



Esso Pipeline Replacement Project – Longford to Hastings:

Flora and fauna survey and impact mitigation

Prepared for WorleyParsons

19 February 2014

Biosis offices

AUSTRALIAN CAPITAL TERRITORY

Canberra

Floor 1, Unit 3, 38 Essington Street
Mitchell ACT 2911

Phone: (02) 6241 2333
Fax: (03) 9646 9242
Email: canberra@biosis.com.au

NEW SOUTH WALES

Sydney

Unit 14 17-27 Power Avenue
Alexandria NSW 2015

Phone: (02) 9690 2777
Fax: (02) 9690 2577
Email: sydney@biosis.com.au

Wollongong

8 Tate Street
Wollongong NSW 2500

Phone: (02) 4229 5222
Fax: (02) 4229 5500
Email: wollongong@biosis.com.au

QUEENSLAND

Brisbane

Suite 4 First Floor, 72 Wickham Street
Fortitude Valley QLD 4006

Phone: (07) 3831 7400
Fax: (07) 3831 7411
Email: brisbane@biosis.com.au

VICTORIA

Ballarat

506 Macarthur Street
Ballarat VIC 3350

Phone: (03) 5331 7000
Fax: (03) 5331 7033
Email: ballarat@biosis.com.au

Melbourne (Head Office)

38 Bertie Street
Port Melbourne VIC 3207

Phone: (03) 9646 9499
Fax: (03) 9646 9242
Email: melbourne@biosis.com.au

Wangaratta

16 Templeton Street
Wangaratta VIC 3677

Phone: (03) 5721 9453
Fax: (03) 5721 9454
Email: wangaratta@biosis.com.au

Document information

Report to: WorleyParsons
Prepared by: Matthew Dell, Katrina Sofu, Anthony Byrne, Ian Smales

Biosis project no.: 16955/16956

File name: 16955 EAPL pipeline ff final 190214.docx

Citation: Biosis 2013. ESO Pipeline Replacement Project – Longford to Hastings: Flora and fauna survey and impact mitigation. Report to Worley Parsons. Authors: Dell, M., Sofu, K., Byrne A. & Smales I. Biosis Pty Ltd, Melbourne. Project 16955/16956.

Document control

Version	Reviewer	Date issued
Draft V1	JY (int.), TJ, MH (ext.)	10/01/14
Draft V2	MDD (int.), TJ (ext.)	31/01/14
Final version	IS (int.)	20/02/14

Acknowledgements

Biosis acknowledges the contribution of the following people and organisations in undertaking this study:

WorleyParsons: Tony Judd, Michelle Hendricks and Gary Fiddes.

CNC Project Management for property access liaison.

Department of Sustainability & Environment for access to the Victorian Biodiversity Atlas.

The following Biosis staff were involved in this project:

Rohan Simkin, Kirsty Kay, Mark Venosta, Daniel Gilmore, Clare McCutcheon, Felicity Humann, Shona Arber, Monica Campbell, Kylie Reed, Anthony Steelcable & Rebecca Steer for assistance with field assessments.

James Shepherd and Sally Mitchell for mapping.

Ben Howells for planning assistance.

© Biosis Pty Ltd

This document is and shall remain the property of Biosis Pty Ltd. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of the Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Disclaimer:

Biosis Pty Ltd has completed this assessment in accordance with the relevant federal, state and local legislation and current industry best practice. The company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report content or for any purpose other than that for which it was intended.

Contents

Summary	VI
1. Introduction.....	1
1.1 Project background.....	1
1.2 Scope of assessment.....	1
1.3 Location of the study area.....	2
2. Methods.....	5
2.1 Literature and database review.....	5
2.1.1 Definitions of significance.....	6
2.2 Stratification of survey sites – Preliminary assessment.....	6
2.3 Ecological Vegetation Class mapping.....	7
2.4 Field survey.....	7
2.4.2 Flora survey.....	7
2.4.3 Fauna survey.....	8
2.4.4 Determination of habitat suitability	10
2.4.5 Likelihood of presence for significant species	11
2.5 Mapping units	12
2.5.2 Mapping limitations	12
2.6 Survey qualifications.....	13
3. Results.....	15
3.1 Vegetation.....	15
3.2 Scattered trees.....	19
3.3 Fauna habitat	19
3.4 Significant species and ecological communities	19
3.4.1 EPBC Act, FFG Act & DEPI Advisory listed species.....	19
3.4.2 Significant ecological communities.....	27
4. Mitigation options for significant biodiversity matters.....	29
4.1 General	29
4.2 Native vegetation and threatened flora	29
4.2.1 Pre-construction design phase.....	29
4.2.2 Construction phase.....	30
4.3 State and Federally listed threatened fauna	31
4.3.1 Pre-construction design phase.....	31
4.3.2 Construction	31
4.3.3 Post-construction.....	32
4.4 General vegetation.....	32

4.4.1	Pre-construction design phase.....	32
4.4.2	Construction phase.....	32
4.4.3	Post-construction phase.....	33
4.5	General fauna & habitat.....	34
4.5.1	Construction.....	34
4.5.2	Post-construction.....	35
4.6	Significant flora and communities.....	35
4.6.1	EPBC Act listed flora.....	35
4.6.2	FFG Act listed flora.....	36
4.6.3	EPBC Act listed ecological communities.....	37
4.6.4	FFG Act listed communities.....	37
4.7	Significant fauna.....	37
4.7.1	EPBC Act listed fauna.....	37
4.7.2	FFG Act listed fauna.....	40
5.	Planning considerations.....	41
5.1	Commonwealth.....	41
5.1.2	Environment Protection and Biodiversity Conservation Act 1999.....	41
5.2	State.....	47
5.2.1	Flora and Fauna Guarantee Act 1988 (FFG Act).....	47
5.2.2	Catchment and Land Protection Act 1994 (CaLP Act).....	49
5.2.3	Permitted clearing of native vegetation biodiversity assessment guidelines.....	49
5.2.4	Wildlife Act 1975 and associated Regulations.....	49
5.2.5	Environmental Effects Act.....	49
5.2.6	Fisheries Act 1995.....	50
5.2.7	Water Act 1989.....	50
5.2.8	Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003	50
5.2.9	Pipelines Act 2005.....	51
6.	References.....	52
	Appendices.....	55
	Appendix 1: Permits.....	56
	Appendix 2: Targeted fauna survey locations.....	57
	Appendix 3: Flora.....	64
	Appendix 4: Fauna.....	80
	Appendix 5: Summary of Mitigation Measures and Site Details.....	110

List of Tables

Table 1: Criteria for determining significance of species & ecological communities	6
Table 2: Prioritisation of survey areas	6
Table 3: Rationale for likelihood of presence.....	11
Table 4: Ecological Vegetation Classes	15
Table 5: Assessment of project in relation to the EPBC Act.....	41
Table A2.1: Locations and survey dates for Southern Brown Bandicoot (remote cameras).....	57
Table A2.2: Locations and dates for New Holland Mouse trapping surveys.....	58
Table A2.3: Locations and dates for Growling Grass Frog surveys.....	59
Table A2.4. Locations and dates for Dwarf Galaxias surveys.....	60
Table A3.1. Flora species recorded from the survey envelope.	65
Table A3.2. Significant flora species recorded / predicted to occur within 1 km of the survey envelope.	74
Table A4.1. Significant aquatic fauna species recorded / predicted to occur within 1 km of the survey envelope.	81
Table A4.2. EPBC Act listed threatened and migratory fauna species recorded, or predicted to occur, within 1 km of the survey envelope.	84
Table A4.3. FFG Act & DEPI Advisory listed fauna species recorded, or predicted to occur, within 1 km of the survey envelope.	89
Table A4.4. EPBC Act listed terrestrial migratory fauna species recorded, or predicted to occur, within 1 km of the survey envelope.	108
Table A5.1. Sites of importance for matters of national environmental significance - listed ecological communities and fauna species.	110
Table A5.2. Sites of importance for matters of national environmental significance - listed flora species habitat and ecological communities.....	119
Table A5.3. Sites of importance for matters of NES, including site specific mitigation options	121

List of Plates

Plate 1. River Swamp Wallaby-grass in a Swamp Scrub opening within the survey envelope, Tyabb.....	21
Plate 2. Southern Brown Bandicoot recorded by remote camera 21, E03610 on 7/12/13.....	22
Plate 3. Floodplain habitat at Shady Creek (E01810),habitat for Dwarf Galaxias and Strzelecki Gum.	24
Plate 4. Adult male Dwarf Galaxias recorded from Saxton Swamp (E01890).....	25
Plate 5. Example of Seasonal Herbaceous Wetlands (freshwater) of the Temperate Lowland Plains.....	27

List of Maps

Figure 1: Location of the study area, Westernport to Longford, Victoria.....	4
Figure 2: Flora and vegetation survey results, Esso Pipeline Replacement Project, Hastings to Longford. ..	132
Figure 3. Fauna survey results, Esso Pipeline Replacement Project, Hastings to Longford.	132
Figure 4. DEPI habitat models for species which are FFG Act listed (only), Esso Pipeline Replacement Project, Hastings to Longford.	132

Summary

Biosis Pty Ltd was commissioned by WorleyParsons to undertake a flora and fauna assessment of the construction footprint for the Esso Pipeline Replacement Project. Biosis undertook a preliminary flora and fauna assessment in June–July 2013 which included a desktop assessment and brief inspection of the existing easement. The preliminary assessment was generally limited to the ground-truthing of significant species records and noting any areas of listed ecological communities or significant fauna habitat. Some targeted surveys for threatened flora species were conducted, including species listed under state advisory lists.

The current assessment includes a more comprehensive set of survey data and follows a revised survey envelope including all potential areas of construction impact. It involved mapping native vegetation / listed community boundaries and undertaking targeted surveys for *Environmental Protection and Biodiversity Conservation Act 1999* Act listed species which are known or predicted to occur within the survey envelope. State threatened species were considered using the Department of Environment and Primary Industries' habitat modelling.

The survey envelope is approximately 186 km in length and includes predominantly agricultural land from Hastings to Longford. The majority of the survey area contains pasture or other non-native vegetation which has limited value as significant species habitat. In general, ecological values are highest where the easement crosses roads and waterways, or runs within a larger patch of native vegetation (e.g. Holey Plains State Park).

A total of 19 Ecological Vegetation Classes were mapped. The mapping was used to quantify likely impacts to native vegetation and to assist with the identification of important habitat for EPBC Act listed species or ecological communities. The following EVCs were mapped:

- Aquatic Herbland
- Coastal Saltmarsh
- Damp Forest
- Damp Sands Herb-rich Woodland
- Floodplain Riparian Woodland
- Grassy Woodland
- Heathy Woodland
- Herb-rich Foothill Forest
- Lowland Forest
- Plains Grassy Wetland
- Plains Grassy Woodland
- Riparian Forest
- Riparian Scrub
- Sedge Wetland
- Swamp Scrub
- Swampy Riparian Woodland
- Swampy Woodland
- Tall Marsh
- Valley Heathy Forest

The assessment confirmed the presence of five EPBC Act listed species within the survey envelope:

EPBC Act listed flora species.

- Strzelecki Gum
- Wellington Mint-bush
- River Swamp Wallaby-grass

EPBC Act listed fauna species.

- Southern Brown Bandicoot
- Dwarf Galaxias

In addition, six state advisory listed flora species and four state advisory listed fauna species were identified within the survey envelope:

Victorian Department of Environment and Primary Industries advisory listed flora species:

- Marsh Saltbush
- Grey Mangrove
- Variable Bossiaea
- Gippsland Lakes Peppermint
- Golden Grevillea
- Pale Mat-rush

Victorian Department of Environment and Primary Industries advisory listed fauna species:

- White-footed Dunnart
- Spotted Quail-thrush
- Emu
- Lace Goanna

Habitat was identified for 12 additional EPBC Act listed species that were determined to have high likelihood of occurrence despite the absence of records during the current assessment.

- Seven flora species: Matted Flax-lily, Green-striped Greenhood, Metallic Sun-orchid, Spiral Sun-orchid, Dwarf Kerrawang, Swamp Everlasting, Swamp Fireweed and Round-leaf Pomaderris.
- One aquatic fauna species: Australian Grayling.
- Three terrestrial fauna species: New Holland Mouse, Australasian Bittern and Growling Grass Frog.

The assessment also revealed the presence of patches of two EPBC Act listed ecological communities:

- Gippsland Red Gum Grassy Woodland and Associated Native Grassland.
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

Areas of high sensitivity were identified for matters of national environmental significance (EPBC Act) and high state biodiversity value, for the purposes of impact mitigation. The high sensitivity areas meet several criteria including where a known population of an EPBC Act listed species or ecological communities occurs within the survey envelope. A mitigation strategy has been prepared and is included for these areas.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by WorleyParsons to undertake a flora and fauna assessment for the Esso Pipeline Replacement Project (Figure 1). Esso Australia Pty Ltd currently transports stabilised liquids in a pipeline between the Longford Crude Stabilisation Plant in Longford and the Long Island Point Tank Farm in Hastings. This approximately 186 km long pipeline was constructed in 1969 and the 86 km section between Longford and Westbury was replaced in 1980. The existing pipeline is approaching its practical end of life and is proposed to be replaced with a new generation, smaller capacity pipeline within the existing easement (Esso Pipeline Replacement Project).

The project aims to avoid triggering the need for an Environmental Effects Statement under the *Environmental Effects Act 1978* or *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act). However, at the same time, Esso Australia Pty Ltd is committed to minimizing any adverse environmental impacts.

Biosis (2013) undertook a preliminary flora and fauna assessment in June–July 2013 which included a desktop assessment and brief inspection of the existing pipeline easement. The preliminary assessment was generally limited to the ground-truthing of significant species records and noting any areas of listed ecological communities or habitat. Some targeted surveys for threatened flora species were conducted, including species listed under state advisory lists.

A detailed assessment (the current assessment) was commissioned to allow survey for relevant significant species during spring and other times specified within available EPBC policy survey guidelines (August–December 2013). The current (detailed) assessment includes a more comprehensive set of survey data and follows a revised survey envelope including all areas of potential construction impact. It involved mapping native vegetation / listed community boundaries and undertaking targeted surveys for EPBC Act listed species which are known or predicted to occur within the survey envelope. The implications for presence of state threatened species (Department of Environment and Primary Industries (DEPI) advisory lists) were considered using the department's habitat modelling for those species.

This report includes the results of both the preliminary and detailed assessment of the project.

1.2 Scope of assessment

The objective of the study (as per the project brief) was to extend the work of the preliminary flora and fauna assessment to cover the revised survey envelope (Figure 2) and to:

- (a) Identify the location of any listed – Flora & Fauna Guarantee Act (FFG), EPBC Act or DEPI advisory list – flora species within the survey envelope, and provide specific coordinates of habitats that require protection (avoidance or minimisation of impact) during construction.
- (b) Undertake a habitat based assessment of listed terrestrial and aquatic fauna species within the survey envelope – including an assessment of habitat quality – and provide specific coordinates of habitats that require protection (avoidance or minimisation of impact) during construction.

(c) Confirm the presence within the survey envelope of any Matters of National Environmental Significance (MNES) listed under the EPBC Act and provide specific coordinates for the locations of MNES that require protection (avoidance or minimisation of impact) during construction.

(d) Undertake targeted survey and/or assessment of the following:

- a. River Swamp Wallaby-grass (targeted surveys in grassy wetland areas identified in the preliminary flora and fauna report and elsewhere in the survey envelope, to be identified following more detailed Ecological Vegetation Class (EVC) mapping).
- b. Matted Flax-lily (targeted surveys in Plains Grassy Woodland and Grassy Woodland areas throughout the survey envelope).
- c. Strzelecki Gum (targeted surveys done in areas of Riparian Forest, Damp Forest and Swampy Woodland / Swampy Riparian Woodland within the survey envelope during spring).
- d. Green-striped Greenhood, Metallic Sun-orchid, Spiral Sun-orchid, Wellington Mint-bush and Dwarf Kerrawang (targeted surveys in areas of woodland or forest with a healthy understorey within the survey envelope; woodland within the survey envelope in the Holey Plains and Westernport areas as a priority for Green-striped Greenhood, and Holey Plains for the remaining four species).
- e. Water quality assessment (including invertebrate indicator species assessment in order to collect baseline data).
- f. Threatened frogs (targeted surveys within the survey envelope for Growling Grass Frog, with naturally occurring wetlands and waterways given survey priority).
- g. Threatened mammals (remote camera surveys for Southern Brown Bandicoot within the survey envelope in areas of high sensitivity for this species).
- h. Aquatic species (targeted surveys in high and medium priority waterways which intersect the survey envelope, focusing on Australian Grayling and Dwarf Galaxias presence and habitat condition).
- i. Map and assess the condition of all EVCs within the survey envelope, to produce a GIS dataset and summary table of total distance, area of impact and existing condition for each EVC.

1.3 Location of the study area

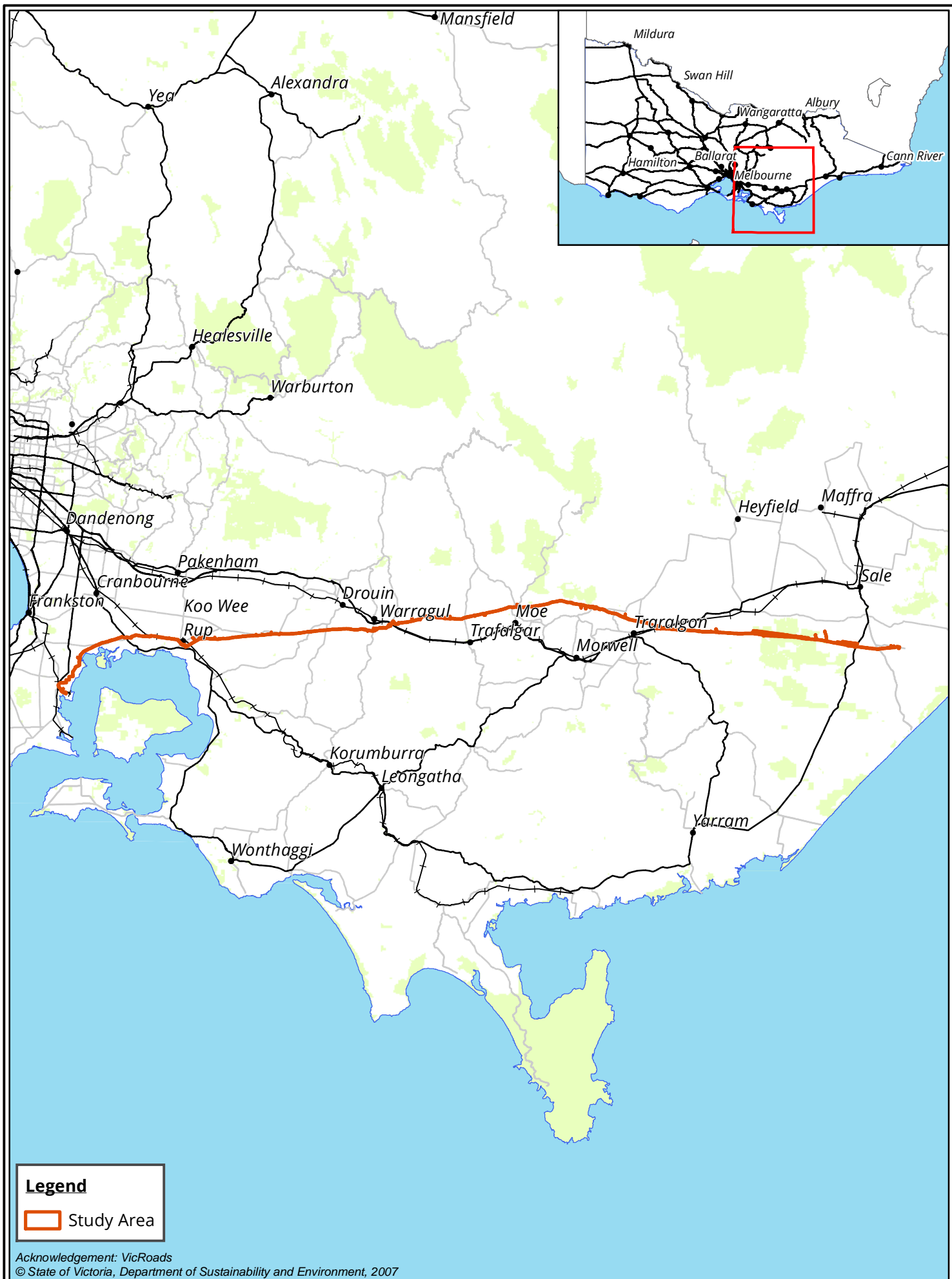
The study area (survey envelope) is defined as the broadest expected impact area allowing for a range of potential design decisions, in order to inform environmental impact assessments and aid landholder discussions. The survey envelope includes the construction area (existing and proposed easement), temporary work space, access tracks and laydown areas. The survey envelope is approximately 186 km in length and runs between the Crude Stabilisation Plant in Longford and the Long Island Point Tank Farm in Hastings. As an easement for the existing pipeline, much of the survey envelope has been subject to ongoing patrol, monitoring and maintenance activities throughout the time it has been in operation.


