and commutes da	Pow
Amphibians							
Litoria raniformis	Growling Grass Frog	٨U		en	11 (2006) PMST	Permanent lakes, swamps, dams and lagoons or very wet areas in woodland and shrubland; often in waterbodies with dense standing and floating vegetation.	Unlikely
Pseudophryne semimarmorata	Southern Toadlet			۸u	2 (1990)	Inhabits sclerophyll forests, woodlands, heathlands and grasslands. Often found under litter, logs and rocks in damp areas.	Unlikely
Fish							
Galaxiella pusilla	Dwarf Galaxias	Ŋ		n	PMST	Swamps, pools, back waters and lake margins among rocks and vegetation. Slow flowing and still, shallow, permanent and temporary, freshwater habitats (swamps, drains and backwaters of streams and creeks, often containing dense aquatic macrophytes and emergent plants.	Unlikely
Nannoperca obscura	Yarra Pigmy Perch	٨U		nv	PMST	Streams and small lakes, prefers flowing water with abundant	Unlikely

Scientific name	Common name	EPB C Act	FFG Act	DELWP advisory list	Records	Habitat requirements	Likelihood of occurrence in project area
						cover of aquatic and emergent vegetation. Often cohabitates with Southern Pygmy Perch N. australis. Patchy distribution West Gippsland east through southern Victoria and in south-eastern South Australia, as far west as near the mouth of the Murray River.	
Protectorates maraena	Australian Grayling	٨U		٨u	PMST	Spends part of its life cycle in freshwater in rivers, typically in gravel bottom pools. Often forming aggregations below barriers to upstream movement such as waterfalls.	Unlikely
Invertebrates							
Plectrotarsus gravenhorstii	Caddisfly sp.			٨u	1 (1915)	Preferred habitat information not available.	Unlikely
Legend <u>EPBC Act</u> CR – Critically Endangered EN – Endangered EN – Vulnerable Wi – Migratory Mi – Migratory Mote: The descriptions of prefer Database (SPRAT) database of futps://viridans.com/wtajammel guides to the mammals of Austr reptiles of Australia (Cogger, 20 Records column presents the nu	<u>FFG Act</u> L – Listed N – Nominated for listing I – Invalid or ineligible D – Delisted Tred habitat for threatened, <i>n</i> f DoEE (<u>http://www.environm</u> <u>()</u> – and reference books inc alia (Menkhorst and Knight, 114; Wilson and Swan, 2013)	<u>VROTS</u> cr – Crit cr – Crit e – End vu – Vu nt – Neæ nt – Neæ nt – Neæ nt – Neæ nigratory <i>e</i> studing, bu 2010), biú	tically End tically End angered ar Threate ar Threate <i>ar Conmar</i> <i>ur cgi-bin/s</i> <i>th not limite</i> <i>cdS of Australi</i> <i>be VBA on</i>	angered ned rire species <i>h</i> c ine species <i>h</i> c ratia (Morcorr ratia (Mager and	Record # (####) – VBA PMST – Protec PMST – Protec abook of Australia be, 2004; Pizzey Jackson, 1993; A	results: number of records (year of last record) ted Matters Search Tool d based on published species accounts - particularly from the Species Profil dans Atlas and Field Guide to Plants and Animals of Melbourne Area n and New Zealand and Antarctic Birds (HANZAB) Volumes 1 to 7 (1990-200 and Knight, 2012), frogs of Victoria (Hero et al, 1991) and Australia (Tyler and filen et al, 2002).	e and Threats 16) and field 14 Knight, 2009),

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Appendix E – Declared weeds likelihood of occurrence assessment

Table E1 Declared weeds likelihood	d of occurrence ass	essment			
Scientific name	Common name	Record	CaLP Act (PPWCMA)	WoNS	Likelihood of occurrence in project areas
Ailanthus altissima	Tree of Heaven	1 (2009)	Regionally controlled	Q	Low
Allium triquetrum	Angled Onion	18 2010)	Restricted	No	High
Alternanthera philoxeroides	Alligator Weed	24 (2008), PMST	State Prohibited	Yes	Low
Anredera cordifolia	Madeira Vine	PMST	I	Yes	Low
Asparagus aethiopicus	Emerald fem	1 (1986), PMST	ſ	Yes	Low
Asparagus asparagoides	Bridal Creeper	34 (2010), PMST	Restricted	Yes	Present
Asparagus scandens	Asparagus Fern	1 (1992), PMST	I	Yes	Low
Austrocylindropuntia spp.	Prickly Pears	PMST	I	Yes	Low
Chrysanthemoides monilifera	Boneseed	26 (2009), PMST	Regionally controlled	Yes	Moderate
Chrysanthemoides monilifera subsp. monilifera	African Boneseed	2 (1998), PMST	Regionally controlled	Yes	Low
Cirsium vulgare	Spear Thistle	60 (2011)	Regionally controlled	No	Present
Crataegus monogyna	Hawthorn	9 (2002)	Regionally controlled	No	Low
Cytisus scoparius	English Broom	PMST	Regionally controlled	Yes	Present
Diplotaxis tenuifolia	Sand Rocket	1 (1986)	Regionally controlled	Q	Low
Dittrichia graveolens	Stinkwort	1 (1985)	Regionally controlled	No	Low
Eichhornia crassipe	Water Hyacinth	PMST	State Prohibited	Yes	Low

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Table E1 Declared weeds

Scientific name	Common name	Record	CaLP Act (PPWCMA)	WoNS	Likelihood of occurrence in project areas
Echium plantagineum	Paterson's Curse	26 (2007)	Regionally controlled	No	Present
Eragrostis curvula	African Love-grass	5 (2010)	Regionally controlled	No	Low
Foeniculum vulgare	Fennel	7 (2006)	Restricted	No	High
Genista linifolia	Flax-leaf Broom	8 (2011), PMST	Regionally controlled	Yes	Present
Genista monspessulana	Montpellier Broom	6 (2012), PMST	Regionally controlled	Yes	Low
Hypericum androsaemum	Tutsan	1 (1985)	Regionally controlled	No	Low
Lycium ferocissimum	African Box-thorn	45 (2012), PMST	Regionally controlled	Yes	High
Marrubium vulgare	Horehound	3 (2010)	Regionally controlled	No	Moderate
Moraea flaccida	One-leaf Cape-tulip	22 (2007)	Regionally controlled	No	Moderate
Nassella neesiana	Chilean needle grass	PMST	Restricted	Yes	Low
Nassella tenuissima	Mexican Feather-grass	11 (2008)	State Prohibited	No	Low
Nassella trichotoma	Serrated Tussock	1 (1997), PMST	Regionally controlled	Yes	Low
Opuntia monacantha	Drooping Prickly-pear	1 (2010)	Regionally controlled	Yes	Low
Opuntia spp.	Prickly pear	2 (2009), PMST	ı	Yes	Moderate
Oxalis pes-caprae	Soursob	27 (2012)	Restricted	No	High
Rosa rubiginosa	Sweet Briar	27 (2007)	Regionally controlled	No	Low
Rubus fruticosus spp. agg.	Blackberry	65 (2012), PMST	Regionally controlled	Yes	Present

Scientific name	Common name	Record	CaLP Act (PPWCMA)	SNoW	Likelihood of occurrence in project areas
Salix X pendulina	Weeping Willow	1 (2010), PMST	Restricted	No	Low
Salix X rubens	Basket Willow	1 (1998), PMST	Restricted	No	Low
Salpichroa origanifolia	Pampas Lily-of-the- Valley	25 (2010)	Regionally controlled	ON	Low
Salvinia molesta	Salvinia	PMST	State Prohibited	No	Low
Ulex europaeus	Gorse	27 (2012), PMST	Regionally controlled	Yes	Present
Watsonia meriana var. bulbillifera	Bulbil Watsonia	3 (2010)	Regionally controlled	No	Moderate
Xanthium spinosum	Bathurst Burr	4 (2007)	Regionally controlled	No	Low
Notes to table:					

<u>Record</u> # (####) – VBA results: number of records (year of last record) PMST – Protected Matters Search Tool

Appendix F – Potentially threatening processes likelihood of occurrence assessment

Key threatening process	Likelihood of occurrence within the project areas	Project likely to exacerbate key threatening processes?
Aggressive exclusion of birds from potential woodland	Present	No.
and forest habitat by over-abundant noisy miners (<i>Manorina melanocephala</i>)	Noisy Miners were recorded in the project areas and given the scarcity of food and nesting resources for avian species, are likely to be excluding other bird species.	Project areas are within a highly fragmented, heavily urbanised environment that lacks extensive patches of woodland or forest habitat. The project is unlikely to increase noisy miner abundance.
Competition and land degradation by rabbits	Low	No.
	Rabbits not recorded from within the project area but there are records from the VBA within five kilometres of the project areas.	The project will not increase the abundance of rabbits at the sites.
	Project areas are within an urban environment. Rabbits, if present, are not likely to persist in high numbers.	
Dieback caused by the root-rot fungus (Phytophthora	Low	No (with mitigation).
cinnamomi)	No signs of dieback were observed in the project areas.	
	Little documented evidence of Cinnamon Fungus in fragmented, urban landscapes.	
Infection of amphibians with chytrid fungus resulting in	Unlikely	No
chytridiomycosis	No aquatic environments within project areas.	
Land clearance	Present	No.
	Land will be cleared to facilitate the level crossing removal project.	Clearing of up to 2.2 hectares of native vegetation, none of which constitutes a threatened community under the EPBC Act or the FFG Act.
		Clearance not considered significant in the context of broader area and historic activities / current land use.