The survey envelope passes through a diverse range of vegetation and land use types; however, a large proportion contains pasture or other non-native vegetation which has limited value as

significant species habitat. In general, ecological values are highest where the easement crosses roads and waterways, or runs within a larger patch of native vegetation (e.g. Holey Plains State Park).

Gippsland Plain, Highlands – Southern Fall and Strzelecki Ranges bioregions

Wellington Shire Council, Latrobe City Council, Baw Baw Shire, Cardinia Shire, City of Casey and Mornington Peninsula Shire local government areas.

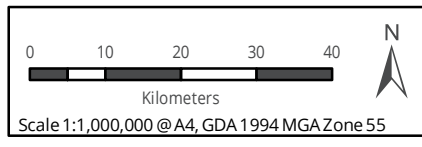


Legend
 Study Area

Acknowledgement: VicRoads
 © State of Victoria, Department of Sustainability and Environment, 2007

 **biosis**
 Biosis Pty Ltd
 Ballarat, Brisbane, Canberra, Melbourne,
 Sydney, Wangaratta & Wollongong

Figure 1: Location of the study area, Longford 700 Pipeline, Longford to Long Island Point
 Matter: 16955,
 Date: 10 January 2014,
 Checked by: MDD, Drawn by: JMS, Last edited by: jshepherd
 Location: P:\16900s\16955\mapping\



2. Methods

The preliminary assessment included a desktop review of flora and fauna values as well as some targeted surveys for significant species. The main objective of the preliminary assessment was to investigate significant species records appearing in relevant databases and to stratify the survey envelope for survey priority. To achieve this, relevant literature and databases were reviewed to determine the location of existing records for threatened flora and fauna, and Ecological Vegetation Classes (EVC) that might contain other significant values. The survey area was then stratified into high, medium and low priority areas based on the likelihood that each area would provide a population or habitat for a threatened species, or contain any areas of a listed ecological community. A preliminary field survey was then undertaken (Biosis 2013) with the survey effort driven by the priority ratings.

The preliminary field assessment was undertaken from June–July 2013, which is outside the optimum survey time for most threatened species being considered. Despite this limitation, the assessment provided a good evaluation of likely important habitat sites for these species and also revealed the locations of some populations.

At the time of the preliminary assessment, state government policy required that the importance of a site for state listed threatened species be determined by a consultant's assessment of best or remaining habitat within each bioregion, using methods in DSE (2007). An amendment to all Victorian planning schemes (VC105) no longer requires the use of this method and, instead, uses predictive modelling to estimate presence of habitat for all state listed threatened species. Habitat importance is also modelled for each species which determines biodiversity offsets at the state level.

The current assessment involves more detailed survey and collection of flora and fauna data with the primary objectives to identify significant biodiversity matters and address mitigation options for the project.

2.1 Literature and database review

Information about flora and fauna from within 1 km of the easement (the 'local area') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Flora Information System which includes records from the Victorian Biodiversity Atlas 'VBA_FLORA25, FLORA100 & FLORA Restricted' August 2012 © The State of Victoria, Department of Environment and Primary Industries (DEPI); the contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged
- Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' August 2012 © The State of Victoria
- DEPI Biodiversity Interactive Map (BIM)
- DEPI Nature Print database
- Protected Matters Search Tool of the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Melbourne Water Fish database (MWF).
- Other sources of biodiversity information:

- DEPI NaturePrint; accessed through the Biodiversity Interactive Map
- Biosis records that have been submitted to DEPI but do not yet appear on the FIS.
- Predictive habitat mapping for Victorian state listed threatened species; accessed from DEPI.

2.1.1 Definitions of significance

The significance of a species or community is determined by its listing as rare or threatened under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised in Table 1.

Table 1: Criteria for determining significance of species & ecological communities

Significance	
National	Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the Environment Protection and Biodiversity Conservation Act 1999
State	Listed as threatened (critically endangered, endangered, vulnerable) or rare for flora species, in Victoria on a DEPI Advisory List (DSE 2005, 2013a) Listed as threatened under the Flora and Fauna Guarantee Act 1988

Fauna species listed as near threatened or data deficient are listed in Appendix 4, however in accordance with advice from DEPI these fauna species are not considered to be at the same level of risk as higher categories of threat. These species are not discussed in detail in this report unless they are listed as threatened under the EPBC Act or FFG Act.

2.2 Stratification of survey sites – Preliminary assessment

Existing site records for threatened species were used in conjunction with DEPI modelled Ecological Vegetation Class mapping, aerial photographs, NaturePrint data and Biosis consultant's experience to stratify survey sites. The survey envelope was stratified into 'high', 'medium' and 'low' priority areas for survey. Each category is described in Table 2. All high and medium priority sites were searched for relevant rare or threatened plant species using 5 m wide transects.

Table 2: Prioritisation of survey areas

Priority	Description
High priority	Areas within 500 m of a threatened species record with high spatial resolution where the record is less than 15 years old. Areas modeled as EVCs which indicate the presence of an EPBC Act listed ecological community.
Medium priority	Areas within 500 m of a threatened species record that is either older than 15 years or has a low spatial resolution, or where data indicates that vegetation is similar in floristics, structure and disturbance history to high priority locations. Areas modeled as EVCs which indicate the presence of an FFG Act listed ecological community.
Low priority	Areas where threatened species records do not occur within 500 m and other data indicates that suitable habitat for threatened species is not present.

2.3 Ecological Vegetation Class mapping

Throughout the survey envelope, areas of native vegetation were mapped according to Ecological Vegetation Classes. The boundaries of EVCs were determined by the definition criteria in DSE (2007); where native understorey vegetation comprises at least 25% of the total understorey plant cover OR where three or more canopy trees in a group have at least 20% foliage cover. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups of the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating. Habitat zones were also mapped using methods described in DSE (2004).

Threatened ecological communities listed under the State *Flora and Fauna Guarantee Act 1988* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were mapped where present. These generally corresponded with EVC habitat zone boundaries where the vegetation qualified as both an EVC and listed community.

Scattered trees were identified and mapped within the survey envelope. Each tree was placed in a size class according to DSE (2007).

2.4 Field survey

2.4.2 Flora survey

Targeted survey for threatened species

Targeted surveys for EPBC Act threatened species were undertaken based on the preliminary assessment priority rating for the survey envelope. These species were:

- Dwarf Kerrawang
- Green-striped Greenhood
- Matted Flax-lily
- Metallic Sun-orchid
- River Swamp Wallaby-grass
- Round-leaf Pomaderris
- Spiral Sun-orchid
- Strzelecki Gum
- Swamp Everlasting
- Swamp Fireweed
- Wellington Mint Bush

Round-leaf Pomaderris was listed as critically endangered under the EPBC Act near the end of the survey period.

The survey method for each priority area is described below. High and medium priority areas are shown as on Figure 2 in Biosis (2013).

High priority Sites were surveyed for threatened flora species in transect lines no more than 5 m apart for shrub and herbaceous species. Transects started at known record sites with greatest spatial accuracy and ran along the length of the easement until the edge of the area of occupancy was located. Transects ceased 100 m from the

start point where no individuals of the target species were located. Tree species were searched for by surveying relevant sections of the Esso pipeline easement in 10 m transects. The boundaries of observed populations were mapped along with point locations for individuals.

Medium priority Targeted searches were undertaken within five 1000 m² sample areas. Where the target species was located, a transect was run along the length of the easement until the edge of the area of occupancy was located. Transects ceased 100 m from the start point where no individuals of the target species were located.

Low priority Areas were either traversed on foot, by car or observed from adjacent land depending on the ecological values which were expected to be present. Areas of native vegetation were mapped and areas that were identified in the field as potential habitat for threatened plant species were searched using medium priority search methods.

Areas that may provide suitable habitat for species which require survey in spring/summer were identified during the preliminary assessment, to inform further survey in the detailed assessment. Consequently, many of the high and medium priority survey area were surveyed again in spring, along with some additional areas of habitat identified during the preliminary assessment.

Comments wanted to include a definition

2.4.3 Fauna survey

Following the preliminary assessment it was determined that targeted survey would be undertaken for the following EPBC Act listed species, based on the likelihood of these species occurring within the survey envelope and the potential for impacts:

- Southern Brown Bandicoot *Isodon obesulus obesulus* – listed as endangered
- New Holland Mouse *Pseudomys novaehollandiae* – listed as vulnerable
- Growling Grass Frog *Litoria raniformis* – listed as vulnerable
- Dwarf Galaxias *Galaxiella pusilla* – listed as vulnerable
- Giant Gippsland Earthworm *Megascolides australis* – listed as vulnerable

This report outlines the results of targeted surveys for Southern Brown Bandicoot, New Holland Mouse, Growling Grass Frog and Dwarf Galaxias (Table A2.1–2.4). Targeted surveys for Australian Grayling were not conducted. The results of the targeted survey for Giant Gippsland Earthworm are provided in a separate report (Invert-Eco 2014).

Site selection for targeted survey was based on a combination of:

- Identifying areas of potential habitat during the preliminary assessment.
- A desktop assessment of sites that were not assessed during the preliminary assessment.
- Expert opinion and knowledge of individual species' current range.
- Additional sites identified during other assessments (i.e. flora assessments) the detailed assessment.

Locations of fauna sampling sites during the present study are provided in Appendix 2, displayed in Figure 3 and discussed in further detail below.

Southern Brown Bandicoot

Remote camera traps were used to survey areas of potential Southern Brown Bandicoot habitat at 29 locations within the survey envelope (Table A2.1). High sensitivity habitat identified for Southern Brown Bandicoot during the preliminary assessment of the project included Holey Plains State Park and the BlueScope Steel / Mornington Peninsula Shire land near Hastings. Eighteen cameras were set in Holey Plains (Map 3.9 – 3.16) and seven cameras were set within the BlueScope Steel property, Hastings (Map 3.88 – 3.89). Two additional cameras were set at a site known as Saxton Swamp (Map 3.50), one camera was set within the disused Southern Gippsland Railway line at Koo Wee Rup (Map 3.74) and one set at a property off Callanans Lane (Map 3.85).

Remote cameras were deployed between 18 October and 3 December 2013 and collected between 14 November and 20 December 2013. Cameras were deployed for a period of 17 to 28 days, with an average of 27 deployment days for each camera. Some cameras recorded the last images 1–5 days short of the collection date either due to battery failure or lack of animals to trigger a photo. Taking this into account, the cameras were active for a total of 749 camera nights across the survey period. A total of 21,862 images were logged.

Each camera site consisted of a motion-sensing infra-red remote camera unit (Reconyx HC500 or HC600) attached to a tree trunk. A bait station was located approximately 2 m from the remote camera in order to lure animals within the camera's sensor range. The bait stations consisted of a small PVC vent cowl containing standard mammal bait (rolled oats, peanut butter and golden syrup).

All vegetation and litter that might obscure the view of an animal investigating the bait or cause the camera to 'false trigger' was cut back from around the bait station. The remote cameras were programmed to take three photos per trigger event, with a 30 second delay between triggers. All remote cameras were set to a 'high' sensitivity level and to operate continuously throughout the entire period in which they were deployed.

Upon retrieval of the cameras, images stored on each camera's SD card were downloaded for later identification of subjects. Where possible, each photograph of an animal was identified to species level. Generally identification of the species recorded was not difficult. However, in certain circumstances it was not possible to identify the animal to species level in which case it was identified to the nearest taxonomic level possible.

New Holland Mouse

Elliott traps were set in areas of habitat deemed suitable for New Holland Mouse. Within the survey envelope, this was restricted to Holey Plains State Park and the BlueScope Steel property near Hastings. Within Holey Plains, a total of 120 Elliott traps were set over four nights from 28 October to 1 November 2013. The survey effort for Holey Plains was 480 trap-nights. Within BlueScope, a total of 56 Elliott traps were set over four nights from 11–15 November 2013. The survey effort for this site was 224 trap-nights (Table A2.2).

Each trap was baited with standard mammal bait (rolled oats, peanut butter and golden syrup) and was covered with a plastic sleeve to protect animals from inclement weather. In addition, artificial nesting material (wood wool) was placed at the back of each trap to enable animals to get off the cold metal base of the trap. Traps were generally arranged in transects of 10 traps per location spaced at 5 m intervals. Traps were checked and cleared early each morning and then closed during the day. The traps were then re-baited and set late each afternoon. Captured animals were identified to species level and released at the point of capture.

Growling Grass Frog

Targeted surveys for Growling Grass Frog were undertaken at 29 waterbodies across 25 sites throughout the survey envelope between 18 November and 17 December 2013 (Table A2.3). In accordance with the EPBC Act survey guidelines for the species (DEWHA 2009a), each site was surveyed twice (i.e. on two separate nights) unless the habitat was deemed unsuitable for Growling Grass Frogs. Twenty-four waterbodies were surveyed twice and four waterbodies were surveyed once due to unsuitable habitat (e.g. little or no water present). One additional waterbody was surveyed only once due to Growling Grass Frogs being confirmed as present at the site.

Survey nights were selected on the basis of projected weather conditions: fine and mild conditions (i.e. day time temperatures above 15 °C and night time temperatures above 12 °C) with little or no wind.

Survey effort included a combination of call playback and active searching/spotlighting. Following sunset, two zoologists surveyed waterbodies by commencing with a five minute period listening for any calling frogs. To illicit a response from male frogs that may be present but not calling, a Growling Grass Frog advertisement call was played for a subsequent five minute period. Head torches and/or hand-held spotlights were used to systematically search wetlands, surrounding vegetation and other areas of potential habitat (i.e. under rocks, logs, refuse).

Dwarf Galaxias

Targeted survey for Dwarf Galaxias was undertaken at 21 sites throughout the survey envelope (Table A2.4). An additional four watercourses were surveyed in close proximity to the survey envelope where suitable habitat existed for Dwarf Galaxias. These additional four sites were accessed at road crossings downstream of the survey envelope where adjacent property access was not yet approved. Each of these watercourses was able to be surveyed within the survey envelope at the end of the survey period in early December. Habitat assessment was conducted at an additional 39 sites to determine the likelihood of the species occurrence. Sites were surveyed between 28 October and 12 December 2013. Sites were selected based on suitable aquatic habitat, flow regime and level of connection to known populations of Dwarf Galaxias.

At each site ten box traps were set with a cyalume light stick serving as an attractant for a period of over 14 hours. If Dwarf Galaxias were not detected using this method, 20 minutes of supplementary dip netting was undertaken. All aquatic vertebrates captured were identified to species and abundance recorded. Size range and developmental stage of Dwarf Galaxias was also recorded.

2.4.4 Determination of habitat suitability

For the detailed assessment, habitat for all state advisory listed species (DSE 2005, DEPI 2013a) was determined from maps of predicted habitat available through the Biodiversity Interactive Map (www.depi.vic.gov.au). This approach provides an objective evaluation of habitat suitability with consistent accuracy and errors, as each species is modelled using the same general procedure.

Where modelled habitat mapping was not available for a threatened species (e.g. Southern Brown Bandicoot), likely suitable habitat was mapped on the basis of expert opinion. This approach was also applied to relevant EPBC Act species to better inform decision-making for potential impacts to the relevant protected matters. Habitat suitability varies depending on the species and may include breeding habitat (e.g. wetland with floating macrophytes for Growling Grass Frog) or foraging habitat (e.g. intact Heathy Woodland understorey vegetation for Southern Brown Bandicoot). Sites which are likely to only be occasionally visited by fauna but not considered important for either breeding or

foraging were not displayed as habitat. Habitat suitability is therefore binary and has no consideration of temporal variables. For the purpose of this assessment, habitat suitability has been determined based on general descriptions of habitat in literature and the opinion of relevant experts and field staff based on accurate recognition of habitat during other surveys in the region.

2.4.5 Likelihood of presence for significant species

The models of advisory listed species distribution produced by DEPI provide the basis for assessment of biodiversity importance when quantifying native vegetation that is proposed to be removed. The models are constructed using state-level explanatory variables and limitations of accuracy should be appropriately considered in site-level assessments. To further improve the success of mitigation measures, a likelihood rating for advisory listed species is also provided in Table 3.

Habitat for species which are either present or have a high likelihood of presence are mapped in Figure 2 (for EPBC Act listed species).

Table 3: Rationale for likelihood of presence

Likelihood	Rationale
High	<ul style="list-style-type: none"> • Sufficient habitat present on site. • Sufficient habitat is present in connected waterbodies in close proximity to the site. • Site is within species natural distributional range (if known). • Species has been recorded within 5 km or from the relevant catchment/basin since 1980.
Medium	<ul style="list-style-type: none"> • Records of terrestrial species within 5 km of the site or of aquatic species in the relevant basin/neighbouring basin but habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	<ul style="list-style-type: none"> • No records within 5 km of the site or for aquatic species, the relevant basin/neighbouring basin, since 1980. • Substantial loss of habitat since any previous record(s). • Native vegetation or other habitat values modified to extent that documented habitat attributes are minimal.
Negligible	<ul style="list-style-type: none"> • Habitat not present on site. • Habitat for aquatic species not present in connected waterbodies in close proximity to the site. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded. • Native vegetation or other habitat values modified to extent that documented habitat attributes apparently absent.

2.5 Mapping units

Survey results were mapped using the following mapping units (Appendix 5). Only native vegetation is shown on the map and in the instances where vegetation appears on the map with no mapping unit, the vegetation was assessed and determined to be naturalised weeds, non-native vegetation or planted vegetation. Fauna habitats may be mapped in any vegetation type.

Ecological Vegetation Classes (EVCs) and listed ecological communities – 1:5000 scale mapping of EVC and community boundaries throughout the survey envelope.

Database threatened species locations – State or nationally listed species that have been recorded previously within the survey envelope (databases in Section 2.1). A label for the spatial accuracy of these records is also shown on the maps.

Current threatened species locations – Species recorded during the preliminary assessment or current assessment and indicated as nationally significant.

Predicted habitat for advisory listed flora and fauna – Raster of one category each for combined models of all listed flora species and all listed fauna species.

Tree Protection Zones – Polygons show a buffer of fixed distance (12 x 1 m trunk diameter) from all remnant (only) scattered trees (based on Australia Standard 4970).

High Sensitivity areas – The following mapping units describe all areas of high sensitivity. These have been determined based on one or more of three criteria and are shown in Figure 2:

- Presence of a record or high likelihood habitat for an EPBC Act / FFG Act listed species or community. Indicated by the species point or polygon label.
- Mapped native vegetation (EVC) within the survey envelope that is contiguous with a high value conservation reserve or recognised site of high contribution to biodiversity in Victoria. These are usually larger reserves that also contain known habitat for several threatened species. Criteria refer to NaturePrint categories as one of the two highest raster categories where $\geq 50\%$ of the vegetation polygon is occupied by land in these raster categories.
- Site where biodiversity values immediately adjacent to the easement are high and offsite impacts could potentially occur during construction, without appropriate mitigation measures. Indicated by polygon and labelled with relevant biodiversity value.

No other level of ecological sensitivity is shown on the maps, however any of the above mapping units should be interpreted as having some ecological value and sensitivity. The vast majority of the easement area has lower ecological value (i.e. provides habitat for common species) and is not indicated by one of the mapping units above e.g. stock paddocks containing largely introduced pasture species. Construction activities should include mitigation to avoid or minimise impacts on areas with the above mapping units where possible.

2.5.2 Mapping limitations

WorleyParsons supplied aerial photography and vector data for the easement boundary.

The field collection of mapping data was undertaken using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS).