Table F1 EPBC Act key threatening processes likelihood of occurrence assessment

Key threatening process	Likelihood of occurrence within the project areas	Project likely to exacerbate key threatening processes?
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Moderate Project areas are located in urban context area already invaded with garden species	No. Much of the native vegetation and indigenous planted vegetation recorded within the project area will be removed to facilitate the project, reducing the risk.
Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases	Unlikely Project areas occur within highly urbanised area and large existing transport corridor (rail line and Nepean Highway).	No.
Predation by European red fox	High Red fox likely to use the rail corridor as habitat and to move through the local environment. However, project areas are in an urban environment, depleted of ecological value during a long history of land modification	No. Project unlikely to exacerbate the existing issue. Areas available for fox predation may actually decrease as a result of the project.
Predation by feral cats	High Feral cats likely to use the rail corridors as habitat and to move through the local environment.	No. Project unlikely to exacerbate the existing issue. Areas available for feral cat predation may actually decrease as a result of the project.
The reduction in the biodiversity of Australian native fauna and flora due to the red imported fire ant, <i>Solenopsis</i> <i>invicta</i> (fire ant)	Unlikely No documented cases of fire ant in Melboume.	No.

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Potentially threatening process	Likelihood of occurrence within project areas	Project likely to exacerbate key threatening processes?
Alteration to the natural flow regimes of rivers and streams.	Unlikely Project area does not directly impact on rivers or streams.	No.
Alteration to the natural temperature regimes of rivers and streams.	Unlikely Project area does not directly impact on rivers or streams.	No.
Degradation of native riparian vegetation along Victorian rivers and streams.	Unlikely Project area does not directly impact on rivers or streams.	No No rivers or streams within project areas and the Patterson River is an artificial canal.
Habitat fragmentation as a threatening process for fauna in Victoria.	Present Project areas and surrounds subject to past and ongoing habitat fragmentation.	Yes The project will remove and fragment the narrow linear corridor of habitat that extends through and loosely connects beyond the project areas. However, the highly modified, urban context of the environment limits the diversity of species likely to avail themselves of the corridor. The corridor is already discontinuous. Those species present are considered likely to be most resilient to habitat fragmentation as they persist in a fragmented environment.
Increase in sediment input into Victorian rivers and streams due to human activities.	Low Project areas occur within close proximity (for example Mordialloc, Creek and Paterson River).	No (with mitigation)
Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis.	Unlikely. Project areas do not contain aquatic habitats.	No.

Table F2 FFG Act potentially threatening processes likelihood of occurrence assessment

Potentially threatening process	Likelihood of occurrence within project areas	Project likely to exacerbate key threatening processes?
Input of organotins to Victorian marine and estuarine	Low	No (with mitigation)
waters.	Project areas do not extend into estuarine environs but such habitats do exist within the Patterson River which is in close proximity to the Bonbeach project area.	
Input of petroleum and related products into Victorian	Low	No (with mitigation)
marine and estuarine environments.	Project areas do not extend into estuarine environs but such habitats do exist within the Patterson River which is in close proximity to the Bonbeach project area.	
Input of toxic substances into Victorian rivers and	Low	No (with mitigation)
streams.	Project areas do not extend over any rivers or streams but Patterson River occurs within close proximity to the southern end of the Bonbeach project area.	
Introduction and spread of Spartina to Victorian estuarine	Unlikely	No
environments.	Project areas do not extend into estuarine environs.	Project areas do not extend over the Patterson River estuary.
Invasion of native vegetation by Blackberry Rubus	High	No (with mitigation)
fruticosus L. agg.	Blackberry recorded from within the project area	The project is not considered likely to exacerbate the spread of this species. Area of available habitat will be decreased.
Invasion of native vegetation by 'environmental weeds'.	High.	No
	Declared weed species recorded within project areas.	The project is not considered likely to exacerbate the spread of weeds as no native vegetation is to be retained within the project areas.

Potentially threatening process	Likelihood of occurrence within project areas	Project likely to exacerbate key threatening processes?
Invasion of native vegetation communities by Tall Wheat- grass Lophopyrum ponticum.	Unlikely. Species not recorded or identified by VBA as occurring within five kilometres of the project areas.	Ŋ
Loss of biodiversity as a result of the spread of Coast Wattle (<i>Acacia longifolia</i> subsp. <i>sophorae</i>) and Sallow Wattle (<i>Acacia longifolia</i> subsp. <i>longifolia</i>) into areas outside its natural range.	High Coast Wattle likely to exist within project area.	Unlikely The project will not exacerbate the spread of these species and no native vegetation is to be retained within the project areas
Loss of biodiversity in native ant populations and potential ecosystem integrity following invasion by Argentine Ants (<i>Linepithema humile</i>)	High Argentine Ants are likely to present	No. Project unlikely to increase the area of occupancy. Will not increase species habitat.
Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases.	Unlikely	No.
Predation of native wildlife by the cat, Felis catus.	High Domestic cats likely to occur in the area.	No Project will not increase area of occupancy of cats.
Predation of native wildlife by the introduced Red Fox Vulpes vulpes	High Red Fox likely to use the rail corridor as habitat and to move through the local environment. However, project areas are in an urban environment, depleted of ecological value during a long history of land modification	No Project unlikely to exacerbate the existing issue. Areas available for fox predation may actually decrease as a result of the project.
Reduction in biodiversity resulting from Noisy Miner (<i>Manorina melanocephala</i>) populations in Victoria.	Present Noisy Miners were recorded in the project areas and are likely to be excluding small bird species.	No. Project areas are within a highly fragmented urban environment and project unlikely to increase Noisy Miner abundance.

Potentially threatening process	Likelihood of occurrence within project areas	Project likely to exacerbate key threatening processes?
Reduction in biomass and biodiversity of native vegetation	Moderate	No.
through grazing by the Rabbit <i>Oryctolagus cuniculus</i> .	Rabbits not recorded from within the project area but there are records from the VBA within five kilometres of the project areas.	The project will not increase the abundance of rabbits at the sites.
	Project areas are within an urban environment. Rabbits, if present, are not likely to persist in high numbers.	
Spread of Pittosporum undulatum in areas outside its	Unlikely.	No.
natural distribution.	Pittosporum undulatum not recorded in the project areas.	
The introduction of exotic organisms into Victorian marine	Unlikely	No
waters.	Works to be completed are terrestrial only.	No mechanism of introduction identified.
The spread of Phytophthora cinnamomi from infected	Low	No(with mitigation)
sites into parks and reserves, including roadsides, under the control of a state or local government authority.	Little documented evidence of Cinnamon Fungus in fragmented, urban landscapes.	
Use of Phytophthora-infected gravel in construction of	Low	No (with mitigation)
roads, bridges and reservoirs.	Little documented evidence of Cinnamon Fungus in fragmented, urban landscapes.	
Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing	Possible changes in water regime are discussed in separate Appendix XX – <i>Ecological Impact A</i> ssess <i>ment</i> : Groundwate	e report on groundwater dependent ecosystems (Technical er Dependent Ecosystems)

Appendix G – EnSym Report (Edithvale)

This report provides offset requirements for internal testing of different proposals to remove native vegetation. This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria. A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: Time of issue:	01/02/2018 7:34 pm		Report ID: Scenario Testing
Project ID		EnSym_Edithvale_VicGrid94	

Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	1.315 ha
Extent of past removal	0.000 ha
Extent of proposed removal	1.315 ha
No. Large trees proposed to be removed	8
Location category	Location 1 The native vegetation is not in an area mapped as an endangered Ecological Vegetation Class, sensitive wetland or coastal area. Removal of less than 0.5 hectares in this location will not have a significant impact on any habitat for a rare or threatened species
1. Location map	

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount ¹	0.308 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Kingston City Council
Minimum strategic biodiversity value score ²	0.200
Large trees	8 large trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

¹ The general offset amount required is the sum of all general habitat units in Appendix 1.

² Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).



above offset i:	the species (s required. T	offset threshold. TI his test is done for	he threshold is set r all species mapp	at 0.005 p∉ ∋d at the sit	er cent of the te. Multiple s	e mapped hab species offsets	itat value for s will be requi	a species. W ired if the spe	Vhen the p ecies offse	roportion it thresho	al impact i Id is excee	s above the species offset threshold a species ded for multiple species.
Where	a zone requi	ires species offset	t(s), the species ha	bitat units i	for each spe	cies in that zo	ne is calcula	ted by the fol	llowing equ	uation in	accordanc	e with the Guidelines:
	Species hi	abitat units = exter	nt x condition x spt	scies lands	cape factor;	x 2, where the	species land	Iscape factor	r = 0.5 + (l	nabitat im	portance s	core(2)
The sp	ecies offset ;	amount(s) required	d is the sum of all {	species hat	oitat units pe	ir zone						
Where	a zone does	s not require a spe	cies offset, the ger	neral habita	at units in the	at zone is calcu	ulated by the	following eq	uation in a	accordan	ce with the	Guidelines:
	General hi	abitat units = exter	nt x condition x geı	neral landsu	cape factor	τ.5, where th	ne general lai	ndscape fact	or = 0.5 +	(strategi	: biodivers	ity value score/2)
The ge	sneral offset a	amount required is	s the sum of all gen	ieral habita	t units per z	one.						
Nativ	ve vedeta	tion to be rer	noved									
									3			
	Informat	tion provided by	or on behalf of th	e applican	ıt in a GIS fi	е	(Informat	ion calcula	ated by EnSym
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition	Polygon Extent	Extent without overlap	SBV score	H score	Habitat units	Offset type
16-A	Patch	gipp0002	Vulnerable	~	NO	0.340	0.129	0.129	0.260		0.041	General
14-A	Patch	gipp0003	Vulnerable	0	ou	0.240	0.081	0.081	0.257		0.018	General
8-A	Patch	gipp0002	Vulnerable	0	QU	0.240	0.021	0.021	0.220		0.005	General
7-A	Patch	gipp0002	Vulnerable	0	ou	0.180	0.005	0.005	0.220		0.001	General
5-A	Patch	gipp0002	Vulnerable	-	ou	0.400	0.084	0.084	0.231		0.031	General
4-A	Patch	gipp0002	Vulnerable	0	ou	0.240	0.039	0.039	0.251		0.009	General
3-A	Patch	gipp0002	Vulnerable	0	ou	0.240	0.118	0.118	0.247		0.026	General
2-A	Patch	gipp0002	Vulnerable	0	ou	0.260	0.053	0.053	0.254		0.013	General
1-A	Patch	gipp0002	Vulnerable	0	ou	0.210	0.077	0.077	0.255		0.015	General
19-A	Patch	gipp0002	Vulnerable	0	ou	0.210	0.074	0.074	0.260		0.015	General
18-A	Patch	gipp0002	Vulnerable	0	ou	060.0	0.016	0.016	0.260		0.001	General