2.6 Survey qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site. Targeted surveys require special consideration. Prescriptions for targeted surveys for other major projects (e.g. development of precinct plans) state specific times of year and methodology for species or groups of species. There are no areas within the survey envelope where targeted survey for EPBC Act listed species was not completed within the seasonal/timing recommendations specified in the relevant Species Profile and Threats (SPRAT) database sheets.

The results presented in this report include field surveys from June–July and August–December in 2013. A total of approximately 420 person hours (minus some travel) were spent undertaking flora surveys and vegetation mapping, and 550 person hours (minus some travel) were spent undertaking fauna surveys.

The survey envelope includes both private and public land (Figure 2). Land was accessed for survey according to access agreement arrangements. Many properties were accessed on several occasions to undertake different types of survey. Access was granted for all but 19 parcels of the 300+ parcels within the survey envelope.

The Tooradin/Koo Wee Rup area is known for its populations of Southern Brown Bandicoot and Growling Grass Frog. A PhD student at Deakin University, Sarah Maclagan, is currently studying Southern Brown Bandicoots within linear habitat corridors around Koo Wee Rup. A high number of animals have been recorded from the area, including sections within and adjacent to the survey envelope. Given the known distribution of the current bandicoot population in this area, we did not undertake targeted survey for this species at these sites and presumed presence. Records of Southern Brown Bandicoot locations from recent surveys undertaken by Ecology Australia (2013) have been included in Figure 3.

Selection of Growling Grass Frog survey sites was based on priority habitat and therefore sites considered of low priority were not surveyed during the current assessment. Areas of potential habitat for this species can change significantly over time due to changes in hydrology and the use by the species of some sites can vary between years. Therefore, although targeted survey may not have detected the species from sites during the current assessment, some areas may provide habitat in the future. Targeted survey for Growling Grass Frog was generally focused on habitat containing water as this is the most effective means to detect the species during the breeding season. It must be noted that although core breeding habitat is focused on a waterbody or watercourse, the Growling Grass Frog also makes substantial use of habitat away from water for foraging and during dispersal. The likelihood of encountering individuals away from water is generally low and therefore these areas are not highlighted as habitat.

Access was not available at two sites requested for targeted fauna survey. A large wetland within a property at Butlers Track (Map 3.56) was requested for Growling Grass Frog survey. This is likely to be a medium priority site due to suitable habitat; however, survey completed to the east within a connecting water course did not record any Growling Grass Frogs. A site south of Watsons Creek (Figure 3.87) was requested to undertake Southern Brown Bandicoot survey. There is potential for this property to support Southern Brown Bandicoot within the vegetation on site which is connected to larger areas of potential habitat along Watsons Creek.

Surveys for Dwarf Galaxias were not able to be conducted at Watsons Creek (Map 3.86 – 3.87) due to elevated flows for a prolonged period making survey ineffective. This particular site was initially selected to confirm the presence of Dwarf Galaxias based on its close proximity to recent records of the species in the same catchment. Under these circumstances we presume presence of the species where suitable habitat exists on site.

Some areas in Figure 2 show EVC and scattered tree mapping which was completed by desktop assessment only. The areas were added to the survey envelope late in the assessment and were therefore not subject to targeted surveys. They are for most part contiguous with other areas of the survey envelope which were surveyed on ground, hence the desktop information is supported by site observation .

3. Results

3.1 Vegetation

The survey envelope crosses two bioregions and a number of different geological regions. Consequently the vegetation contained within the survey envelope varies greatly. Past land use has modified the pre-European vegetation along most of the survey envelope. Disturbance has predominantly come from agricultural land uses such as grazing and cropping. The pipeline easement was also subject to disturbance during installation and ongoing maintenance of the pipeline. In some sections including the Holey Plains State Park, native vegetation on the existing easement is slashed on a regular basis as part of on-going maintenance. The majority of the survey envelope on private land is grazed and therefore maintained as low vegetation with very few shrubs or other woody plants. Some localised areas contain taller shrubby vegetation, particularly areas of Swamp Paperbark *Melaleuca ericifolia* which has recolonised swampy areas.

In many cases vegetation within the existing easement meets the criteria for native vegetation as defined by DSE (2007) but is highly modified due to regular slashing or grazing of vegetation within the existing easement. In these instances the vegetation lacks much of the structure and diversity described on the relevant EVC benchmark.

The survey envelope supports a range of ecological features including areas of native vegetation (Table 4), scattered trees, degraded treeless vegetation (DTV), waterways and wetlands. Due to maintenance of the pipeline, native vegetation is usually limited to understorey component examples although more intact forests and woodland may occur immediately adjacent to the easement. The ecological features are shown in Figure 2 and are described below:

Table 4: Ecological Vegetation Classes

Ecological Vegetation Class	Description
Aquatic Herbland EVC 653	Occurs in shallow depression of black clays or peat, on floodplains and dune depression which are seasonally inundated. This EVC within the survey envelope typically has the dominant species Water Ribbon <i>Triglochin procera</i> , Streaked Arrowgrass <i>Triglochin striata</i> , Swamp Lily <i>Ottelia ovalifolia</i> , Red Pondweed <i>Potamogeton cheesemanii</i> , White Purslane <i>Montia australasica</i> , Soft Twig-sedge <i>Baumea rubiginosa</i> , Water Plantain <i>Alisma Plantago-aquatica</i> , milfoils <i>Myriophyllum</i> spp., Common Reed <i>Phragmites australis</i> , Tall Sedge <i>Carex appressa</i> and rushes <i>Juncus</i> spp. There are few high quality examples of this EVC within the vicinity of the survey envelope, and those on agricultural land have been modified by stock access and other disturbances.
Coastal Saltmarsh EVC 9	Represented by a few very small patches on the Bunyip River crossing and comprises a community which has re-colonised the modified banks and constructed channels of the waterway. It comprises common saltmarsh species such as <i>Tecticornia arbuscula</i> Shrubby Glasswort, <i>Suaeda australis</i> Austral Seablite, Creeping Brookweed <i>Samolus repens</i> , Coast Saw-sedge <i>Gahnia filum</i> , Australian Salt-grass <i>Distichlis distichophylla</i> , Knobby Club-sedge <i>Ficinia nodosa</i> and Rounded Noon-flower <i>Disphyma crassifolium</i> .
Damp Forest	Occurs in a small number of sites within the central part of the easement within the

Ecological Vegetation Class	Description
EVC 29	<p>boundary region of the Highlands – Southern Fall. Examples within the survey envelope occupy gullies and include the dominant canopy species Mountain Grey-gum <i>Eucalyptus cypellocarpa</i>, Messmate Stringybark <i>Eucalyptus obliqua</i> and Narrow-leaf Peppermint <i>Eucalyptus radiata</i> to about 30 m tall. The understorey includes a number of broad-leaf shrubs such as Snowy Daisy Bush <i>Olearia lirata</i> and Hazel Pomaderris <i>Pomaderris aspera</i>. The ground flora includes the dominant grass Forest Wire-grass <i>Tetrarrhena juncea</i>, Variable Sword-sedge <i>Lepidosperma laterale</i> and a moderate cover of ferns including Rough Tree-fern <i>Cyathea australis</i> and Common Ground-fern <i>Calochlaena dubia</i>.</p>
Damp Sands Herb-rich Woodland EVC 3	<p>Occurs in some areas within the Holey Plains National Park and east of Westernport Bay. It is characterised by an overstorey containing Rough barked Manna-gum <i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i> and Narrow-leaf Peppermint with a ground layer rich in grasses and other herbs, compared with Heathy Woodland which typically grades into this EVC on areas with more sandy soils. The higher clay content of the up soil layer in Damp Sands Herb-rich Woodland makes provides more favourable conditions for orchid and lily diversity. The dominant shrub species at Holey Plains are Burgan <i>Kunzea ericoides</i>, Prickly Tea-tree <i>Leptospermum ericoides</i> and may include in wetter examples Swamp Paperbark <i>Melaleuca ericifolia</i> and Scented Paperbark <i>Melaleuca squarrosa</i>. In the Westernport area, shrub species include Scrub Sheoke <i>Allocasuarina paludosa</i>, Dagger Hakea <i>Hakea teretifolia</i> subsp. <i>hirsuta</i> and Hedge Wattle <i>Acacia paradoxa</i>. Understorey vegetation may be dominated by grasses, rushes and/or sedges in some examples including Zig-zag Bog-sedge <i>Schoenus brevifolius</i>, Common Scale-rush <i>Lepyrodia muelleri</i>, Knobby Club-sedge, Thatch Saw-sedge <i>Gahnia radula</i>, wallaby-grasses <i>Rytidosperma</i> spp. and spear-grasses <i>Austrostipa</i> spp.</p> <p>There are maintained slashed examples of this EVC as well as more intact treed examples within the survey envelope.</p>
Floodplain Riparian Woodland EVC 56	<p>Occurs in the central east region on wide (>200 m) floodplains between hills. Due to its higher fertile soils, this EVC has been mostly cleared for agriculture and there are few examples within the survey envelope which have intact understorey vegetation. The canopy is occupied by tall eucalyptus: Manna Gum <i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>, Strzelecki Gum <i>Eucalyptus strzeleckii</i> and Swamp Gum <i>Eucalyptus ovata</i>. An exceptional example of this EVC occurs at Shady Creek where a relatively intact sedge-dominated understorey occurs under Strzelecki Gum.</p>
Heathy Woodland EVC 48	<p>Occurs extensively throughout Holey Plains State Park and areas around Westernport on old sand dunes. This EVC includes the dominant canopy species Gippsland Lakes Peppermint <i>Eucalyptus arenicola</i>, Coast Manna-gum <i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i> and Messmate Stringybark. Common taller shrub species include Coast Banksia <i>Banksia serrata</i>, Heath Tea-tree <i>Leptospermum myrsinoides</i>, Prickly Tea-tree and Wedding Bush <i>Ricinocarpos pinifolius</i>. A high diversity of ground flora includes Prickly Guinea-flower <i>Hibbertia acicularis</i>, Showy Parrot-pea <i>Dillwynia sericea</i>, Thick Twist-rush <i>Caustis pentandra</i> and Austral Bracken <i>Pteridium esculentum</i>. At Holey Plains it contains threatened species including Golden Grevillea <i>Grevillea chrysophaea</i> and Variable Bossiaea <i>Bossiaea heterophylla</i> within the easement and Wellington Mint Bush</p>

Ecological Vegetation Class	Description
	<p><i>Prostanthera galbraithiae</i> within 500 m the easement. Introduced species are uncommon within this EVC.</p> <p>There are maintained slashed examples of this EVC as well as more intact treed examples within the survey envelope.</p>
<p>Grassy Woodland EVC 175</p>	<p>Occurs around the Westernport area and includes the dominant canopy species Coast Manna Gum. The understorey is dominated by native grasses such as wallaby grasses <i>Rytidosperma</i> spp., and spear grasses <i>Austrostipa</i> spp., and it has scattered shrubs such as Black Sheoak <i>Allocasuarina littoralis</i> and Blackwood <i>Acacia melanoxylon</i>. High quality examples occur within the Bluescope Steel land at Tyabb where common species included Coast Manna-gum, Hedge Wattle, Prickly Tea-tree, Kangaroo Grass, Bristly Wallaby-grass <i>Rytidosperma setaceum</i>, Slender Wallaby-grass <i>Rytidosperma racemosum</i>, Supple Spear-grass <i>Austrostipa mollis</i>, Veined Spear-grass <i>Austrostipa rudis</i> subsp. <i>rudis</i>, Pale Grass-lily <i>Caesia parviflora</i>, sun-orchids <i>Thelymitra</i> spp., onion-orchids <i>Microtis</i> spp., Long Purple Flag <i>Patersonia occidentals</i>, Milkmaids <i>Burchardia umbellata</i> and Chocolate Lily <i>Arthropodium strictum</i>.</p> <p>There are maintained slashed examples of this EVC as well as more intact treed examples within the survey envelope.</p>
<p>Herb-rich Foothill Forest EVC123</p>	<p>Occurs at one location on private property, west of Willow Grove Rd. This EVC has structural and floristic composition similarity to Lowland Forest. Its canopy is dominated by Narrow-leaf Peppermint and Messmate Stringybark. The understorey vegetation includes the common species Dusty Daisy-bush <i>Olearia phlogopappa</i>, Varnish Wattle <i>Acacia verniciflua</i>, Blackwood, Silver Wattle and a high diversity of grasses and forbs in the ground flora. This example included some areas of Austral Bracken <i>Pteridium esculentum</i>.</p>
<p>Lowland Forest EVC 16</p>	<p>Occurs scattered throughout the central foothill areas of the survey envelope on sedimentary loams and has a canopy provided by several eucalypt species (mostly Messmate Stringybark and Yertchuk <i>Eucalyptus consideniiana</i>). It includes characteristic shrub species such as Narrow-leaf Wattle <i>Acacia mucronata</i> subsp. <i>longifolia</i>, Burgan, Dusty Daisy-bush, Broom Spurge <i>Amperea xiphoclada</i> and Silver Wattle <i>Acacia dealbata</i>. The ground flora comprises a range of small forbs such as Trailing Goodenia <i>Goodenia lanata</i>, drought tolerant ground ferns and grasses such as Forest Wire-grass.</p>
<p>Plains Grassy Wetland EVC 125</p>	<p>Occurs in a small number of patches, in seasonally inundated areas and is dominated by native grasses and sedges such as Australian Sweet-grass <i>Glyceria australis</i>, swamp wallaby-grasses <i>Amphibromus</i> spp., spike sedges as well as a range of aquatic forb species. Native species are more conspicuous in spring and following suitable winter rainfall.</p>
<p>Plains Grassy Woodland EVC 55</p>	<p>Occurs in the central parts of the easement and associated with the EPBC Act listed ecological community 'Gippsland Red Gum Grassy Woodland and Associated Native Grassland'. It includes the dominant canopy species Gippsland Red Gum <i>Eucalyptus tereticornis</i> and has an understorey dominated by Kangaroo Grass, wallaby grass, spear</p>

Ecological Vegetation Class	Description
	grasses and other graminoids. Higher quality examples include Black Sheoak, Lightwood <i>Acacia implexa</i> , Golden Wattle <i>Acacia pycnantha</i> and a moderate diversity of native forbs.
Riparian Forest EVC 18	This EVC was mapped at one location on the Tyers River. It is characterised by a tall eucalypt canopy (Manna Gum in this example) with understorey trees Silver Wattle <i>Acacia dealbata</i> and Blackwood <i>Acacia melanoxylon</i> . The ground flora in this location is highly modified and the site has been subject to revegetation work on what had appeared to have been previously cleared. The remnant ground flora includes Weeping Grass, wallaby-grasses and some aquatic herbs on the water edge such as knotweeds <i>Persicaria</i> spp.
Riparian Scrub EVC 191	This EVC was only recorded at Saxton Swamp on private land. It is generally treeless and dominated by the tall shrubs (3–4 m) Scented Paperbark <i>Melaleuca squarrosa</i> , Prickly Tea-tree <i>Leptospermum continentale</i> and Woolly Tea-tree <i>Leptospermum lanigerum</i> as well as coral ferns <i>Gleichenia</i> spp., Dusty Daisy-bush, Austral King-fern <i>Todea barbara</i> , other ground ferns and saw-sedges <i>Gahnia</i> spp. This vegetation grows from a deep peaty substrate and is dense with almost no areas of open ground.
Sedge Wetland EVC 136	Occurs in a few small patches where found in low-lying areas that are seasonally inundated. This EVC is usually characterised by having larger sedge species as dominants and include a range of species including Pithy Sword-sedge <i>Lepidosperma longitudinale</i> , spike-sedges <i>Eleocharis</i> spp. and rushes <i>Juncus</i> spp. Central zones of the wetland are usually low in diversity and narrow edge zones resemble the floristic composition of Aquatic Herbland (or grade into this EVC). A large patch of Sedge Wetland occurs at Holey Plains within 40 m to the south of the survey envelope.
Swamp Scrub EVC 53	Occurs throughout numerous drainage lines, floodplains, swamps and riparian zones within the survey envelope. It is dominated by Swamp Paperbark and may also include Blackwood <i>Acacia melanoxylon</i> and Black Wattle <i>Acacia mearnsii</i> . Swamp Gum is often emergent. This EVC is important within the Westernport area for Southern Brown Bandicoot.
Swampy Riparian Woodland EVC 83 / Swampy Woodland EVC 937	These EVCs occur in low lying areas with poorly drained seasonally waterlogged soils and in riparian zones or smaller waterways. The dominant canopy species is typically Swamp Gum <i>Eucalyptus ovata</i> and the understorey shrub Swamp Paperbark <i>Melaleuca ericifolia</i> is common. The ground flora is usually modified and includes Weeping Grass <i>Microlaena stipoides</i> , Common Tussock-grass <i>Poa labillardierei</i> , Shrubby Fireweed <i>Senecio minimus</i> , rushes and sedges. Swampy Riparian Woodland occurs in riparian zones and Swampy Woodland occurs on floodplains associated with waterways. The latter differs from Floodplain Riparian Woodland by having a lower canopy height and usually being associated with smaller waterways.
Tall Marsh EVC 821	Occurs in low-lying areas which are shallowly inundated for most of the year. The dominant species is Common Reed <i>Phragmites australis</i> to approximately 2.5 m tall. It may also include Narrow-leaf Cumbungi, Water Plantain and some other macrophytes.

Ecological Vegetation Class	Description
	This EVC frequently regenerates as derived community on modified substrates. Natural examples are commonly low in plant diversity.
Valley Heathy Forest EVC 127	Occurs in two locations within the central west area of the survey envelope. The first occurs on roadside (Cummings Rd) and includes an understorey component and the second location is a canopy patch on farmland east of Moe–Walhalla Rd. The latter comprises a canopy of But But <i>Eucalyptus bridgesiana</i> . Understorey vegetation at Cummings Road includes Cherry Ballart <i>Exocarpos cupressiformis</i> , Small Grass-tree <i>Xanthorrhoea minor</i> , Hop Bitter-pea <i>Daviesia latifolia</i> , Spiny-headed Mat-rush <i>Lomandra longifolia</i> , Grey Tussock-grass <i>Poa sieberiana</i> , Weeping Grass, wallaby-grasses and spear-grasses. The canopy at Cummings Road is mostly Narrow-leaf Peppermint.

3.2 Scattered trees

A total of 243 scattered trees were mapped within the survey envelope. An additional 46 scattered trees, or trees within patches that may require selective removal, were mapped during desktop assessment of some areas (Figure 2). For the latter, trees were mapped from aerial photograph interpretation. Those suspected to be Strzelecki Gum are indicated as such in Table A5.3 and the remainder are most probably remnant species of *Eucalyptus*. Tree mapping was undertaken prior to DEPI (2013c) was incorporated into Victorian planning schemes and consequently methods followed relevant policy (DSE 2007) and the requirement to record tree size class. The 243 scattered trees comprise 30 Large Old Trees, 122 Large Old Trees, 67 Medium Old Trees and 24 Small Trees. Details of their species, location and conservation status is provided in Table A5.3.

Some trees are identified as *Eucalyptus* sp. where access at the time of survey was limited or material for confident identification was difficult to obtain. These trees were checked to ensure they were not consistent with characters of Strzelecki Gum or other threatened *Eucalyptus* species. In all cases these trees were not swamp gums of any kind and determined as one of several common (usually) box or stringybark species native to Gippsland.

3.3 Fauna habitat

The fauna habitat throughout the survey envelope varies considerably by type and quality. Many of the fauna habitats present correspond with the different EVCs described above. In addition, other landscape features identified as fauna habitat outside of EVCs includes scattered remnant trees, planted vegetation, other vegetation dominated by exotic species, man-made structures, creeks, rivers, ephemeral creeks, artificial wetlands and drainage lines. Specific habitat types relevant to significant species is provided in Appendix 4 and is discussed in more detail below for the EPBC listed species likely to occur within the survey envelope.

3.4 Significant species and ecological communities

3.4.1 EPBC Act, FFG Act & DEPI Advisory listed species

Lists of significant species recorded or predicted to occur within 5 km of the survey envelope or from the relevant catchment (aquatic species) are provided in Appendix 3 (flora) and Appendix 4 (fauna).

An assessment of the likelihood of these species occurring in the survey envelope and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included. Those species recorded or with a medium or higher likelihood of occurring in the survey envelope are considered for their contribution to ecological values of EVC or other mapping unit on Figure 2.

The assessment confirmed the presence of six nationally significant species and five state significant species within the survey envelope. The EPBC Act listed species are summarised in the following.

Strzelecki Gum

Strzelecki Gum is a tall, forest tree which is endemic to southern Victoria; most populations occur in south Gippsland. It occupies a range of landscape positions although, within the survey envelope, it was mostly recorded in floodplain areas or lower reaches of broad gullies. Its general appearance may be similar to that of a related and more widespread species Swamp Gum *Eucalyptus ovata*. Swamp Gum was recorded in several locations throughout the alignment. Material that is important for confirming differences between these two species is not always accessible. However, the survey effort enabled a detailed inspection of Strzelecki Gum populations and the resulting maps accurately reflect their distribution within the survey envelope. Where all other habitat on accessible property was surveyed and no Strzelecki Gum were found, the locations have generally been determined not to be habitat for that species. There is one exception where habitat is present and Strzelecki Gum occurs within the local area although the trees mapped within the survey envelope were other species (Damp Forest east of Greenshield Rd).

There are two key areas containing Strzelecki Gum which require particular management during construction works. These are the riparian areas and floodplains of Tanjil River and Shady Creek (Appendix 5).

Wellington Mint Bush

Wellington Mint Bush is a medium shrub which typically grows amongst dense heathy vegetation. Soils with higher clay content in Damp Sands Herb-rich Woodland also provide good conditions for this species. Despite searches during its documented flowering period, one individual was located within the survey envelope. An individual also recorded to the south of the survey envelope during the preliminary assessment is included in Figure 2 for reference.

During its flowering period, this species is relatively easy to detect as few other species in the relevant vegetation types are of similar size and have purple flowers. The survey results revealed that this species is sparsely distributed within the vicinity of the survey envelope. Other parts of Holey Plains are reported to have a higher stand density (Carter 2006b) and are therefore expected to provide conditions that are important for the maintenance of larger populations within the park e.g. Red Hill Track, approximately 1.5 km to the north of the survey envelope.

River Swamp Wallaby-grass

River Swamp Wallaby-grass (Plate 1) is a wetland grass that is typically found in permanent or ephemeral, shallow wetlands or running waterways; usually with a peaty or sandy substrate. A population was located within Bluescope Steel land at Tyabb (Appendix 5) where it is part of a more extensive area of habitat within the local area. The record is the second record of this species on the Mornington Peninsula and elevates the biodiversity value of native vegetation within this part of the survey area.

A brief desktop assessment for the current project revealed that there are approximately 4.5 ha of likely habitat within a 1 km radius of the site and that trenching construction methods would remove approximately 0.7 ha of habitat (15%). Further survey has not been undertaken on surrounding land as the majority of this land is in private ownership.



Plate 1. River Swamp Wallaby-grass in a Swamp Scrub opening within the survey envelope, Tyabb.

New Holland Mouse

New Holland Mouse is a small, indigenous rodent patchily distributed within near-coastal environments of south-eastern Australia. The preferred habitat for this nocturnal species includes woodlands, heathlands, open forest and paperbark swamps with sandy substrates (Van Dyck & Strahan 2008). Populations are known to respond positively to increased floristic diversity found within habitat in the period of 3–5 years post-fire.

New Holland Mouse was not detected during the trapping surveys in Holey Plains or the BlueScope Steel property. Although an extensive trapping effort was conducted, there was very low capture rates for all non-target small mammals across both sites. Non-target species included Eastern Pygmy-possum *Cercartetus nanus* (two captures) and Swamp Rat *Rattus lutreolus* (two captures) at Holey Plains and one capture of Swamp Rat at BlueScope Steel.

During the remote camera surveys numerous small mammals were detected. Due to the lack of detail provided by the infra-red images it is not possible to positively identify these animals to species level. Several of these images from Holey Plains are likely to be House Mouse *Mus musculus*, although there is some possibility they could also be New Holland Mouse. The only way to positively identify a New Holland Mouse is to examine key morphological characteristics of an individual in the hand.

Despite not detecting New Holland Mouse, there is still potential for the species to occur at Holey Plains based on habitat suitable features and nearby records (Appendix 5). Although the habitat within BlueScope appears suitable, the species has not been recorded from the Mornington

Peninsula region since the early 1970s (DSE 2003). It is possible that the species has become locally extinct due to factors such as predation and urbanisation. The lack of recent fire may have also diminished the habitat characteristics favoured by the species.

Southern Brown Bandicoot

The Southern Brown Bandicoot is a medium sized marsupial with a distribution across south-eastern Australia. It prefers habitat that provides a high cover with open areas for foraging, usually associated with forest, woodland, shrub and heath vegetation communities (Van Dyck & Strahan 2008), although in some regions it is also commonly found in disturbed areas dominated by weed species (e.g. Blackberry thickets).

One Southern Brown Bandicoot individual was recorded at one camera location (RC 21, Figure 3.74) during the current assessment. An image of this individual is shown in Plate 2. This site is the disused rail reserve of the Southern Gippsland Railway Line within VicTrack land, south-east of Koo Wee Rup township. An extant population of Southern Brown Bandicoot is well documented throughout Koo Wee Rup, particularly within the disused rail reserve and within linear vegetation along the drains and road reserves (Brown & Main 2010; DSEWPaC 2011; Ecology Australia 2013). Remote cameras were not set along Railway Road or the disused rail reserve between Koo Wee Rup Road and Tooradin Station Road due to the known presence of this population. This area is considered to be high sensitivity for the species as it provides habitat and connectivity for an important population.



Plate 2. Southern Brown Bandicoot recorded by remote camera 21 on 7/12/13.

Within Holey Plains, no Southern Brown Bandicoots were recorded, however, four state significant species were detected by the remote cameras, including Emu *Dromaius novaehollandiae* (near threatened), Lace Goanna *Varanus varius* (endangered), Spotted Quail-thrush *Cinlosoma punctatum* (near threatened) and White-footed Dunnart *Sminthopsis leucopus* (FFG listed & near threatened). Long-nosed Bandicoot *Perameles nasuta* was also detected at Holey Plains. We consider there to be a low likelihood of Southern Brown Bandicoot occurring within the park.

No Southern Brown Bandicoots were detected in the BlueScope property, despite the site providing suitable habitat. The cameras recorded a large number of images of Red Fox *Vulpes vulpes*. It is

possible that high densities of this introduced predator may have impacted on the persistence of a Southern Brown Bandicoot population at this site.

Based on historical database records and recent surveys, the current known distribution for the Southern Brown Bandicoot within the region of the Esso Pipeline Replacement Project extends approximately from Longwarry to Cribb Point at Western Port Bay. With reference to the survey envelope, the core habitat for Southern Brown Bandicoot is likely to extend from Westernport Road in the east, to the Long Island Point Tank Farm in the west. Areas of known and potential habitat utilised by the species throughout this section has been mapped in Figure 3 based on habitat features preferred by the species. A summary of these areas and their relevant mitigation measures are provided in Appendix 5.

It should be noted that this species is also known to move through and forage in open grassed areas outside areas of core habitat.

Growling Grass Frog

The Growling Grass Frog is a large frog endemic to south-eastern Australia. It prefers permanent or semi-permanent waterbodies (Hero et al. 1991, Cogger 1996). Habitat characteristics, such as the extent of fringing aquatic vegetation and submerged vegetation, can also have a positive impact on the likely use of a waterbody by the Growling Grass Frog, but may not be as important as proximity to other waterbodies within a local metapopulation (Robertson et al. 2002).

Growling Grass Frog was recorded from one of the 29 waterbodies surveyed during the current assessment. Individuals were heard calling from the channel complex for Deep Creek, Cardinia Creek and Toomuc Creek, south of the disused rail reserve in Koo Wee Rup (south of R03751). The individuals heard calling were outside the survey envelope, however, it is likely this network of drains provides important habitat and movement corridors for the species in the local area, providing connectivity with suitable breeding wetlands nearby.

Important populations of Growling Grass Frog are well documented from the Pakenham and Officer region, north of Koo Wee Rup (Biosis Research 2005; Ecology Partners 2006; DEPI 2013b). Recent records of Growling Grass Frog are from a watercourse within the survey envelope within property E03750 (Ecology Australia 2013). As these records are so recent, this site was not surveyed and the species is presumed to be present.

Despite survey at several other sites around the Koo Wee Rup area the species was not recorded during our assessment. Many survey sites did not provide suitable breeding habitat, mostly due to insufficient water to facilitate breeding. Many additional small road-side drains in the region provide habitat for Growling Grass Frog, particularly for movement and dispersal (Appendix 5). However, these are unlikely to provide important breeding habitat and any impacts on these sites are expected to be low and at the local level.

Australasian Bittern

Australasian Bittern is a large, solid heron that occurs in southern Australia. Habitat for Australasian Bittern generally consists of densely vegetated wetlands and watercourses. It prefers shallow water with reeds, grasses and shrubs for foraging, and deeper water with dense rushes, sedges and reeds for nesting.

Targeted survey for Australasian Bittern was not conducted as part of the current assessment. However, potential habitat was identified at several locations throughout the survey envelope

(Appendix 5), and it is possible that a variety of wetlands within or near the survey envelope are utilised on an irregular basis for foraging. In particular, wetlands associated with Tall Marsh and Sedge Wetland EVCs, and some of the larger, permanent wetlands with dense vegetation may be used.

Dwarf Galaxias

Dwarf Galaxias were recorded at three sites associated with two watercourses within the survey envelope: Shady Creek (Figure 3.48) and an unnamed tributary of the Moe Drain at Saxton Swamp (Figure 3.50). Details of sites where Dwarf Galaxias were recorded or predicted to occur are presented in Appendix 5. The habitat identified within the survey envelope is classed as either ephemeral (periodically / seasonally inundated) or permanent (presumed permanently inundated). Those sites identified as ephemeral Dwarf Galaxias habitat are expected to be occupied only during periods of inundation (flow) often coinciding with dispersal and breeding in late autumn and winter. At locations identified as permanent habitat, Dwarf Galaxias are presumed to be present year round.

Shady Creek

The Shady Creek site consists of an extensive floodplain area inundated at the time of survey. A complex of online wetlands is present throughout the floodplain providing extensive areas of breeding habitat and refuge during low flow periods (Plate 3). Two adults in breeding condition and 101 juveniles were detected using both box traps and dip nets. This is potentially an important site for this species within the Latrobe catchment where the species has an otherwise patchy distribution. The survey envelope at this site is consequently of high environmental sensitivity.



Plate 3. Floodplain habitat at Shady Creek (E01810), habitat for Dwarf Galaxias and Strzelecki Gum.

Saxton Swamp

Five adult males were detected at the Saxton Swamp site. The site consists of heavily vegetated Swampy Riparian Woodland margins over a peat bog. Dwarf Galaxias (Plate 4) were detected in a single small pool within the survey envelope. The survey envelope at this site is consequently of high environmental sensitivity.



Plate 4. Adult male Dwarf Galaxias recorded from Saxton Swamp (E01890).

Dwarf Galaxias are predicted to occur at an additional 16 sites within the survey envelope.

Lower Latrobe

In addition to the VBA records used for the desktop assessment of priority sites, records within the lower Latrobe catchment were provided by Dan Stoessel (ARI – DEPI). These records give an indication of the distribution of Dwarf Galaxias within the major tributaries of the Loy Yang Creek (Blind Joe Creek, Flynn's Creek) and identify a significant population of the species within these drainages. Survey conducted by Biosis was consequently concentrated within these major tributaries and included Sandy Creek, Sheepwash Creek and several unnamed tributaries of Loy Yang Creek. These sites consist of both ephemeral (Blind Joe and Sandy Creeks) and permanent habitats (Flynn's and Sheepwash Creeks). While Dwarf Galaxias were not recorded at these sites they are considered to be present particularly during higher flow periods coinciding with spawning and dispersal.

Rintoul Creek

Habitat assessment only was conducted at Rintoul Creek. While marginal habitat exists for Dwarf Galaxias at this site, they may persist in low numbers or transition through this site during spawning / dispersal phases given its proximity to multiple records in the upper reaches of the Loy Yang Creek.

Yallock Creek and tributaries

A significant population of Dwarf Galaxias exists within an extensive reach of the Yallock Creek upstream of the South-Gippsland Highway to Cora Lynn at the Bunyip River diversion. Dwarf Galaxias have been recorded consistently here between 2005 and 2008. Dwarf Galaxias were not recorded during current survey presumably due to protracted periods of high flow during the survey period. Dwarf Galaxias is considered to be present in the permanent habitat within Yallock Creek (Figure 3.73) and ephemeral habitat in associated drainages (Figure 3.71 and 3.74) detailed in Appendix 5.

Langwarrin Creek

Dwarf Galaxias were not recorded during survey however they are considered present due to the proximity of records within the upper catchment less than 700 m from the survey envelope.

Watson Creek

Survey was not conducted within Watson Creek due to protracted periods of high flow during the survey period. Large numbers of Dwarf Galaxias have been consistently recorded within the upper Watson Creek catchment by Biosis for other projects between 2010 and 2012 and are considered present within the survey envelope particularly during high flow periods coinciding with spawning and dispersal.

Australian Grayling

Australian Grayling is a diadromous species which spends most of its life in freshwater. Juveniles inhabit estuaries and coastal seas. Adults occur in freshwater habitats, typically rivers and major creeks of significant winter discharge with cool, clear waters and gravel substrates, but occasionally also in turbid waters. Australian Grayling typically migrate during March – April to the lower reaches of the catchment above the estuarine extent to breed from April to July (Koster et al, 2013). Larval Australian Grayling are expected to undergo passive migration coinciding with winter discharges and return to freshwater making their upstream migration from October to December (Koehn and O'Connor, 1990). Australian Grayling are predicted to occur within two major and three minor drainages traversed by the survey envelope: the Bunyip River (Figure 75), Latrobe River (Figure 29), Rintoul Creek (Figure 30) and Cardinia and Deep Creeks (Figure 77). Of note is the Bunyip River site. The Australian Grayling population in the Bunyip River has been extensively surveyed between 2008 and 2011 (Koster et al. 2013) including monitoring of dispersal and migration of adults and spawning sites. Drift net surveys were conducted at numerous locations within the Bunyip River downstream of the Tarago River confluence. Over 95% of the larval material was collected in the vicinity of the survey envelope suggesting that this site is the spawning area for Australian Grayling in the Bunyip River. The survey envelope at this site is consequently of high environmental sensitivity.

Migratory Species

Three EPBC Act listed migratory species have potential to occur within the survey envelope, including:

- Eastern Great Egret
- Lewin's Rail
- Latham's Snipe

Although there is potential for individuals of these species to use habitat within the survey envelope, it does not provide any areas of important habitat for any of these species. That is, the survey envelope does not support an ecologically significant proportion of the population of any of these species, it does not provide habitat of critical importance to any of these species, the habitat is not at the limit of these species ranges, or where these species are declining. Consequently, the project is unlikely to have a significant impact on a migratory species as defined by the EPBC Act significant impact guidelines (DEWHA 2009b; DoE 2013).

Ramsar Sites

The survey envelope is identified as being located within 10 km of the following two wetlands of international importance (Ramsar Sites):

- Gippsland Lakes
- Western Port

The survey envelope does not drain directly into the Gippsland Lakes Ramsar site due to the small and ephemeral nature of the watercourses at the eastern end of the alignment, and their distance from the Ramsar site.

The survey envelope crosses over numerous main watercourses at the western end of the alignment that flow directly into the Western Port Ramsar site. These waterways include: Yallock Creek, Bunyip River, Deep Creek, Toomuc Creek, Tooradin Creek, Cardinia Creek, Rutherford Creek, Langwarrin Creek, Watson Creek, Olivers Creek, Western Contour Drain, Muddy Grates Drain, Moodys Inlet and Lyalls Inlet. There is potential for direct and indirect impacts on the Western Port Ramsar site, including increased sedimentation and pollution. However, with appropriate mitigation measures in place impacts are expected to be low.

3.4.2 Significant ecological communities

EPBC Act listed

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains – listed as critically endangered

The ecological community is located where patches are sufficiently large enough and have the required composition and cover of species to meet definition criteria in the listing advice (DSEWPaC 2012). It is characterised by shallow wetlands which do not hold water over summer. They have a moderately high cover of native grasses and also include sedges, rushes and other herbs (Plate 5). In some situations, these waterways have been modified although they maintain the required composition and cover of native species to meet the definition of this community.

Other areas of corresponding EVCs (e.g. Plains Grassy Wetland) occur with the survey envelope although these areas are have been deemed to not include the listed community.



Plate 5. Example of Seasonal Herbaceous Wetlands (freshwater) of the Temperate Lowland Plains.

Gippsland Red Gum Grassy Woodland and Associated Native Grassland – listed as critically endangered.

This community includes both treed and treeless examples within the survey envelope. The canopy in treed areas is dominated by Gippsland Red-gum *Eucalyptus tereticornis*. Shrubs are usually sparse and the ground flora is dominated by various native grass species. Some areas of the EVC Plains Grassy Woodland correspond to this listed community. The patches identified meet size and species composition thresholds identified in the listing advice. In most areas on private land, this community has been cleared to the extent that the remnant do not meet the definition criteria of the listed community e.g. weed cover too high or only scattered trees are present.

FFG Act listed communities

Communities listed under the FFG Act generally correspond to the EPBC Act listed communities above. However, component species of FFG Act communities within the communities' natural range require a permit under the Act for their removal. That is, an area of FFG Act listed community may be mapped where the corresponding EPBC Act listed community does not meet definition criteria. An application for impacts associated with this project should address the relevance of these FFG Act listed communities, and state whether any impacts for EPBC Act communities are dealt with in the same area.

Central Gippsland Plains Grassland Community

This community is found on the poorly drained, heavy alluvial clays of the lowland plains of central Gippsland, Seaspray west to Westernport, and on parts of the Mornington Peninsula. Rainfall ranges from 570–650 mm, generally <600 mm. It is comprised of open tussock grassland, mostly dominated by Kangaroo Grass. Between grass tussocks there is a variety of perennial herbs, including rice-flowers, daisies, lilies, sedges and orchids.

The Willung Rd and Princes Hwy roadside remnants of Plains Grassy Woodland are an example of this FFG community.

Forest Red-gum Grassy Woodland

This community is found on the poorly drained, heavy alluvial clays of the lowland plains of central Gippsland, from Traralgon east to Lakes Entrance. Rainfall ranges from 570–650 mm, generally <600 mm. It is dominated by Gippsland Red Gum over a grassy understorey that is similar to that of Central Gippsland Plains Grassland, but without the dominance of Kangaroo Grass.

Within the survey envelope, the floristic composition of Plains Grassy Woodland EVC and the EPBC Act listed community Gippsland Red Gum Grassy Woodland and Associated Grassland is consistent with that of the FFG Act listed community Forest Red-gum Grassy Woodland. Areas of the EVC or EPBC community are therefore also regarded as the FFG community.

Herb-rich Plains Grassy Wetland (West Gippsland) Community

This community has a swampy grassland/sedgeland ground layer and ranges in structure from naturally treeless to a woodland or open forest with a tree canopy of River Red-gum *Eucalyptus camaldulensis*.

Areas of Plains Grassy Wetland within the survey envelope are this community. The geographic limit of this community is unclear however all mapped areas of the envelope containing grassy wetland vegetation should also be regarded as this community.

4. Mitigation options for significant biodiversity matters

4.1 General

Priority is given in mitigation advice for areas where significant values are confirmed from the survey envelope. For EPBC Act listed species only, habitat was identified based on expert opinion for some plants including those that were predicted to occur but not found during the current assessment. Habitat suitability considers the vicinity of records within the surrounding landscape as well as the vegetation types present within the survey envelope and their quality. Targeted surveys provide some reassurance that construction will not impact on these species although they do not prove absence. Predicted species that were not recorded during targeted surveys were Matted Flax-lily, Green-striped Greenhood, Metallic Sun-orchid, Spiral Sun-orchid, Dwarf Kerrawang, Swamp Everlasting and Swamp Fireweed. The approach for mitigating impacts to Matted Flax-lily, Swamp Everlasting and Swamp Fireweed habitat is to follow mitigation options for EPBC Act listed ecological communities. The approach for mitigating impacts to Green-striped Greenhood, Metallic Sun-orchid and Spiral Sun-orchid is to avoid impacts to treed areas within Holey Plains State Park and BlueScope / Mornington Peninsula Shire land at Tyabb. These areas are indicated as high sensitivity in Figure 2. No other specific mitigation advice is provided for these species.