Appendix 1: Description of native vegetation to be removed

lated by EnSym	Offset type	General	General	General	General	General	General	General	General	General	General	General	General	General	
tion calcu	Habitat units	0.004	0.001	0.014	0.026	0.019	0.005	0.003	0.013	0.002	0.014	0.013	0.009	0.009	
Informat	HI score					(5								
	SBV score	0.260	0.260	0.260	0.251	0.258	0.260	0.260	0.256	0.220	0.231	0.250	0.240	0.240	
	Extent without overlap	0.022	0.014	090.0	0.085	0.067	0.027	0.036	0.041	0.026	0.073	0.070	0.048	0.048	
	Polygon Extent	0.022	0.014	0.060	0.085	0.067	0.027	0.036	0.041	0.026	0.073	0.070	0.070	0.070	
e	Condition score	0.210	0.090	0.240	0.320	0.300	0.210	0.090	0.340	0.090	0.210	0.200	0.200	0.200	
nt in a GIS fi	Partial removal	ou	ou	ou	ou	ou	ou	ou	ou	ou	ou	ou	ou	ou	
ne applicar	Large tree(s)	0	0	0	~	~	0	0	~	0	0	~	-		
or on behalf of th	BioEVC conservation status	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Depleted	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	5
on provided by	BioEVC	gipp0002	gipp0002	gipp0002	gipp0002	gipp0002	gipp0160	gipp0002	gipp0002	gipp0002	gipp0002	gipp0002	gipp0002	gipp0002	0,
Informati	Type	Patch	Patch	Patch	Patch	Patch	Patch	Patch	Patch	Patch	Patch	Scattered Tree	Scattered Tree	Scattered Tree	
	Zone	20-A	17-A	15-A	13-A	11-A	12-A	10-A	9-A	6-A	21-A	22-A	23-A	24-A	

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

 Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.	
 Habitat impacted Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species Habitat importance maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat. Geveloped from the highest habitat importance scores in dispersed species habitat maps and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	 blitat impacted Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	oped from the highest habitat importance scores in dispersed
 Highly localised habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is more than 2000 hectares or mapped habitat for the species Dispersed habitat means there is more than 2000 hectares or mapped habitat for a rais of threatened species Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rais of threatened species Top ranking mass and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	 Highly localised habitat means there is 2000 hectares of less mapped habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for a rare of threatened species Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare of threatened species Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat developed from the highest habitat importance scores in dispersed species habitat maps are and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	oped from the highest habitat importance scores in dispersed
None Highly localised habitat group Highly localised habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is 2000 hectares or mapped habitat for the species Dispersed habitat means there is a more than 2000 hectares or mapped habitat for the species Highly localised habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species Dispersed habitat for a rate or threatened Dispersed thabitat means are the maps defined in the Guidelines that depict the important areas of a dispersed species Dispersed habitat Dispersed habitat maps are the maps defined in the Cuidelines that depict the important areas of a dispersed species Dispersed habitat Dispersed habitat maps area in Victoria that represents a large population, roosting or breeding site etc. Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.	None None Distat group Highly localised habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is 2000 hectares or less mapped habitat for the species habitat means there is 2000 hectares or less mapped habitat for a rank or threatened species Top ranking maps are the maps defined in the Guidelines that include all the important areas of a dispersed species habitat maps and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	becies oped from the highest habitat importance scores in dispersed

Appendix 3 – Images of mapped native vegetation 2. Strategic biodiversity values map





Appendix H – EnSym Report (Bonbeach)

This report provides offset requirements for internal testing of different proposals to remove native vegetation. This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria. A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: Time of issue:	01/02/2018 6:50 pm		Report ID: Scenario Testing
Project ID		EnSym_Bonbeach_VicGrid94	

Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	1.123 ha
Extent of past removal	0.000 ha
Extent of proposed removal	1.123 ha
No. Large trees proposed to be removed	5
Location category	Location 1 The native vegetation is not in an area mapped as an endangered Ecological Vegetation Class, sensitive wetland or coastal area. Removal of less than 0.5 hectares in this location will not have a significant impact on any habitat for a rare or threatened species
1. Location map	

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount ¹	0.262 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Kingston City Council
Minimum strategic biodiversity value score ²	0.199
Large trees	5 large trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps



¹ The general offset amount required is the sum of all general habitat units in Appendix 1.

² Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).



above offset i	the species (s required. Ti	offset threshold. The his test is done for	he threshold is set all species mappe	at 0.005 pt sd at the sit	er cent of the te. Multiple s	e mapped hab pecies offsets	itat value for will be requi	a species. V red if the spe	Vhen the ρ scies offse	st thresho	ial impact i old is excee	s above the species offset threshold a species eded for multiple species.
Where	a zone requi	ires species offset	(s), the species ha	bitat units 1	for each spe	cies in that zo	ne is calcula	ted by the fo	llowing eq	uation in	accordanc	e with the Guidelines:
	Species h	abitat units = exter.	nt x condition x spε	scies lands	cape factor >	۲2, where the	species lanc	Iscape facto	r = 0.5 + (I	habitat in	portance s	score/2)
The sp	ecies offset :	amount(s) requirec	d is the sum of all s	species hat	oitat units pe	r zone						
Where	a zone does	not require a spec	cies offset, the gen	ieral habita	at units in the	it zone is calcı	ulated by the	following eq	uation in ¿	accordan	ce with the	Guidelines:
	General hi	abitat units = exter.	nt x condition x ger	neral lands	cape factor >	c 1.5, where th	ie general lai	ndscape fact	or = 0.5 +	(strategi	c biodivers	ity value score/2)
The ge	sneral offset a	amount required is	the sum of all gen	ieral habita	t units per z	one.						
Nativ	/e vegeta	tion to be rer	noved								k	
	Informat	ion provided by e	or on behalf of th	e applican	t in a GIS fi	е	(Informat	ion calcul	ated by EnSym
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
38-A	Patch	gipp0160	Depleted	0	Q	0:210	0.019	0.019	0.240		0.004	General
37-A	Patch	gipp0002	Vulnerable	0	ou	0.240	0.056	0.056	0.240		0.012	General
33-A	Patch	gipp0002	Vulnerable	0	QU	0.250	0.398	0.398	0.254		0.094	General
36-A	Patch	gipp0160	Depleted	0	ou	0.210	0.018	0.018	0.260		0.004	General
35-A	Patch	gipp0002	Vulnerable	0	ou	0.350	0.185	0.185	0.260		0.061	General
34-A	Patch	gipp0002	Vulnerable	~	ou	060.0	0.015	0.015	0.260		0.001	General
32-A	Patch	gipp0002	Vulnerable	0	ou	060.0	0.014	0.014	0.227		0.001	General
31-A	Patch	gipp0002	Vulnerable	0	ou	0.190	0.032	0.032	0.249		0.006	General
30-A	Patch	gipp0002	Vulnerable	0	ou	060.0	0.066	0.066	0.233		0.005	General
29-A	Patch	gipp0002	Vulnerable	0	ou	0.120	0.032	0.032	0.250		0.004	General
27-A	Patch	gipp0002	Vulnerable	0	оц	0.120	0.025	0.025	0.243		0.003	General

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats
	lated by EnSym	Offset type	General	General	General	General	General	General	General	
	tion calcu	Habitat units	0.016	0.002	0.002	0.015	0.008	0.012	0.013	
	Informa	HI score					(5		
		SBV score	0.250	0.240	0.240	0.250	0.250	0.250	0.220	
		Extent without overlap	0.047	0.024	0.013	0.046	0.026	0.038	0:070	
		Polygon Extent	0.047	0.024	0.013	0.046	0.026	0.038	0.070	
	е	Condition score	0.350	0.090	0.210	0.340	0.340	0.340	0.200	
	nt in a GIS fil	Partial removal	ou	ou	ou	ou	ou	ou	ou	
	e applicaı	Large tree(s)	~	0	0	0	~	~	÷	
	or on behalf of th	BioEVC conservation status	Vulnerable	Vulnerable	Depleted	Vulnerable	Vulnerable	Vulnerable	Vulnerable	
	ion provided by	BioEVC	gipp0002	gipp0002	gipp0160	gipp0002	gipp0002	gipp0002	gipp0002	
	Informat	Type	Patch	Patch	Patch	Patch	Patch	Patch	Scattered Tree	
		Zone	28-A	26-A	25-A	24-A	23-A	22-A	39-A	

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

 Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	 Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	
 List impacted Handrating maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat and a area in Victoria that represents a large population, roosting or breeding site etc. Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	 bitat impacted Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species set importance maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	pecies loped from the highest habitat importance scores in dispersed
 Highly localised habitat means there is 2000 hectares of mapped habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species Distat impacted Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rate of threatened species Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rate of threatened species Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rate of threatened species Habitat maps and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding she etc. 	 Highly localised habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for a rare or threatened species Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species Top ranking maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	pecies loped from the highest habitat importance scores in dispersed
 More bits group Highly localised habitat means there is 2000 hectares or less mapped habitat for the species Highly localised habitat means there is more than 2000 hectares of mapped habitat for the species Bits imposed Habitat imposed Habitat imposed Habitat imposed Habitat imposed Fabitat imposed Fabita	 None bitat group bitat group Highly localised habitat means there is 2000 hectares or less mapped habitat for the species Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species bispersed habitat means there is a more than 2000 hectares of mapped habitat for the species bispersed habitat means there is a mapped habitat for the species bispersed mathematic means there is a mapped habitat for the species bitat impacted Habitat impacted Habitat impacted Fabitat impacted Fabitat impacted Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc. 	pecies loped from the highest habitat importance scores in dispersed