A Construction Environmental Management Plan (CEMP) will be prepared for the project prior to commencement of construction. All aspects set out below that are of relevance to the construction and immediate post-construction phases will be included in the CEMP. Mitigation measures that are specific to particular geographic locations must be clearly identified as such in the CEMP.

An Operational Environmental Management Plan (OEMP) will be prepared for the project at completion of construction and prior to commissioning. All aspects set out below that are of relevance to the operational phase will be included in the OEMP. Management measures that are specific to particular geographic locations must be clearly identified as such in the OEMP.

A prescription for mitigating impacts to ecological values within the survey envelope should consider the measures set out below. Mitigations methods should follow any relevant Australian Standards or other approved industry standard.

Consideration must be given to relevant recovery plans for EPBC Act listed species and ecological communities. See Section 5 for information regarding these.

4.2 Native vegetation and threatened flora

The CEMP will address flora management. It will include the following aspects that are specific to the protection of listed flora species and ecological communities. Other, more general mitigation and management measures for vegetation are set out in this section and will add to protective measures for listed flora species and ecological communities.

4.2.1 Pre-construction design phase

- Consideration will be given to avoid tree protection zones for all scattered trees. Avoid means the exclusion of any construction activity including storage of materials. This has been set at a standard 12 m for all scattered trees following consideration of the size classes of trees within the survey envelope. For most part, canopy trees have a diameter at breast

height of less than 1 m. Where construction will be undertaken near the edge of a mapped EVC, a buffer of 12 m should be applied from each tree trunk to avoid impacts to trees within patches that are not otherwise identified for vegetation clearing (canopy tree or understorey vegetation). Where construction is likely to impact within the 12 m buffer of scattered trees or the edge of an EVC patch, the subject trees should have their trunk diameter measured at 1.3 m above the ground and a buffer applied no less than 12 x the diameter (Australian Standard 4970–2009). The maximum buffer should be no more than 15 m from the centre of the tree trunk. Trees which have their protection zone encroached and deemed to be lost by a qualified arborist should be reported and offset using the permitted clearing guidelines.

- The locations of any EPBC Act threatened plant species must be flagged on-site prior to construction. All such plants that are to be retained must be protected within clearly designated and fenced 'no-go' zones on-site.
- Following the process outlined above, any necessary removal of native vegetation will be subject to an approved Native Vegetation Offset Strategy, as per the Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines (DEPI 2013c). This will be developed prior to any disturbance of native vegetation and when all proposed losses of such vegetation have been quantified.
- If the project entails the potential loss of any threatened flora species or of any ecological vegetation community that is listed under the EPBC Act, an offset strategy under the EPBC Act will be required to be approved by the Commonwealth and will form part of the CEMP and OEMP.
- All pipeline construction plans and construction drawings will show extents of vegetation clearing and any protected areas clearly on project mapping and mark them in the field.

4.2.2 Construction phase

- Construction should be undertaken by trenchless methods to exclude surface disturbance in all High Sensitivity Areas.
- Vegetation to be protected will be clearly identified within fenced and/or signed 'no-go' zones on-site for the duration of construction.
- Where threatened species removal is unavoidable, relocation will be investigated and utilised if practicable, achievable and approved by regulatory authorities.
- The removal or disturbance of vegetation outside the access tracks, agreed / approved temporary work areas and pipeline easement will not be permitted unless separate additional regulatory approvals are obtained.
- A record will be maintained of all native vegetation cleared for the project (including for subsequent operations and maintenance) as part of the associated offsetting program(s). The record will comprise spatial data showing accurate boundaries of actual clearing at the completion of construction. A final assessment will be done at the end of construction to confirm quantities of each vegetation type removed.

4.3 State and Federally listed threatened fauna

The CEMP will address fauna management. It will include the following aspects that are specific to the protection of listed fauna species. Mitigation and management measures outlined in sections here for vegetation and for general fauna will add to protective measures for listed fauna species.

4.3.1 Pre-construction design phase

- Locations of habitat for any EPBC Act threatened fauna species must be flagged on-site prior to construction. All such areas of habitat that are to be retained must be protected within clearly designated 'no-go' zones on-site.
- Impacts on identified areas of habitat for listed threatened riparian and aquatic fauna species (e.g. EPBC listed fish species, Growling Grass Frog, Australasian Bittern) will be avoided at key locations by the use of trenchless methods where 1) the appropriate trenchless method is able to be used with normal engineering constraints and 2) the activity does not result in impacts that are greater in quantity and extent than would be entailed in trenching of the area being avoided.
- Areas will be identified where additional workspace is required early in the planning process (access tracks, lay down areas, vehicle turn around areas). Such areas will be located in pre-disturbed areas of low or no vegetative value where possible, and their locations will be negotiated with the relevant landowner. All such areas will be checked by a qualified zoologist to ensure that no habitat for EPBC Act threatened fauna species or state advisory listed fauna species are present and if any such are present then the area will be excluded from use as a workspace.
- A water quality monitoring program will be developed as a component of the CEMP to manage and monitor potential impacts upon threatened species and other areas of environmental sensitivity (e.g. Western Port Ramsar Wetland). Monitoring requirements to follow relevant industry and state water quality guidelines (e.g. ANZECC 2000, SEPP WoV - Schedule F8 Water of Western Port and Catchment 2001).
- Construction impacts will be monitored to ensure there are no significant impacts on threatened species or communities. Potential impacts on threatened aquatic fauna in locations identified as environmentally sensitive will require the development of a monitoring plan as part of the CEMP. The scope of the monitoring will enable the determination of any impacts from construction on populations of threatened aquatic fauna.
- Impacts to areas of high sensitivity Southern Brown Bandicoot habitat can be offset by the installation of temporary artificial shelters prior to and during construction. Such structures will allow animals to shelter safely until disturbed habitat is fully reinstated.

4.3.2 Construction

- Potential for listed threatened ground-dwelling fauna (e.g. Southern Brown Bandicoot, New Holland Mouse, Growling Grass Frog) to become trapped in the open trench and open pipe will be minimized by the measures for trench and pipe construction set out below (see General fauna & habitat).
- In areas of high sensitivity for Southern Brown Bandicoot, habitat will be walked through by an ecologist or appropriately experienced fauna advisor immediately prior to construction to 'flush any animals from the vicinity into nearby habitat.

- Potential impacts to threatened aquatic and terrestrial fauna in locations identified as environmentally sensitive shall be monitored throughout construction.
- Trenching or open cut watercourse crossing methods in permanent habitat for threatened species where trenchless construction is not possible shall employ coffer dams. This shall be followed by staged dewatering and salvage of threatened species and other incidental aquatic fauna within the dam. Diversion flues shall not impede the movement of aquatic species. Any pump diversions should employ adequate incurrent screens to eliminate threatened small bodied aquatic species being drawn through any pumps. Any pump outlets shall employ flow dissipaters to reduce erosion and additional sedimentation.
- Ephemeral watercourses would ideally be traversed (trenched) during dry periods. Areas indicated as ephemeral habitat for threatened aquatic fauna would be preferentially traversed during dry periods with appropriate in stream sediment and flow bypass controls in place to manage incidental flows during construction.

4.3.3 Post-construction

- Native shrub and graminoid cover should be re-established by revegetation of ground flora (tussock grasses and small shrubs) immediately after construction in any areas mapped as Southern Brown Bandicoot habitat. This will be incorporated into the rehabilitation requirements (see *General vegetation*).

4.4 General vegetation

4.4.1 Pre-construction design phase

- The new pipeline will be located within the existing pipeline easement, thereby minimising vegetation clearance.
- Pre-existing access tracks will be utilised whenever possible and upon completion be reinstated to their pre-construction condition, or as otherwise agreed with the relevant landowner.
- Wildlife habitat fragmentation effects will be minimised by retaining tree canopy connectivity where practicable, particularly at watercourses and where there are roadside areas of native vegetation or significant fauna habitat.
- A rehabilitation plan will be developed within the CEMP and approved prior to commencement of construction. It will consider the appropriate application of vegetation regeneration and/or revegetation techniques to optimise potential for regrowth and stabilisation success (e.g. species selection, seed collection, propagation, erosion/ sediment control devices, re-use of cleared / translocated species, weed control, etc.). Rehabilitation will be in accordance with the approved rehabilitation plan. The rehabilitation plan will include a monitoring program for re-instatement of native vegetation, significant fauna habitat and weed control.

4.4.2 Construction phase

- A risk based assessment of the need to clean machinery and equipment of dirt (including possible treatment with PhytoClean or similar products to kill plant pathogens such as Cinnamon Fungus and prevent the spread of weeds) should be done. The requirement for treatment will be determined by the project environmental manager and communicated to

relevant construction personnel. Machinery and equipment will be free of plant and animal pathogens.

- Minimise areas of disturbance of riparian and instream aquatic vegetation.
- Beds and banks of watercourse will be reinstated to pre-existing conditions to facilitate the natural flow regimes of the watercourse. Materials used for re-instatement should be sufficiently robust to minimise streamside erosion while allowing for riparian and instream aquatic vegetation re-establishment.
- Watercourse banks will be revegetated with suitable indigenous plants to minimise fragmentation of vegetation corridors and to avoid interrupting the movement of fauna.
- Where practicable, trenched watercourse crossings will be scheduled during dry or low flow periods. Consideration will be given to potential effects from upstream works on downstream estuarine / tidal waters.
- Biosecurity measures shall be applied to any imported topsoil to avoid importation of pathogens and seeds or vegetative material of weed species.
- Tree protection zones should be established and surrounded with a 1 m tall, high visibility mesh (or similar) to prevent encroachment into the tree protection zone by machinery. Tree protection zones are general 12 x the trunk diameter (at 1.3 m above the ground) from the trunk centre and to a maximum of 15 m.
- Removal of trees will be undertaken in a manner that avoids or minimises damage to adjacent live vegetation (e.g. trees will be felled onto the easement away from standing timber).
- Clearing will aim to retain roots in riparian zones and other sensitive areas where possible, to retain stability. Slashing may be undertaken as a means of vegetation clearing, particularly in sown pastures or at water courses.
- Pruning or the removal of protected vegetation will only occur in accordance with the requirements of the relevant state legislation.
- Pruning of trees will be undertaken only by suitably trained personnel or an arborist.
- Cleared vegetation will be stockpiled separately from topsoil and subsoil so that the soil can be used for spreading during reinstatement.
- Disturbing roots or compacting soil within tree protection zones will be avoided unless deemed entirely necessary for the construction activities.
- Vehicle parking will be restricted to the right of way and agreed in advance with the landowner.
- Parking vehicles and machinery within TPZs, which can damage roots through soil compaction and can impair water infiltration into the soil, will be discouraged.
- Relief of soil compaction will be undertaken, as required, by ripping or scarifying soils along the contours. This may be required during and/or after construction.

4.4.3 Post-construction phase

- Upon completion of pipeline construction, all areas of soil disturbance will be subject to rehabilitation of vegetation to a condition compatible with the surrounding land use, and as

pre-agreed with the affected landowner. This will include temporary access tracks which will then be closed and rehabilitated.

- Where rehabilitation works are at risk of deleterious impacts, such as from stock or vehicular access, adequate measure will be implemented and maintained. These may include exclusion fencing, signage, etc.
- Where appropriate, rehabilitation will use native species that are typical of the surrounding vegetative community and will use stock of local provenance.
- Weed control will be implemented in all areas of soil disturbance to decrease the risk of weed establishment.
- Rehabilitation works will continue until vegetation is established, maintaining growth and producing reproductive material. This will be indicated for 1) pastures by restoration of at least 50% perennial grass cover on affected area, 2) native treeless vegetation by measurable recruitment and $\geq 50\%$ total native species cover by $\geq 50\%$ benchmark diversity in graminoids, other herbs and (where relevant) shrubs 3) treed vegetation by measurable recruitment and $\geq 50\%$ total native species cover by $\geq 50\%$ benchmark diversity in all lifeforms. Canopy tree recruitment must be restored for treed vegetation types. This will be monitored using standard DEPI vegetation condition assessment methods. Where other artificial vegetation types are to be restored for agriculture, the rehabilitation method will be developed with the relevant landowner. Where rehabilitated areas of native vegetation are being used for state native vegetation offsets, standards for re-instatement will follow state policy requirements.

4.5 General fauna & habitat

4.5.1 Construction

- Construction should preferentially be undertaken during daylight hours to avoid impacts on nocturnal species breeding and foraging activity.
- Wherever possible, capacity for fauna movement through habitats should be maintained. Examples are retention of connected tree canopies to facilitate movement of arboreal mammals, and use of trenchless methods under streams and corridors of adjacent riparian vegetation.
- Measures to prevent and minimise potential for ground-dwelling fauna to become trapped in the open trench and open pipe will be included in the measures for trench and pipe construction set out below.
- Minimise the period of time the trench is open.
- Branches, ropes, hessian sacks, ramped gangplanks or similar will be used to create 'ladders' to enable fauna to exit the trench. These should be spaced approximately every 100 m along the open trench.
- Welded pipe sections will have temporary end caps installed when the site is not attended, to prevent ingress of fauna.
- The open trench will be monitored and any trapped fauna will be removed by an experienced fauna handler.

- Individual pipes and joined pipe sections (pipe strings) will have gaps of no less than 1 m so as to not impede passage of listed threatened ground-dwelling fauna across the pipeline easement.
- Injured fauna will be taken to a vet or approved wildlife carer for treatment.
- Records of all fauna interactions will be created, listing the species concerned, the nature of the interaction and its GPS coordinates.
- Watercourse crossings shall be completed as quickly as is reasonably practical in order to minimise impacts. The area of disturbance within the watercourse and associated riparian vegetation shall be minimised to avoid impacts within periods of fauna sensitivity (e.g. fish migration periods).
- For sites where trenchless construction is implemented there will be adequate controls to avoid stream bed collapse and incursion of drilling mud into surface waters, and adequate controls to minimise sediment discharge from operations to the watercourse.
- For sites where surface trenching is required works should be timed to coincide with dry periods for ephemeral habitats or low flow conditions in permanent habitats. In permanent habitat for threatened species coffer dams should be employed, followed by staged dewatering and salvage of threatened species and other incidental aquatic fauna. Diversion flues should facilitate the movement of aquatic species. Any pump diversions should employ adequate incurrent screens to eliminate small bodied aquatic species being drawn through any pump.
- Adequate controls will be employed to minimise or eliminate sediment discharge and ASS pollutants into downstream environments.

4.5.2 Post-construction

- Watercourse banks will be revegetated as per a rehabilitation plan (see General vegetation) to minimise fragmentation of vegetation corridors and to avoid interrupting the movement of fauna.
- Fauna habitat will be considered when planning for easement management during operations, especially for general mowing, slashing or line of sight maintenance activities, with any valuable habitat to be managed in accordance with license conditions or the approved maintenance plan / arrangements.

4.6 Significant flora and communities

4.6.1 EPBC Act listed flora

Strzelecki Gum

Within areas identified as containing scattered trees or habitat for Strzelecki Gum, the following mitigation measures are recommended:

- Construction should avoid Tree Protection Zones (TPZs). If TPZ cannot be avoided, do not remove top soil from associated high sensitivity areas (Figure 2), minimise machinery use, examine use of ground protection mats, keep stock piles away from TPZ and engage an arborist to determine residual impacts to trees for offset purposes. If trees removal cannot be avoided, offset according to the Permitted Clearing Guidelines.

- Trenchless construction methods should be used in areas of vegetation shown on Figure 2 where Strzelecki Gum is present. In comparison to scattered Strzelecki Gum trees, these areas contain space for tree recruitment. Absence of recruitment is identified in the recovery plan as a threat to this species. If trenching cannot be avoided, a plan will need to be developed for the re-instatement and protection of land to allow for ongoing recruitment.

Wellington Mint-bush

Within areas identified as containing records or habitat for Wellington Mint-bush, the following mitigation measures are recommended:

- As a priority, avoid removal of native vegetation in treed areas of Holey Plains (particularly Heathy Woodland and Damp Sands Herb-rich Woodland); these are areas that contain vegetation generally taller than 1 m and outside of the existing slashed easement. Construct sediment barrier along edge of slashed easement and treed area boundary to avoid spread of soil stock piles into treed area.
- Where impacts to treed areas cannot be avoided, undertake survey to locate any individuals which may be present and collect material for propagation if present.
- Permanent loss of individuals or associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.

River Swamp Wallaby-grass

Within areas identified as containing records or habitat for River Swamp Wallaby-grass, the following mitigation measures are recommended:

- Trenchless construction through this section of the alignment would require a removal of a significant area of native vegetation, including additional habitat for River Swamp Wallaby-grass. Preferred mitigation is to remove surface soil and plant material (intact sections) to 0.5 m in depth and store for reinstatement following trenching. Salvage should be undertaken when the soil is moist but not saturated or inundated.
- Monitoring of weed spread and any loss of River Swamp Wallaby-grass should follow construction in accordance with an approved monitoring plan.
- Permanent loss of River Swamp Wallaby-grass and associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.

4.6.2 FFG Act listed flora

- Consider DEPI habitat models where they indicate the presence of an FFG listed flora species for potential impacts to associated habitat (see Table A5.3). The mapping shows modelled habitat for three additional species that were not revealed in the review of databases and other information; these are Grey Billy Buttons *Craspedia canens*, Purple Diuris *Diuris punctata* and Purple Blown-grass *Lachnagrostis punicea*. These species are FFG Act listed (subsp. *filifolia* for the latter). Within the survey envelope, Grey Billy Buttons and Purple Blown-grass are most likely associated with Plains Grassy Wetland although no individuals were recorded. Surface disturbance to this EVC should be avoided or otherwise salvage of reinstatement of the vegetation should be done consistent with methods described for areas that correspond to Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. Purple Diuris occurs in a range of vegetation types including Heathy Woodland and Grassy Woodland. It was not found during targeted surveys for other orchid species (EPBC Act)

despite searches during its flowering period. No specific mitigation advice is given for Purple Diuris.

4.6.3 EPBC Act listed ecological communities

Within areas identified as containing EPBC Act listed ecological communities, the following mitigation measures are recommended for understorey or treeless vegetation:

- Trenchless construction methods are the preferred mitigation option where these communities occur. Where trenching cannot be avoided, the preferred mitigation option is to remove surface soil and plant material (intact sections) to 0.5 m in depth and store for reinstatement following trenching. Section sized will depend on equipment and are generally 1–4 m². Salvage should be undertaken when the soil is moist but not saturated or inundated and should be done between Dec–August. Salvaged material should be stored as close as possible to the salvage site, in an area of non-native vegetation, free of CaLP Act listed weed species and maintained damp until re-instatement. Equipment used for salvage and re-instatement should be free of plant propagules and treated with PhytoClean or similar prior moving soil and plant material. A plan will be prepared by an experienced ecologist with detailed instructions for salvage and re-instatement of relevant sites.
- Monitoring of weed spread should follow construction and in accordance with an approved monitoring plan.
- Permanent loss of River Swamp Wallaby-grass and associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.

4.6.4 FFG Act listed communities

- Mitigation for the three FFG Act listed ecological communities (understorey components) identified within the survey envelope should follow the same trenchless construction methods as described above for EPBC Act listed communities.
- Areas of Plains Grassy Wetland that do not meet the EPBC Act associated wetland community are examples of Herb-rich Plains Grassy Wetland (West Gippsland) Community. Consideration should be given to salvage and re-instatement options for these areas.
- Central Gippsland Plains Grassland Community and Forest Red-gum Grassy Woodland Community mitigation is accounted for in options described for the EPBC Act listed community Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Native Grassland.

4.7 Significant fauna

4.7.1 EPBC Act listed fauna

New Holland Mouse

Within areas identified as potential habitat (i.e. Holey Plains and the BlueScope Steel property) for New Holland Mouse, the following mitigation measures are recommended:

- Works should be restricted to the existing pipeline easement to avoid clearing of additional areas of higher quality habitat.

- Hygiene protocols must be enforced to reduce the risk of spread or introduction of weeds and plant and animal pathogens. This is of particular concern for Cinnamon Fungus that is a significant threat to the floristic diversity and structure of New Holland Mouse habitat.
- Restrict the timing of works to avoid the breeding season, which usually occurs between August and January, but can extend into autumn.
- Restrict all construction activities to day-light hours to minimize disturbance (i.e. lighting, noise, vibration) to movement and foraging activities undertaken at night.
- Engage an ecologist to complete pre-clearance survey of the site immediately before clearing of vegetation to capture and release individuals or ensure they move freely from the construction area.
- Allow for habitat connectivity to be reinstated as soon as possible following construction.

Southern Brown Bandicoot

Within areas identified as potential habitat for Southern Brown Bandicoot, the following mitigation measures are recommended:

- Works should be restricted to the existing pipeline easement to avoid clearing of additional areas of higher quality habitat.
- Hygiene protocols must be enforced to reduce the risk of spread or introduction of weeds and plant and animal pathogens.
- Restrict the timing of works to avoid the core breeding season, which is usually the most consistent between July and November. However, it should be noted that breeding can extend beyond this period depending on environmental factors.
- Restrict all construction activities to day-light hours to minimise disturbance (i.e. lighting, noise, vibration) to movement and foraging activities undertaken at night.
- Engage an ecologist to complete pre-clearance survey of the site immediately before clearing of vegetation to capture and release individuals or ensure they move freely from the construction area.
- Allow for habitat connectivity to be reinstated as soon as possible following construction. Habitat that is suitable for Southern Brown Bandicoot consists of dense native understory vegetation (i.e. 0.2-1m high) that consists of a 50-80% average foliage density (DSEWPac 2011).
- Install construction fencing that allows movement of animals (particularly at night) but ensures works restricted from no-go zones.

Within areas identified as high sensitivity for Southern Brown Bandicoot, the additional mitigation measures are recommended:

- Avoid loss, modification or fragmentation of areas of core habitat by using trenchless construction. A buffer of 30 m from the edge of dense habitat (i.e. with a dense understory) should be allowed for in the construction area to minimize disturbance.

If trenchless construction is not possible, additional mitigation measures may include:

- Limit construction to the existing pipeline easement to avoid impacting on core habitat (e.g. dense (shrubby) vegetation that provides shelter), particularly along Railway Road and the Southern Gippsland Rail Reserve.
- Where works occur directly adjacent to core habitat, install exclusion fencing to prohibit the access of bandicoots into the construction site. Construction times within these areas must be reduced to a minimum time frame to limit the disturbance.
- Creation of compensatory habitat outside the survey envelope. This would involve supplementary plantings or revegetation of areas with plant species suitable for use by Southern Brown Bandicoot. Allowance must be made for sufficient time (potentially years) for the habitat to establish and support the species. Monitoring of the Southern Brown Bandicoot population and use of the habitat would be required.
- Using artificial shelters to supplement habitat and allow connectivity for smaller area of habitat removal or disturbance while habitat regenerates.
- Ensuring connectivity between habitat patches on one or the other side of the construction easement during and after construction, and minimizing the construction time through the site.

Growling Grass Frog

For areas of potential Growling Grass Frog habitat the following mitigation measures are recommended:

- Avoid construction works during the breeding season (October to March) or only undertake works when the sites are dry.
- Ensure appropriate hygiene protocols are enforced to avoid the introduction or spread of Chytrid fungus.
- Restrict all construction activities to day-light hours to minimise disturbance (i.e. lighting, noise, vibration) to movement and foraging activities undertaken at night.
- Allow a terrestrial buffer of 200 m around wetland habitat. Within this terrestrial buffer, engage an ecologist to complete pre-clearance survey of the site immediately before site clearing (e.g. stripping of vegetation and topsoil) to capture and release individuals.
- If any Growling Grass Frogs are found during construction activities, implement a contingency plan to capture and release individuals. The contingency plan should be developed and included in the CEMP prior to any works being undertaken.
- Protect water quality by installing sediment fences along the construction corridor and ensure they are monitored to remain effective throughout the construction period.

Australasian Bittern

For areas of potential Australasian Bittern habitat, impacts by the project are expected to be minimal and temporary. For wetlands with dense vegetation that provide potential habitat for this species, the following is recommended:

- Keep areas of impact within wetlands to a minimum.
- Reinstate habitat following construction through re-planting appropriate wetland vegetation that was removed and/or disturbed.

4.7.2 FFG Act listed fauna

For three FFG Act listed fauna species predicted to occur within the survey envelope, the following measures are recommended:

- White-footed Dunnart – Avoid impacts to treed area within Holey Plains State Park. The mitigation approach for New Holland Mouse will also be effective for White-footed Dunnart.
- Swamp Skink – Avoid impacts to larger patches (>0.1 ha) of swampy vegetation including Swamp Scrub and Swampy Woodland at Bluescope Tyabb.

5. Planning considerations

This section provides an assessment of the project in relation to key biodiversity legislation and government policy. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

5.1 Commonwealth

5.1.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act. Definitions and guidance with regards to what may constitute a significant impact are provided in published *Significant Impact Guidelines for the EPBC Act* (DoE 2013)

Matters of National Environmental Significance relevant to the project are summarised in Table 5.

The Australian Minister for the Environment is responsible for preparing, adopting and implementing recovery plans to provide research and management actions to stop the decline of and assist in the recovery of EPBC Act listed species or threatened ecological communities. A summary of the relevant matters of NES for the project with regards to recovery plans is provided in Table 16.

Table 5: Assessment of project in relation to the EPBC Act

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
Strzelecki Gum	Scattered mature trees may be removed to allow for the pipe installation. Some secondary impacts to adjacent trees or relevant communities may occur e.g. spread of weeds.	Depending on the number of trees or habitat proposed for removal, the project may constitute a significant impact for this species. Quantification of proposed losses should be documented in the referral documents.	Carter, O. 2006a. National Recovery Plan for Strzelecki Gum <i>Eucalyptus strzeleckii</i>. Department of Sustainability and Environment, Melbourne. Major threatened identified in the recovery plan are: Grazing – there are no proposed changes to existing land use. Weed Invasion – Weed monitoring and control mitigation within the vicinity of Strzelecki Gum will minimise associated threats. Lack of recruitment – Recruitment in pastures is very infrequent and the project is unlikely to change this where scattered trees are concerned. Recruitment is occurring at Shady Creek and to a lesser degree at the Tanjil River crossing. Construction that avoids understorey disturbance will retain

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
			<p>recruitment processes at these locations.</p> <p>Tree removal – the recover plan identifies tree removal as an ongoing threat and there are some circumstances where construction activities cannot avoid scattered trees.</p> <p>Fire – the proposed activities are not likely to result in long term changes to fire regime.</p> <p>Changes to hydrology – there are unlikely to be significant changes to hydrology concerning this species and in relation to the project.</p> <p>Increased nutrient levels - there are unlikely to be significant changes to nutrient levels concerning this species and in relation to the project.</p> <p>Loss of genetic diversity – seed may be sourced from any individuals proposed for removal to use in re-vegetation and maintenance of genetic diversity.</p> <p>Climate change – mitigation associated with this is not within the control of the project.</p> <p>All records of Strzelecki Gum from this assessment will be added to the Victorian Biodiversity Atlas for use in future conservation planning.</p>
<p>Wellington Mint Bush</p>	<p>Removal of habitat for Wellington Mint-bush</p>	<p>Impacts to treed areas within Holey Plains State Park may constitute a significant impact for this species.</p> <p>Quantification of proposed losses should be documented in the referral documents.</p>	<p>Carter, O. 2006b. National Recovery Plan for Wellington Mint Bush <i>Prostanthera galbraithiae</i>. Department of Sustainability and Environment, Melbourne.</p> <p>Major threatened identified in the recovery plan are:</p> <p>Inappropriate fire regime - - the proposed activities are not likely to result in long term changes to fire regime.</p>

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
			<p>Firebreak works – the project will not involve firebreak works.</p> <p>Herbicide use – context of herbicide use in the recovery plan is not relevant to the project.</p> <p>Browsing – context of browsing within the recover plan is not within the control of the project.</p> <p>Competition – disturbance to vegetation can cause changes to vegetation composition or introduction of weed species which may competitively exclude this species. Mitigation regarding weed control will likely provide an effective control for this threat. Its main habitat type, Heathy Woodland, is generally resilient to weed infestation provide soil disturbance is minimised and plants or soil are not introduced to the area.</p>
<p>River Swamp Wallaby-grass</p>	<p>A population was recorded within Swamp Scrub at Tyabb.</p>	<p>A brief desktop assessment for the current project revealed that there are approximately 4.5 ha of likely habitat within a 1 km radius of the site and that trenching would remove about 0.7 ha of habitat (15%). More detailed assessment is required to determine whether trenching would constitute a significant impact to this species.</p>	<p>No recovery plan has been prepared.</p>
<p>Green Striped Greenhood, Swamp Everlasting, Metallic Sun-orchid, Spiral Sun-orchid, Dwarf Kerrawang, Matted Flax-lily.</p>	<p>No plants were found during the current assessment.</p>	<p>The project is unlikely to constitute a significant impact to this species.</p>	<p>Duncan, M., Pritchard, A. and Coates, F. 2009. National Recovery Plan for Fifteen Threatened Orchids in South-eastern Australia. Department of Sustainability and Environment, Victoria.</p> <p>Carter, O. and Walsh, N. 2011. National Recovery Plan for the Swamp Everlasting <i>Xerochrysum</i></p>

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
			<p><i>palustre</i>. Department of Sustainability and Environment, Melbourne.</p> <p>Carter, O. 2010. National Recovery Plan for Matted Flax-lily <i>Dianella amoena</i>. Department of Sustainability and Environment, Melbourne.</p> <p>Coates, F., Jeanes, J. and Pritchard, A. (2002). Recovery Plan for Twenty-five Threatened Orchids of Victoria, South Australia and New South Wales 2003 - 2007. Department of Sustainability and Environment, Melbourne.</p> <p>Duncan, M. 2010. National Recovery Plan for the Spiral Sun Orchid <i>Thelymitra matthewsii</i>. Department of Sustainability and Environment, Melbourne.</p> <p>Carter, O. and Walsh, N. 2010. National Recovery Plan for the Dwarf Kerrawang <i>Rulingia prostrata</i>. Department of Sustainability and Environment, Melbourne.</p> <p>The recovery plan identified threats to this species; however the proposed mitigation to its habitat with the survey envelope is likely to avoid significant impacts to identified habitat.</p>
Swamp Fireweed	No plants were found during the current assessment.	The project is unlikely to constitute a significant impact to this species.	No recovery plan has been prepared.
Southern Brown Bandicoot	Habitat along Railway Road and the disused rail reserve considered to be core habitat for an important population within the Koo Wee Rup area.	The project may impact on the species in the short term through disturbance; however, provided core habitat is excluded from the construction footprint and appropriate measures are implemented to reduce risks	The recover plan for this species is in draft.

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
		to Southern Brown Bandicoot, a significant impact is unlikely.	
New Holland Mouse	Although not detected through targeted surveys, the species has some potential to occur within Holey Plains and the BlueScope Steel property. Impacts of the project are likely to affect a small proportion of these habitat areas in the short term.	With appropriate mitigation measures outlined in Appendix 5, the project is unlikely to constitute a significant impact.	No recovery plan has been prepared.
Australasian Bittern	The species has not been recorded on site. The habitat present may be used opportunistically by this mobile species, however, it is unlikely to constitute important breeding habitat. Any impacts on wetlands are expected to occupy a small area of overall habitat and be of a temporary nature.	The project is unlikely to constitute a significant impact for this species.	No recovery plan has been prepared.
Growling Grass Frog	No known occupied wetlands within the survey envelope. The project may impact on terrestrial habitat (within 200 m of an occupied wetland). Impact area on the terrestrial habitat is expected to be temporary and will affect a small proportion of a larger area of habitat for the important population of Officer/Pakenham/Koo Wee Rup.	The project is unlikely to constitute a significant impact for this species.	Clemann, N. and Gillespie, G.R. 2012. National Recovery Plan for the Southern Bell Frog <i>Litoria raniformis</i>. Department of Sustainability and Environment, Melbourne. The recovery plan identified threats to this species; however the proposed mitigation to its habitat with the survey envelope is likely to avoid significant impacts to identified habitat.
Dwarf Galaxias	Dwarf Galaxias are either recorded or predicted to	Impacts to Dwarf Galaxias relating to the project are not	Saddler, S., Jackson, J. and Hammer, M. 2010. National

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
	occur within 19 watercourses at 21 locations (Table 12)	considered to constitute a significant impact, provided mitigation measures outlined in this report are adhered to.	<p>Recovery Plan for the Dwarf Galaxias <i>Galaxiella pusilla</i>. Department of Sustainability and Environment, Melbourne.</p> <p>Impacts to Dwarf Galaxias relating to the project are not considered a threatening process as defined within the species recovery plan provided mitigation measures outlined in this report are adhered to.</p>
Australian Grayling	Australian Grayling are predicted to occur within five watercourses at four locations (Table 13)	Impacts to Australian Grayling relating to the project are not considered to constitute a significant impact , provided mitigation measures outlined in this report are adhered to.	<p>1. Backhouse, G., Jackson, J. and O'Connor, J. 2008a. National Recovery Plan for the Australian Grayling <i>Prototroctes maraena</i>. Department of Sustainability and Environment, Melbourne.</p> <p>2. Backhouse, G., Jackson, J. and O'Connor, J. 2008b. Background and Implementation Information for the Australian Grayling <i>Prototroctes maraena</i> National Recovery Plan. Department of Sustainability and Environment, Melbourne.</p> <p>Impacts to Australian Grayling relating to the project are not considered a threatening process as defined within the species recovery plan provided mitigation measures outlined in this report are adhered to.</p>
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Some areas of this community occur within the survey envelope (Figure 2).	With appropriate mitigation measures outlined in Appendix 5, the project is unlikely to constitute a significant impact.	No recovery plan has been prepared.
Gippsland Red Gum Grassy Woodland and Associated Grassland	Two roadside areas containing this community occur within the survey envelope (Figure 2).	With appropriate mitigation measures outlined in Appendix 5, the project is unlikely to constitute a significant impact.	No recovery plan has been prepared.

Matter of NES	Potential impacts	Implications for project	Recovery Plan notes
Migratory species	<p>Three migratory species previously recorded within 1 km of the survey envelope.</p> <ul style="list-style-type: none"> • Eastern Great Egret • Lewin's Rail • Latham's Snipe <p>The survey envelope not likely to provide important habitat for these species.</p>	The project is unlikely to constitute a significant impact for these species.	NA
Wetlands of international importance (Ramsar sites)	The survey envelope is identified as being within 10 km of two Ramsar sites: Gippsland Lakes and Western Port.	The survey envelope crosses over a number of watercourses that drain directly into the Western Port Ramsar site. With appropriate mitigation measures in place it is unlikely the project will have a significant impact on the Ramsar site.	NA

While no Matted Flax-lily plants were recorded during the current assessment, suitable habitat occurs in Plains Grassy Woodland on the Princes Highway. Targeted searches were limited in this area due to limitation with access to VicTrack land and roadwork areas of the Princes Hwy during the survey period. The habitat type is an EPBC Act listed ecological community and will therefore have appropriate planning consideration.

Habitat for Green-striped Greenhood, Metallic Sun-orchid and Spiral Sun-orchid is limited to Heathy Woodland and Damp Sands Herb-rich Woodland in Holey Plains and Tyabb. While no individuals were found despite searching extensive areas of likely habitat, consideration should be given to the occurrence of habitat.

Swamp Fireweed and Swamp Everlasting may occur in Plains Grassy Wetland within the Koo Wee Rup area. However, this species is very rarely recorded in the region and it was not recorded during surveys of these vegetation types. Due to the seasonal variation of grassy wetland communities, a precautionary approach has been taken to regard these areas as important habitat. Larger patches qualify as the associated EPBC Act listed community and will gain planning consideration as such.

5.2 State

5.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a

permit is required from DSE to 'take' protected flora species from public land. A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

For species that are listed as threatened under the FFG Act, not EBPC Act listed and given at least medium likelihood of occurrence in Table A3.2, additional consideration should be given to threats identified in the relevant FFG Act action statements. Few species fit these criteria including White-footed Dunnart, Little Egret, Chestnut-rumped Heathwren and Swamp Skink. An action statement exists only for Little Egret which is likely to only use relevant habitats within the survey envelope for occasional foraging. Species on the DEPI Threatened Species Advisory Lists will be considered during the preparation of the project's approved Native Vegetation Offset Strategy, as per the Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines (DEPI 2013c). This strategy will be developed prior to any disturbance of native vegetation and when all proposed losses of such vegetation have been quantified.

Some native vegetation on site is a listed community and contains protected flora species or habitat for them. Where this includes public land, a protected flora permit from DEPI would be required if any of these species will be affected by the proposal.

Central Gippsland Plains Grassland Community

This community is found on the poorly drained, heavy alluvial clays of the lowland plains of central Gippsland, Seaspray west to Westernport, and on parts of the Mornington Peninsula. Rainfall ranges from 570–650 mm, generally <600 mm. It is comprised of open tussock grassland, mostly dominated by Kangaroo Grass. Between grass tussocks there is a variety of perennial herbs, including rice-flowers, daisies, lilies, sedges and orchids.

The Willung Rd and Princes Hwy roadside remnants of Plains Grassy Woodland are an example of this FFG community. These areas are also part of an EPBC Act listed ecological community and, as such, already gain appropriate planning consideration. An action statement exists for this community.

Forest Red-gum Grassy Woodland

This community is found on the poorly drained, heavy alluvial clays of the lowland plains of central Gippsland, from Traralgon east to Lakes Entrance. Rainfall ranges from 570–650 mm, generally <600 mm. It is dominated by Gippsland Red Gum over a grassy understorey that is similar to that of Central Gippsland Plains Grassland, but without the dominance of Kangaroo Grass.

All areas of the associated EPBC Act community and the EVC Plains Grassy Woodland are also considered to be the FFG community (within its geographic limits) and, as such, already gain appropriate planning consideration. An action statement exists for this community.

Herb-rich Plains Grassy Wetland (West Gippsland) Community

This community has a swampy grassland/sedgeland ground layer and ranges in structure from naturally treeless to a woodland or open forest with a tree canopy of River Red-gum *Eucalyptus camaldulensis*.

Areas of Plains Grassy Wetland within the survey envelope are this community. The geographic limit of this community is unclear however all mapped areas of the envelope containing grassy wetland vegetation should also be regarded as this community. Good quality examples of this community

are also an EPBC Act listed ecological community and, as such, already gain appropriate planning consideration. There is currently no action statement for this community.

5.2.2 Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals, and provides a system of controls on noxious species.

The land owner must take all reasonable steps to eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds, and prevent the spread of and as far as possible eradicate established pest animals. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

5.2.3 Permitted clearing of native vegetation biodiversity assessment guidelines

The Guidelines provide State Government policy to determine how impacts on biodiversity should be considered when assessing an application for a permit to remove, lop or destroy native Vegetation (DEPI 2013c). The objective for permitted clearing under the guidelines is no net loss in the contribution made by native vegetation to Victoria's biodiversity. An assessment following one of three risk assessment pathways is required to be completed prior to application for a planning permit. The type of pathway is dependent on the quantity of native vegetation being removed and its location importance for biodiversity.

Assessment requirements for state advisory threatened species is provided within the Guidelines. Consideration of impacts to state threatened species is assisted by use of habitat models.

An assessment in relation to the guidelines is provided in a separate report.

5.2.4 Wildlife Act 1975 and associated Regulations

The *Wildlife Act 1975* (Wildlife Act) is the primary piece of legislation in Victoria providing for protection and management of wildlife. The Wildlife Act does not apply to fish, as defined under the *Fisheries Act 1995*.

The Wildlife Regulations 2002 prescribe penalties for persons who wilfully damage, disturb or destroy any wildlife habitat without appropriate authorisation. These penalties may apply unless authorisations given under the Pipelines Act are considered appropriate.

5.2.5 Environmental Effects Act

The *Environment Effects Act 1978* establishes a process to assess the environmental impacts of a project. If applicable, the Act requires that an Environment Effects Statement (EES) be prepared by the proponent. The EES is submitted to the Minister for Planning and enables them to assess the potential environmental effects of the proposed development.

The general objective of the assessment process is *to provide for the transparent, integrated and timely assessment of the environmental effects of projects capable of having a significant effect on the environment* (DSE 2006).

The 'Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978' (DSE 2006a) provide a range of criteria that can be used to determine whether an EES may be required for a project. These criteria relate to individual potential environmental effects and a combination of (two or more) potential environmental effects.

However, the guidelines are not binding, and the decision as to whether an EES is required is ultimately at the discretion of the Minister for Planning.