Appendix 3 – Images of mapped native vegetation 2. Strategic biodiversity values map





Appendix I – Risk Assessment

Qualitative descriptions	Probability over a given time period	Basis
A. Certain	1 (or 0.999, 99.9%)	Certain, or as near to as makes no difference
B. Almost certain	0.2 – 0.9	One or more incidents of a similar nature has occurred here
C. Highly probable	0.1	A previous incident of a similar nature has occurred here
D. Possible	0.01	Could have occurred already without intervention
E. Unlikely	0.001	Recorded recently elsewhere
F. Very unlikely	1 x 10 ⁻⁴	It has happened elsewhere
G. Highly improbable	1 x 10 ⁻⁵	Published information exists, but in a slightly different context
H. Almost impossible	1 X 10 ⁻⁶	No published information on a similar case

Table J1 Guide to quantification of likelihood

Source: Bowden, A.R., Lane, M.R. and Martin, J.H., 2001, Triple Bottom Line Risk Management – Enhancing Profit, Environmental Performance and Community Benefit, Wiley and Sons, New York, 314 pp.

Qualitative descriptor	Negligible	Minor	Moderate	Major	Extreme
Consequence description	Minimal, if any impact for some communities. Potentially some impact for a small number (<10) of individuals	Low level impact for some communities, or high impact for a small number (<10) of individuals	High level of impact for some communities, or moderate impact for communities area-wide	High level of impact for communities area-wide	High level of impact State-wide
	0.1 0.3	1 3	10 30	100 300	1000
ENVIRONMENT Native vegetation	Insignificant loss of endangered or very high conservation significance native vegetation (<0.1 Ha) or	Minor loss of endangered or very high conservation significance native vegetation (>0.1-0.5 Ha) or	Moderate loss of endangered or very high conservation significance native vegetation (>0.5-5 Ha)	Substantial loss of endangered or very high conservation significance native vegetation (>5 -10 Ha)	Significant loss of endangered or very high conservation significance native vegetation (>10 Ha) or
	total loss of native vegetation (<0.5 Ha).	total loss of native vegetation (>0.5- 5 Ha).	or total loss of native vegetation (>5-10 Ha).	or total loss of native vegetation (>10 -15 Ha).	total loss of native vegetation (>15 Ha).
ENVIRONMENT Indigenous flora/fauna species	Changes to species habitat extent not detectable outside natural variation.	Change to habitat extent that is significant at a project or GDE study area level.	Change to habitat extent that is significant at a GDE study area or Local Government Area) (LGA).	Change to habitat extent that is significant at a bioregional level.	Change to habitat extent that is significant at a State and/or National level.
ENVIRONMENT Threatened ecological communities	Changes to threatened ecological communities not detectable outside natural variation.	Loss to the area of threatened ecological community that is >1%, but <10%, of its extent within the LGA.	Loss to the area of threatened ecological community that is >10% of, but <30% of its extent within the LGA.	Loss to the area of threatened ecological community that is >30% of, but <50% of its extent within LGA	Loss to the area of threatened ecological community that is >50% of its extent within the LGA.
ENVIRONMENT Threatening processes	No exacerbation of a threatening process.	Exacerbation of threatening process leading to impacts to associated ecological values within the project area.	Exacerbation of threatening process leading to impacts to associated ecological values within the GDE study area or LGA.	Exacerbation of threatening process leading to impacts to associated ecological values within the bioregion.	Exacerbation of threatening process leading to impacts to associated ecological values within at the State and/or National level.

Table J2 Consequence table used for ecological (project areas) risk assessment

Qualitative descriptor	Negligible	Minor	Moderate	Major	Extreme
ENVIRONMENT Ecosystem function	Ecosystem change not detectable outside natural variation / occurrence.	Measurable changes to the ecosystem components with a minor change in function (no loss of components or introduction of new species that affects ecosystem function).	Measurable changes to the ecosystem components with a moderate change in function (some loss of components or introduction of new species that affects ecosystem function).	Measurable changes to the ecosystem components with a major change in function.	Long term and possibly irreversible damage to one or more ecosystem function.
ENVIRONMENT Ramsar site	No measurable change in ecological character. Limit of acceptable change met.	Minor change in ecological character. Limit of acceptable change met.	Moderate change in ecological character. Limit of acceptable change not met for Critical CPS: - physical habitat for waterbirds. and/or - waterbird diversity and abundance (Ramsar Criteria 6).	Major change in ecological character. Limit of acceptable change not met for Critical CPS: - waterbird diversity and abundance (Ramsar Criteria 4). and/or - physical habitat for waterbirds (Ramsar Criteria 4).	Extreme change in ecological character. Limit of acceptable change not met for Critical CPS: - threatened bird species (Ramsar Criteria 2 and 6). and/or - Sharp-tailed Sandpiper abundance (Ramsar Criteria 6).
ENVIRONMENT Groundwater dependent ecosystems (GDE)	No notable change in condition and/or extent of surface expression GDE (wetland).	Loss of or impact to a GDE that is of significance within the study area.	Loss of or impact to a GDE that is of significance within the local area.	Loss of or impact to a GDE that is of significance within the bioregion.	Loss of or impact to a GDE that is of significance within the State and/or National context.