5.2.6 Fisheries Act 1995

The Fisheries Act 1995 provides a legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats.

A person must not take, injure, damage, destroy or release any protected aquatic biota on public land. Protected aquatic biota includes all species of the family Syngnathidae (seahorses, sea dragons and pipefish), and any fish or aquatic invertebrate or community that is listed under the FFG Act.

Protected aquatic biota that may be impacted upon by the Esso project include:

- Dwarf Galaxias
- Australian Grayling
- Pale Mangrove Goby
- Gippsland Burrowing Cray
- Warragul Burrowing Cray
- *Tanjistomella verna* caddis fly

The potential for protected aquatic biota as listed above to be injured, damaged or destroyed cannot be completely avoided. For the taking of any FFG listed fish or community, an FFG permit is required from DEPI. For FFG listed aquatic invertebrates that do not meet the definition of fish, a protected aquatic biota permit is required from DEPI.

5.2.7 Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems. Under By-Laws created by the relevant Authority under the Act, the authorities regulate the works within and in the vicinity of waterways. In Melbourne Water's management area this applies to all waterways with a catchment area of 60 ha or more. These waterways are deemed to be Melbourne Water assets, while assessments of smaller watercourses are deemed the responsibility of the local government under the *Planning and Environment Act 1987*.

The proposed project may involve construction or maintenance activities that affect beds and banks of waterways, riparian vegetation or quality or quantity of water in several waterways.

Development within the survey requirement will require a permit from both Melbourne Water and the West Gippsland Catchment Management Authority.

5.2.8 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003

The Environment Protection Act underpins the State Environmental Protection Policy (SEPP) - Waters of Victoria which provides a legal framework for the protection and rehabilitation of Victoria's surface water environments.

The project may directly and/or indirectly impact upon numerous watercourses and their aquatic ecosystems traversed by the Esso survey envelope. The SEPPs (Waters of Victoria and Schedule F8 Waters of Western Port and Catchment) require that aquatic ecosystem values be protected.

Environmental quality objectives and indicators are defined to protect beneficial uses (i.e. the uses and values of the water environment) and an attainment program provides guidance on protection of the beneficial uses.

Impacts to surface water quality must not result in changes that exceed background levels and/or the water quality objectives specified within these two SEPP documents to protect surface water uses and values. The proponent and contracted representatives need to ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the background levels and/or water quality objectives.

5.2.9 Pipelines Act 2005

The Pipelines Act has the objective to facilitate the development of pipelines for the benefit of Victoria, and—in general—to govern process for their construction including environmental considerations. If a licence has been issued under the Act for the construction and operation of a pipeline, nothing in a planning scheme under the *Planning and Environment Act 1987* can prevent or require a planning permit for the use or development of the land or the doing, carrying out of any matter or thing for the purpose of the pipeline.

6. References

- Backhouse, G., Jackson, J. and O'Connor, J. 2008a. National Recovery Plan for the Australian Grayling *Prototroctes maraena*. Department of Sustainability and Environment, Melbourne.
- Backhouse, G., Jackson, J. and O'Connor, J. 2008b. Background and Implementation Information for the Australian Grayling *Prototroctes maraena* National Recovery Plan. Department of Sustainability and Environment, Melbourne.
- Biosis Research 2005. Pakenham Bypass: Conservation Management Plan for the Growling Grass Frog, Pakenham, Victoria. Report for VicRoads. Author: Organ, A. Biosis Research, Port Melbourne.
- Biosis 2013. Esso Pipeline Replacement Project: Preliminary flora and fauna assessment. Report for Worley Parsons. Authors: Dell, M & Simkin, R. Biosis Pty Ltd, Melbourne. 16476.
- Brown, G.W. and Main, M.L. 2010. National Recovery Plan for the Southern Brown Bandicoot *Isoodon obesulus obesulus*. Draft for Comment. Department of Sustainability and Environment, Victoria.
- Carter O. 2006a. National Recovery Plan for the Wellington Mint-bush *Prostanthera galbraithiae*. Department of Sustainability and Environment, Melbourne.
- Carter O. 2006b. National recovery plan for the Strzelecki Gum *Eucalyptus Strzeleckii*. Victorian Government Department of Sustainability and Environment, Melbourne.
- Carter, O. 2010. National Recovery Plan for the Matted Flax-lily *Dianella amoena*. Department of Sustainability and Environment, Victoria.
- Carter, O. and Walsh, N. 2010. National Recovery Plan for the Dwarf Kerrawang *Rulingia prostrata*. Department of Sustainability and Environment, Melbourne.
- Carter, O. and Walsh, N. 2011. National Recovery Plan for the Swamp Everlasting *Xerochrysum palustre*. Department of Sustainability and Environment, Melbourne.
- Coates, F., Jeanes, J. and Pritchard, A. (2002). Recovery Plan for Twenty-five Threatened Orchids of Victoria, South Australia and New South Wales 2003 - 2007. Department of Sustainability and Environment, Melbourne.
- Cogger, H. 1996. Reptiles and Amphibians of Australia. Reed Books, Sydney.
- DEPI 2013a. Advisory List of Threatened Vertebrate Fauna in Victoria – 2013. Victorian Government Department of Environment & Primary Industries, Melbourne.
- DEPI 2013b. Sub-Regional Species Strategy for the Growling Grass Frog. The Victorian Government Department of Environment and Primary Industries, East Melbourne.
- DEPI 2013c. Permitted clearing of native vegetation – Biodiversity Assessment Guidelines. Victorian Government Department of Environment and Primary Industries Melbourne.
- DEWHA 2009a. Significant impact guidelines for the vulnerable Growling Grass Frog (*Litoria raniformis*). Nationally threatened species and ecological communities EPBC Act policy statement 3.14, Department of the Environment, Water, Heritage & the Arts, Australian Government, Canberra.

DEWHA 2009b. Significant impact guidelines for 36 migratory shorebird species: Migratory species. Draft EPBC Act policy statement 3.21. Australian Government Department of the Environment, Water, Heritage & the Arts, Canberra.

DSEWPaC (2012) Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, listing advice. Threatened Species Scientific Committee, Department of Sustainability, Environment, Water, Populations and Communities, Canberra.

DoE 2013. *Matters of National Environment Significance: Significant impact guidelines 1.1. Environment Protection Biodiversity Conservation Act 1999*. Australian Government Department of the Environment, Canberra.

DSE 2003. Flora and Fauna Guarantee Action Statement No. 74: New Holland Mouse *Pseudomys novaehollandiae*. The Victorian Department of Sustainability and Environment, East Melbourne.

DSE 2004. Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Victorian Department of Sustainability and Environment, Melbourne.

DSE 2005. *Advisory List of Rare or Threatened Plants in Victoria – 2005*. Victorian Government Department of Sustainability & Environment, East Melbourne.

DSE 2007. Native Vegetation – Guide for assessment of referred planning permit applications. Victorian Government Department of Sustainability & Environment, East Melbourne.

DSE 2010a. Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNARestricted, FLORA25, FLORA100 & FLORARestricted' August 2010. Victorian Government Department of Sustainability & Environment, Melbourne.

DSE 2010c. National recovery plan for the Dwarf Galaxias *Galaxiella pusilla*. Victorian Government Department of Sustainability and Environment, Melbourne.

DSE 2003. Flora and Fauna Guarantee Action Statement No. 182: Central Gippsland Plains Grassland, Forest Red-gum Grassy Woodland, Northern Plains Grassland, South Gippsland Plains Grassland, Western (Basalt) Plains Grassland. Department of Sustainability and Environment, Melbourne.

DSEWPaC 2011. Environment Protection and Biodiversity Conservation Act 1999 draft referral guidelines for the endangered southern brown bandicoot (eastern), *Isodon obesulus obesulus*. Australian Government Department of Sustainability, Environment, Water, Population & Communities, Canberra.

Duncan, M. 2010. National Recovery Plan for the Spiral Sun Orchid *Thelymitra matthewsii*. Department of Sustainability and Environment, Melbourne.

Duncan M, Pritchard A and Coates F. 2009. National Recover Plan for Fifteen Threatened Orchids in South-eastern Australia. Department of Sustainability and Environment, Victoria.

Ecology Australia 2013. Koo Wee Rup Bypass fauna management plan. Unpublished report by Ecology Australia Pty Ltd, Fairfield.

Ecology Partners 2006. Distribution, habitat use, movement patterns and conservation management of the Growling Grass Frog *Litoria raniformis* throughout the Pakenham area, Pakenham, Victoria. Unpublished report by Ecology Partners Pty Ltd for DSE.

Hero, J.M., Littlejohn, M. & Marantelli, G. 1990. *Frogwatch Field Guide to Victorian Frogs*. Department of Conservation and Environment, East Melbourne.

Invert-Eco 2014. Esso Pipeline Replacement Project – Giant Gippsland Earthworm Survey Report. Unpublished report by Invert-Eco, Melbourne.

Jeanes, J. & Backhouse, G. 2006. *Wild Orchids of Victoria Australia*. Aquatic Photographics, Australia.

Koehn, J. D. and O'Connor, W.G. 1990. *Biological information for management of native fish in Victoria*. Department of Conservation and Environment. Freshwater Fish Management Branch. Arthur Rylah Institute. Macleod.

Koster, W. M. Dawson, D.R. and Crook, D. A. 2013. Downstream spawning migration by the amphidromous Australian grayling (*Prototroctes maraena*) in a coastal river in south-eastern Australia. *Marine and Freshwater Research* 64: 31–41.

Robertson, P., Heard, G.W. & Scroggie, M. 2002. The ecology and conservation status of the Growling Grass Frog *Litoria raniformis* within the Merri Creek corridor. Interim Report: Distribution, Abundance and Habitat Requirements. Wildlife Profiles Pty Ltd Report for the Department of Natural Resources and Environment.

Saddler, S., Jackson, J. and Hammer, M. 2010. National Recovery Plan for the Dwarf Galaxias *Galaxiella pusilla*. Department of Sustainability and Environment, Melbourne.

Threatened Species Scientific Committee (TSSC) 2012. Commonwealth listing advice on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. Department of Sustainability, Environment, Water, Population and Communities, Canberra

Threatened Species Scientific Committee 2008. Commonwealth listing advice on Gippsland red-gum (*Eucalyptus tecticornis* subsp. *mediana*) grassy woodland and associated grassland. Department of Environment, Water, Population and Communities, Canberra

Van Dyck & Strahan. 2008. *The Mammals of Australia*. Reed New Holland, Sydney.

Walsh, N.G. & Stajsic, V. 2007. *A Census of the Vascular Plants of Victoria*. Eighth edition, Royal Botanic Gardens Melbourne.

Appendices

Appendix 1: Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by the Department of Environment and Primary Industries under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10006240, expiry date 9 May 2015).

Approvals 04.12 and 14.12 from the Wildlife and Small Institutions Animal Ethics Committee.

Permit RP1071 issued by the Department of Environment and Primary Industries (Fisheries Victoria) under the *Fisheries Act 1995*.

Appendix 2: Targeted fauna survey locations

The following tables list the locations and survey dates for the EPBC Act fauna species targeted during the detailed assessment. The coordinates for the sites are provided as Easting and Northing (MGA 55).

A2.1 Southern Brown Bandicoot

Table A2.1: Locations and survey dates for Southern Brown Bandicoot (remote cameras).

Camera No.	Fig.	Location	Easting, MG 55	Northing, MGA 55	Date deployed	Date collected	No. images
RC1	3.9	Holey Plains	499072	5770956	18/10/2013	14/11/2013	107
RC2	3.9	Holey Plains	498117	5771180	18/10/2013	14/11/2013	278
RC3	3.10	Holey Plains	496969	5771294	18/10/2013	14/11/2013	98
RC4	3.10	Holey Plains	496212	5771331	18/10/2013	14/11/2013	674
RC5	3.11	Holey Plains	495236	5771428	18/10/2013	14/11/2013	485
RC6	3.11	Holey Plains	495236	5771428	18/10/2013	14/11/2013	524
RC7	3.11	Holey Plains	494144	5771560	18/10/2013	14/11/2013	257
RC8	3.12	Holey Plains	493361	5771622	18/10/2013	14/11/2013	422
RC9	3.12	Holey Plains	492312	5771806	18/10/2013	14/11/2013	434
RC10	3.13	Holey Plains	491235	5771852	18/10/2013	14/11/2013	125
RC11	3.13	Holey Plains	490297	5771891	18/10/2013	14/11/2013	161
RC12	3.14	Holey Plains	489153	5771962	18/10/2013	14/11/2013	165
RC13	3.14	Holey Plains	488262	5772009	18/10/2013	14/11/2013	117
RC14	3.15	Holey Plains	487189	5772071	18/10/2013	14/11/2013	335
RC15	3.15	Holey Plains	486201	5772221	18/10/2013	14/11/2013	245
RC16	3.16	Holey Plains	485134	5772357	18/10/2013	14/11/2013	206
RC17	3.16	Holey Plains	484636	5772462	18/10/2013	14/11/2013	675
RC18	3.16	Holey Plains	484058	5772552	18/10/2013	14/11/2013	248
RC19	3.50	Saxton Swamp	416534	5776125	14/11/2013	10/12/2013	1479
RC20	3.50	Saxton Swamp	416387	5776020	14/11/2013	10/12/2013	1034
RC21	3.74	VicTrack disused railway	368657	5770229	3/12/2013	20/12/2013	976
RC22	3.85	Callanans Lane	346870	5768785	13/11/2013	10/12/2013	1001

Camera No.	Fig.	Location	Easting, MG 55	Northing, MGA 55	Date deployed	Date collected	No. images
RC23	3.88	BlueScope Steel	344670	5763969	31/10/2013	28/11/2013	2414
RC24	3.89	BlueScope Steel	344680	5763825	31/10/2013	28/11/2013	1382
RC25	3.89	BlueScope Steel	344689	5763725	31/10/2013	28/11/2013	1753
RC26	3.89	BlueScope Steel	344608	5763686	31/10/2013	28/11/2013	1718
RC27	3.89	BlueScope Steel	344488	5763653	31/10/2013	28/11/2013	1925
RC28	3.89	BlueScope Steel	344368	5763654	31/10/2013	28/11/2013	1200
RC29	3.89	BlueScope Steel	343902	5763666	31/10/2013	28/11/2013	1424

A2.2 New Holland Mouse

Table A2.2: Locations and dates for New Holland Mouse trapping surveys.

(Note: the Easting and Northing are provided for the start of each trapping transect. Some transects were split across the current easement (north and south) and are shown as two datasets).

Trap transect	Fig.	Location	Easting, MGA 55	Northing, MGA 55	Start date	End date
NHM1	3.9	Holey Plains	498352	5771086	28/10/2013	1/11/2013
NHM2	3.10	Holey Plains	495984	5771347	28/10/2013	1/11/2013
NHM2	3.10	Holey Plains	496004	5771318	28/10/2013	1/11/2013
NHM3	3.11	Holey Plains	494705	5771447	28/10/2013	1/11/2013
NHM3	3.11	Holey Plains	494729	5771423	28/10/2013	1/11/2013
NHM4	3.11	Holey Plains	493722	5771600	28/10/2013	1/11/2013
NHM4	3.11	Holey Plains	493694	5771590	28/10/2013	1/11/2013
NHM5	3.12	Holey Plains	492556	5771780	28/10/2013	1/11/2013
NHM5	3.12	Holey Plains	492527	5771761	28/10/2013	1/11/2013
NHM6	3.13	Holey Plains	491607	5771820	28/10/2013	1/11/2013
NHM7	3.13	Holey Plains	490573	5771833	28/10/2013	1/11/2013
NHM7	3.13	Holey Plains	490573	5771833	28/10/2013	1/11/2013
NHM8	3.14	Holey Plains	489584	5771895	28/10/2013	1/11/2013
NHM9	3.14	Holey Plains	488643	5771952	28/10/2013	1/11/2013
NHM9	3.14	Holey Plains	488621	5771981	28/10/2013	1/11/2013
NHM10	3.15	Holey Plains	487489	5772009	28/10/2013	1/11/2013

Trap transect	Fig.	Location	Easting, MGA 55	Northing, MGA 55	Start date	End date
NHM11	3.15	Holey Plains	486103	5772203	28/10/2013	1/11/2013
NHM12	3.16	Holey Plains	484779	5772395	28/10/2013	1/11/2013
NHM12	3.16	Holey Plains	484759	5772415	28/10/2013	1/11/2013
NHM13	3.88	BlueScope Steel	344671	5764015	11/11/2013	15/11/2013
NHM14	3.89	BlueScope Steel	344674	5763851	11/11/2013	15/11/2013
NHM15	3.89	BlueScope Steel	344675	5763743	11/11/2013	15/11/2013
NHM16	3.89	BlueScope Steel	344516	5763650	11/11/2013	15/11/2013
NHM17	3.89	BlueScope Steel	344492	5763649	11/11/2013	15/11/2013
NHM18	3.89	BlueScope Steel	344396	5763645	11/11/2013	15/11/2013

A2.3 Growling Grass Frog

Table A2.3: Locations and dates for Growling Grass Frog surveys.

Site	Fig.	Location	Easting, MGA 55	Northing, MGA 55	Date 1 st survey	Date 2 nd survey
1	3.5	East of Sth Gippsland Highway	505746	5769771	9/12/2013	10/12/2013
2	3.44	Embletons Road	427821	5776335	3/12/2013	10/12/2013
3	3.48	Shady Creek	421125	5775644	16/12/2013	17/12/2013
4	3.5	Saxton Swamp	416447	5776034	3/12/2013	Not required, no suitable habitat
5	3.54	Armours Road	407826	5773626	3/12/2013	10/12/2013
6	3.56	Hazel Creek	404606	5773288	3/12/2013	10/12/2013
7	3.57	Lardners Track	402495	5773292	2/12/2013	3/12/2013
8	3.62	Westernport Road	392387	5772772	2/12/2013	3/12/2013
9	3.66	Caldermeade Road	384583	5772312	28/11/2013	2/12/2013
10	3.71	No. 5 Drain Road	374549	5771367	2/12/2013	Not required, no suitable habitat
11	3.71	South of No. 5 Drain Road	374306	5771352	28/11/2013	2/12/2013
12	3.71	South of No. 5 Drain Road	374063	5771339	28/11/2013	Not required, no suitable habitat
13	3.74	VicTrack rail reserve	368661	5770236	16/12/2013	17/12/2013

Site	Fig.	Location	Easting, MGA 55	Northing, MGA 55	Date 1 st survey	Date 2 nd survey
14	3.77	Cardinia Ck drain complex	363450	5771636	16/12/2013	GGF recorded, not required
15	3.78	Dalmore Road	361496	5771920	16/12/2013	17/12/2013
16	3.78	Peers Road	360531	5771952	28/11/2013	2/12/2013
17	3.80	Western Contour Drain	355771	5771697	27/11/2013	28/11/2013
18	3.82	North of Baxter-Tooradin Road	352798	5771145	18/11/2013	27/11/2013
19	3.82	East of Fisheries Road	352463	5771050	27/11/2013	28/11/2013
20	3.82	West of Fisheries Road	351866	5770862	18/11/2013	27/11/2013
21	3.84	Vowell Drive	348851	5769758	18/11/2013	27/11/2013
22	3.86	Watsons Creek	345974	5767070	16/12/2013	17/12/2013
23	3.87	Bungower Road	345944	5765964	16/12/2013	Not required, no suitable habitat
24	3.91	BlueScope Steel	341786	5761601	18/11/2013	27/11/2013
25	3.91	South of Bayview Road	342834	5760437	18/11/2013	27/11/2013

A2.4 Dwarf Galaxias

Table A2.4. Locations and dates for Dwarf Galaxias surveys.