risks
area)
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Table J3

	Risk		Minor	Minor	Negligible	Minor
	Consequence		Minor	Minor	Minor	Minor
Residual risk	Likelihood		Certain	Certain	Almost impossible	Certain
EPR ID (final)			As initial EPR	As initial EPR	No EPR specified	As initial EPR
	Risk		Minor	Minor	Negligible	Minor
	Consequence		Minor	Minor	Minor	Minor
Initial risk	Likelihood		Certain	Certain	Almost impossible	Certain
EPR ID (initial)			EPR FF1 Native vegetation and habitat	EPR FF2 FFG permits	No EPR specified	EPR FF4 Fauna EPR FF6 Landscaping for wildlife EPR UD1 Urban Design Guidelines
Risk pathway			Removal of native vegetation (patches and scattered trees) within the project area, impacting native vegetation extent.	Loss of protected flora species reducing the abundance of that species.	Removal of habitat for threatened flora and/or fauna species within the project area affecting the persistence of the species.	Removal of habitat resulting in the displacement, injury or death of wildlife protected under the <i>Wildlife Act 1975</i> causing animal welfare concerns.
Risk name		iction risks	Native vegetation removal	Removal of protected flora	Removal of habitat for threatened species	Removal of habitat (non- threatened fauna)
Risk ID		Constru	E 42	E 43	E 44	E 45

	Risk	Negligible	Negligible
	Consequence	Minor	Minor
Residual risk	Likelihood	Very unlikely	Almost impossible
EPR ID (final)		As initial EPR	As initial EPR
	Risk	Negligible	Negligible
	Consequence	Minor	Minor
Initial risk	Likelihood	Very unlikely	Almost impossible
EPR ID (initial)		EPR AQ1 Air quality (construction) EPR AQ2 Air quality management EPR NV2 Construction noise EPR SW1 Stormwater management – construction EPR LV2 Lighting EPR LV3 Light spillage	EPR FF3 Weeds and pathogens
Risk pathway		Increase in noise, vibration and artificial light affecting fauna behaviour within or adjacent to project area resulting in a decline in fauna abundance and/or diversity.	Spread of weeds listed under the CaLP Act resulting in the decline in quality of native vegetation in the rail corridor adjacent to the project area. Spread or introduction of pathogens / pest animals resulting in the exacerbation of a threatening process listed under the FFG
Risk name		Disturbance to fauna (project areas)	Threatening processes (weeds, pathogens, pests)
Risk ID		Е 46	E 47

	Risk		Minor	Negligible
	Consequence		Moderate	Negligible
Residual risk	Likelihood		Almost certain	Almost impossible
EPR ID (final)			As initial EPR	As initial EPR
	Risk		Minor	Negligible
	Consequence		Moderate	Negligible
Initial risk	Likelihood		Almost certain	Almost impossible
EPR ID (initial)			EPR FF1 Native vegetation and habitat EPR FF6 Landscaping for wildlife EPR UD1 Urban Design Guidelines	EPR FF5 Protection of retained/adjacent vegetation and habitat
Risk pathway		Act and EPBC Act.	Fragmentation of the narrow habitat corridor within and beyond the rail reserve, resulting in the exacerbation of a threatening process listed under the FFG Act.	 Unintended impacts on adjacent/retained vegetation and habitat resulting from: Inappropriate placement of construction stockpiling resulting in unintended impacts to native vegetation and habitat. Soil compaction or excavation causing root damage and vegetation loss within (or adjacent to) the project area. Dust generation during construction impacting the health
Risk name			Threatening process (habitat fragmentation)	Unintended impacts on vegetation and habitat
Risk ID			Е 48	П 49

	Risk	
	Consequence	
Residual risk	Likelihood	
EPR ID (final)		
	Risk	
	Consequence	
Initial risk	Likelihood	
EPR ID (initial)		
Risk pathway		 of vegetation. Spills of chemicals resulting in pollution of native vegetation or habitat (particularly Edithvale Wetland and/or Wetlands) either through surface or groundwater flows. Unintended loss of vegetation to be retained from accidental plant / personnel access to designated "No Go Areas" or areas outside of the defined and anticipated project area.
Risk name		
Risk ID		