Site	Location	Easting, MGA 55	Northing, MGA 55	Survey Date	Assessment Type
1	East of Sth Gippsland Highway	505695	5769746	28/10/2013	Survey
2	East of Sth Gippsland Highway	505695	5769746	28/10/2013	Habitat
3	Holey Plains	498338	5771066	29/10/2013	Habitat
4	Holey Plains	494062	5771566	29/10/2013	Survey
5	Holey Plains	494132	5771845	29/10/2013	Habitat
6	Holey Plains	498094	5771151	29/10/2013	Habitat
7	Holey Plains	497180	5771233	29/10/2013	Habitat
8	Holey Plains	496946	5771253	29/10/2013	Habitat

Site	Location	Easting, MGA 55	Northing, MGA 55	Survey Date	Assessment Type
9	Holey Plains	496752	5771269	29/10/2013	Habitat
10	Holey Plains	496495	5771289	29/10/2013	Habitat
11	Holey Plains	494930	5771394	29/10/2013	Habitat
12	Holey Plains Crooke Creek and tributaries	492948	5771735	29/10/2013	Habitat
13	Flynns Creek	472944	5772957	28/10/2013	Habitat
14	Rintoul Creek	456952	5776018	29/10/2013	Habitat
15	Sheepwash Creek	466760	5771222	29/10/2013	Survey
16	Unnamed tributary of Loy Yang Creek	463314	5774412	29/10/2013	Survey
17	Unnamed tributary of Loy Yang Creek	461418	5775869	29/10/2013	Habitat
18	Unnamed tributary of Loy Yang Creek	461410	5775874	29/10/2013	Survey
19	Unnamed tributary of Tyers River	449796	5778155	29/10/2013	Habitat
20	Unnamed tributary of Tyers River	451344	5778299	29/10/2013	Habitat
21	Unnamed tributary of Tyers River	448792	5778497	29/10/2013	Habitat
22	Unnamed tributary of Tyers River	448899	5778378	29/10/2013	Habitat
23	Anderson Creek	442920	5778897	29/10/2013	Habitat
24	Unnamed tributary of Latrobe River	438129	5777924	30/10/2013	Habitat
25	Unnamed tributary of Latrobe River	434792	5777839	30/10/2013	Survey
26	Saxton Swamp	416245	5775888	30/10/2013	Habitat
27	Saxton Swamp	416433	5776024	30/10/2013	Survey
28	Shady Creek	421099	5775608	31/10/2013	Habitat
29	Shady Creek	421114	5775686	31/10/2013	Survey
30	Unnamed tributary of Loy Yang Creek	463140	5774286	10/11/2013	Survey

Site	Location	Easting, MGA 55	Northing, MGA 55	Survey Date	Assessment Type
31	Unnamed tributary of Tyers River	451357	5778298	10/11/2013	Survey
32	Unnamed tributary of Moe Drain	427768	5776340	11/11/2013	Survey
33	Hazel Creek	404618	5773346	11/11/2013	Survey
34	Bunyip-Modella Road Drain	386243	5772416	11/11/2013	Habitat
35	Carses Drain	384338	5772264	11/11/2013	Habitat
36	Hornbuckles Road Ext Drain	382977	5772361	11/11/2013	Habitat
37	Malcolms Road Ext Drain	382215	5772069	11/11/2013	Habitat
38	Catani Drain	381075	5772025	11/11/2013	Survey
39	Walshs Drain	379524	5771867	11/11/2013	Habitat
40	Fincks Road Drain	374553	5771339	11/11/2013	Survey
41	Yallock Creek	371189	5771583	12/12/2013	Survey
42	West Dalmore Road Drain	361622	5771882	12/12/2013	Survey
43	Tooradin Road Drain	358956	5771944	12/12/2013	Habitat
44	Unnamed tributary of Tooradin Road Drain	358536	5772000	12/12/2013	Habitat
45	Unnamed tributary of Tooradin Road Drain	358117	5772066	12/12/2013	Habitat
46	Rutherford Creek	354473	5771191	12/12/2013	Habitat
47	Adeneys Road Drain	353892	5771487	12/12/2013	Habitat
48	Fisheries Road Drain	352074	5770894	12/11/2013	Survey
49	Baxter-Tooradin Road Drain	350016	5770248	12/11/2013	Habitat
50	Tooradin Inlet Drain	360599	5771975	13/12/2013	Habitat
51	Blue Scope	344662	5763908	13/11/2013	Habitat
52	Blue Scope	344321	5763669	13/11/2013	Survey
53	Blue Scope	344032	5763664	13/11/2013	Survey

Site	Location	Easting, MGA 55	Northing, MGA 55	Survey Date	Assessment Type
54	Olivers Creek	341693	5762006	13/11/2013	Habitat
55	Unnamed tributary of Watson Creek	344691	5764665	13/11/2013	Habitat
56	Watson Creek	345558	5767217	13/11/2013	Habitat
57	Langwarrin Creek	346902	5768760	13/11/2013	Habitat
58	Vowell Drive	348576	5769648	13/11/2013	Habitat
59	Langwarrin Creek	346857	5768815	9/12/2013	Survey
60	Unnamed tributary of Yallock Creek in Vic Track rail reserve	368681	5770233	9/12/2013	Survey
61	Shady Creek	420953	5775787	9/12/2013	Survey
62	Sheepwash Creek	466292	5773476	9/12/2013	Survey
63	Sandy Creek	468439	5773271	10/12/2013	Survey
64	Blind Joe Creek	477201	5772714	10/12/2013	Habitat

Appendix 3: Flora

Notes to tables:

<p>EPBC Act: CR - Critically Endangered EN - Endangered VU - Vulnerable</p>	<p>DSE 2005: e - endangered v - vulnerable r - rare</p>
<p>PMST – Protected Matters Search Tool</p>	<p>FFG Act: L - listed as threatened under FFG Act P - protected under the FFG Act (public land only)</p>
<p># - Native species outside natural range</p>	<p>Noxious weed status: SP - State prohibited species RP - Regionally prohibited species RC - Regionally controlled species RR - Regionally restricted species</p>

Introduced species recorded are generally limited to those that are determined as high threat for mapped habitat zones within the survey envelope.

A3.1 Flora species recorded from the survey envelope

Table A3.1. Flora species recorded from the survey envelope.

Status	Scientific Name	Common Name
	Indigenous Species	
	<i>Acacia dealbata</i>	Silver Wattle
	<i>Acacia implexa</i>	Lightwood
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle
	<i>Acacia mearnsii</i>	Black Wattle
	<i>Acacia melanoxylon</i>	Blackwood
	<i>Acacia oxycedrus</i>	Spike Wattle
	<i>Acacia paradoxa</i>	Hedge Wattle
	<i>Acacia pycnantha</i>	Golden Wattle
	<i>Acacia</i> spp.	Wattle
	<i>Acacia stricta</i>	Hop Wattle
	<i>Acacia suaveolens</i>	Sweet Wattle
	<i>Acacia verticillata</i>	Prickly Moses
	<i>Acaena novae-zelandiae</i>	Bidgee-widgee
	<i>Acianthus</i> spp.	Mosquito Orchid
	<i>Acrotriche prostrata</i>	Trailing Ground-berry
	<i>Acrotriche serrulata</i>	Honey-pots
	<i>Adiantum aethiopicum</i>	Common Maidenhair
	<i>Alisma plantago-aquatica</i>	Water Plantain
	<i>Allocasuarina littoralis</i>	Black Sheoak
	<i>Allocasuarina paludosa</i>	Scrub Sheoak
	<i>Allocasuarina</i> spp.	Sheoak
	<i>Allocasuarina verticillata</i>	Drooping Sheoak
	<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge
VU	<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass
	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
	<i>Amyema pendula</i>	Drooping Mistletoe
	<i>Amyema</i> spp.	Mistletoe
	<i>Arthropodium milleflorum</i> s.s.	Pale Vanilla-lily
	<i>Arthropodium minus</i>	Small Vanilla-lily
	<i>Arthropodium strictum</i> s.s.	Chocolate Lily
	<i>Astroloma conostephioides</i>	Flame Heath
	<i>Astroloma humifusum</i>	Cranberry Heath
r	<i>Atriplex paludosa</i> subsp. <i>paludosa</i>	Marsh Saltbush
	<i>Austrostipa mollis</i>	Supple Spear-grass
	<i>Austrostipa pubinodis</i>	Tall Spear-grass
	<i>Austrostipa rudis</i>	Veined Spear-grass
	<i>Austrostipa</i> spp.	Spear Grass
r	<i>Avicennia marina</i> subsp. <i>australasica</i>	Grey Mangrove
	<i>Azolla filiculoides</i>	Pacific Azolla

Status	Scientific Name	Common Name
	<i>Banksia marginata</i>	Silver Banksia
	<i>Banksia serrata</i>	Saw Banksia
	<i>Baumea arthropphylla</i>	Fine Twig-sedge
	<i>Baumea juncea</i>	Bare Twig-sedge
	<i>Baumea</i> spp.	Twig Sedge
	<i>Billardiera mutabilis</i>	Common Apple-berry
	<i>Blechnum cartilagineum</i>	Gristle Fern
	<i>Blechnum minus</i>	Soft Water-fern
	<i>Boronia anemonifolia</i>	Sticky Boronia
	<i>Bossiaea cinerea</i>	Showy Bossiaea
r	<i>Bossiaea heterophylla</i>	Variable Bossiaea
	<i>Bossiaea prostrata</i>	Creeping Bossiaea
	<i>Brachyloma daphnoides</i>	Daphne Heath
	<i>Brachyscome</i> spp.	Daisy
	<i>Brunonia australis</i>	Blue Pincushion
	<i>Burchardia umbellata</i>	Milkmaids
	<i>Caesia calliantha</i>	Blue Grass-lily
	<i>Caesia parviflora</i>	Pale Grass-lily
	<i>Caladenia carnea</i> s.s.	Pink Fingers
	<i>Caladenia pusilla</i>	Tiny Pink-fingers
	<i>Callistemon sieberi</i>	River Bottlebrush
	<i>Calochlaena dubia</i>	Common Ground-fern
	<i>Carex appressa</i>	Tall Sedge
	<i>Carex breviculmis</i>	Common Grass-sedge
	<i>Carex gaudichaudiana</i>	Fen Sedge
	<i>Carex tereticaulis</i>	Poong'ort
	<i>Cassinia aculeata</i>	Common Cassinia
	<i>Cassinia arcuata</i>	Drooping Cassinia
	<i>Cassinia longifolia</i>	Shiny Cassinia
	<i>Cassytha glabella</i>	Slender Dodder-laurel
	<i>Cassytha pubescens</i> s.s.	Downy Dodder-laurel
	<i>Caustis flexuosa</i>	Curly Wig
	<i>Caustis pentandra</i>	Thick Twist-rush
	<i>Centella cordifolia</i>	Centella
	<i>Centrolepis aristata</i>	Pointed Centrolepis
	<i>Centrolepis strigosa</i> subsp. <i>strigosa</i>	Hairy Centrolepis
	<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	Blue Stars
	<i>Chiloglottis cornuta</i>	Green Bird-orchid
	<i>Chiloglottis</i> spp.	Bird Orchid
	<i>Clematis aristata</i>	Mountain Clematis
	<i>Clematis microphylla</i> s.s.	Small-leaved Clematis
	<i>Comesperma</i> spp.	Milkwort
	<i>Comesperma volubile</i>	Love Creeper
	<i>Coprosma quadrifida</i>	Prickly Currant-bush

Status	Scientific Name	Common Name
	<i>Coronidium scorpioides</i> s.s.	Button Everlasting
	<i>Correa reflexa</i>	Common Correa
	<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula
	<i>Crassula helmsii</i>	Swamp Crassula
	<i>Crassula sieberiana</i> s.s.	Sieber Crassula
	<i>Cyathea australis</i>	Rough Tree-fern
	<i>Cyperus</i> spp.	Flat Sedge
	<i>Cyperus</i> spp.	Flat Sedge
	<i>Daviesia latifolia</i>	Hop Bitter-pea
	<i>Daviesia leptophylla</i>	Narrow-leaf Bitter-pea
	<i>Dianella admixta</i>	Black-anther Flax-lily
	<i>Dichondra repens</i>	Kidney-weed
	<i>Dianella laevis</i>	Smooth Flax-lily
	<i>Dillwynia cinerascens</i> s.s.	Grey Parrot-pea
	<i>Dillwynia glaberrima</i>	Smooth Parrot-pea
	<i>Dillwynia sericea</i>	Showy Parrot-pea
	<i>Dipodium</i> spp.	Hyacinth Orchid
	<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>	Rounded Noon-flower
	<i>Distichlis distichophylla</i>	Australian Salt-grass
	<i>Drosera aberrans</i>	Scented Sundew
	<i>Drosera glanduligera</i>	Scarlet Sundew
	<i>Drosera peltata</i> s.l.	Pale Sundew
	<i>Eleocharis acuta</i>	Common Spike-sedge
	<i>Eleocharis sphacelata</i>	Tall Spike-sedge
	<i>Entolasia marginata</i>	Bordered Panic
	<i>Epacris impressa</i>	Common Heath
	<i>Epilobium billardierianum</i>	Variable Willow-herb
	<i>Epilobium hirtigerum</i>	Hairy Willow-herb
	<i>Eragrostis brownii</i>	Common Love-grass
	<i>Eucalyptus angophoroides</i>	Apple Box
r	<i>Eucalyptus arenicola</i>	Gippsland Lakes Peppermint
	<i>Eucalyptus bridgesiana</i> s.s.	But But
	<i>Eucalyptus cephalocarpa</i> s.s.	Mealy Stringybark
	<i>Eucalyptus consideniana</i>	Yertchuk
	<i>Eucalyptus cypellocarpa</i>	Mountain Grey-gum
	<i>Eucalyptus conspicua</i>	Silver Swamp Stringybark
	<i>Eucalyptus dives</i>	Broad-leaf Peppermint
	<i>Eucalyptus melliodora</i>	Yellow Box
	<i>Eucalyptus obliqua</i>	Messmate Stringybark
	<i>Eucalyptus ovata</i>	Swamp Gum
	<i>Eucalyptus radiata</i> subsp. <i>radiata</i>	Narrow-leaf Peppermint
VU, L, v	<i>Eucalyptus strzeleckii</i>	Strzelecki Gum
	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	Coast Manna-gum
	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum

Status	Scientific Name	Common Name
	<i>Euchiton japonicus</i> s.s.	Creeping Cudweed
	<i>Exocarpos cupressiformis</i>	Cherry Ballart
	<i>Ficinia nodosa</i>	Knobby Club-sedge
	<i>Gahnia radula</i>	Thatch Saw-sedge
	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge
	<i>Gahnia</i> spp.	Saw Sedge
	<i>Geranium</i> spp.	Crane's Bill
	<i>Gleichenia microphylla</i>	Scrambling Coral-fern
	<i>Glossodia major</i>	Wax-lip Orchid
	<i>Glyceria australis</i>	Australian Sweet-grass
	<i>Gompholobium huegelii</i>	Common Wedge-pea
	<i>Gonocarpus humilis</i>	Shade Raspwort
	<i>Gonocarpus montanus</i>	Mat Raspwort
	<i>Gonocarpus tetragynus</i>	Common Raspwort
	<i>Gonocarpus teucrioides</i> s.s.	Germander Raspwort
	<i>Goodenia geniculata</i>	Bent Goodenia
	<i>Goodenia humilis</i>	Swamp Goodenia
	<i>Goodenia lanata</i>	Trailing Goodenia
	<i>Goodenia ovata</i>	Hop Goodenia
r	<i>Grevillea chrysophaea</i>	Golden Grevillea
	<i>Gynatrix pulchella</i> s.s.	Hemp Bush
	<i>Hakea nodosa</i>	Yellow Hakea
	<i>Hakea</i> spp.	Hakea
	<i>Hakea teretifolia</i> subsp. <i>hirsute</i>	Dagger Hakea
	<i>Hakea ulicina</i>	Furze Hakea
	<i>Hardenbergia violacea</i>	Purple Coral-pea
	<i>Helichrysum luteoalbum</i>	Jersey Cudweed
	<i>Hibbertia acicularis</i>	Prickly Guinea-flower
	<i>Hibbertia fasciculata</i> var. <i>prostrata</i>	Bundled Guinea-flower
	<i>Hibbertia riparia</i>	Erect Guinea-flower
	<i>Hibbertia sericea</i>	Silky Guinea-flower
	<i>Hibbertia</i> spp.	Guinea Flower
	<i>Hibbertia virgata</i>	Twiggy Guinea-flower
	<i>Hydrocotyle foveolata</i>	Yellow Pennywort
	<i>Hydrocotyle hirta</i>	Hairy Pennywort
	<i>Hydrocotyle sibthorpioides</i>	Shining Pennywort
	<i>Hypericum gramineum</i> spp. agg.	Small St John's Wort
	<i>Hypolaena fastigiata</i>	Tassel Rope-rush
	<i>Hypoxis vaginata</i>	Yellow Star
	<i>Isolepis cernua</i>	Nodding Club-sedge
	<i>Isolepis</i> spp.	Club Sedge
	<i>Juncus amabilis</i>	Hollow Rush
	<i>Juncus bufonius</i>	Toad Rush
	<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush

Status	Scientific Name	Common Name
	<i>Juncus pallidus</i>	Pale Rush
	<i>Juncus planifolius</i>	Broad-leaf Rush
	<i>Juncus procerus</i>	Tall Rush
	<i>Juncus sarophorus</i>	Broom Rush
	<i>Juncus</i> spp.	Rush
	<i>Juncus subsecundus</i>	Finger Rush
	<i>Kennedia prostrata</i>	Running Postman
	<i>Kunzea ericoides</i> spp. agg.	Burgan
	<i>Lachnagrostis filiformis</i> s.s.	Common Blown-grass
	<i>Lagenophora gracilis</i>	Slender Bottle-daisy
	<i>Lagenophora stipitata</i>	Common Bottle-daisy
	<i>Lepidosperma concavum</i>	Sandhill Sword-sedge
	<i>Lepidosperma gunnii</i>	Slender Sword-sedge
	<i>Lepidosperma laterale</i> var. <i>laterale</i>	Variable Sword-sedge
	<i>Lepidosperma laterale</i> var. <i>majus</i>	Variable Sword-sedge
	<i>Lepidosperma longitudinale</i>	Pithy Sword-sedge
	<i>Lepidosperma</i> spp.	Sword Sedge
	<i>Leptospermum continentale</i>	Prickly Tea-tree
	<i>Leptospermum lanigerum</i>	Woolly Tea-tree
	<i>Leptospermum myrsinoides</i>	Heath Tea-tree
	<i>Leptospermum scoparium</i>	Manuka
	<i>Lepyrodia muelleri</i>	Common Scale-rush
	<i>Leucopogon</i> spp.	Beard Heath
	<i>Leucopogon virgatus</i>	Common Beard-heath
	<i>Lindsaea linearis</i>	Screw Fern
	<i>Lobelia anceps</i>	Angled Lobelia
	<i>Lobelia</i> spp.	Lobelia
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	Wattle Mat-rush
k	<i>Lomandra glauca</i> s.s.	Blue Mat-rush
	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
	<i>Lomandra nana</i>	Dwarf Mat-rush
	<i>Lotus</i> spp.	Trefoil
	<i>Luzula meridionalis</i>	Common Woodrush
	<i>Lythrum hyssopifolia</i>	Small Loosestrife
	<i>Marsilea drummondii</i>	Common Nardoo
	<i>Melaleuca</i> spp.	Honey-myrtle
	<i>Melaleuca squarrosa</i>	Scented Paperbark
	<i>Melicytus dentatus</i> s.s.	Tree Violet
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
	<i>Microtis</i> spp.	Onion Orchid
	<i>Monotoca scoparia</i>	Prickly Broom-heath
	<i>Montia australasica</i>	White Purslane
	<i>Myriophyllum simulums</i>	Amphibious Water-milfoil
	<i>Myriophyllum</i> spp.	Water Milfoil

Status	Scientific Name	Common Name
	<i>Olearia lirata</i>	Snowy Daisy-bush
	<i>Olearia phlogopappa</i>	Dusty Daisy-bush
	<i>Opercularia varia</i>	Variable Stinkweed
	<i>Oxalis perennans</i>	Grassland Wood-sorrel
	<i>Ozothamnus ferrugineus</i>	Tree Everlasting
	<i>Patersonia fragilis</i>	Short Purple-flag
	<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	Long Purple-flag
	<i>Pelargonium rodneyanum</i>	Magenta Stork's-bill
	<i>Persicaria decipiens</i>	Slender Knotweed
	<i>Persicaria praetermissa</i>	Spotted Knotweed
	<i>Phragmites australis</i>	Common Reed
	<i>Pimelea humilis</i>	Common Rice-flower
	<i>Pimelea linifolia</i>	Slender Rice-flower
	<i>Platylobium formosum</i>	Handsome Flat-pea
	<i>Platylobium obtusangulum</i>	Common Flat-pea
	<i>Poa clelandii</i>	Noah's Ark
	<i>Poa ensiformis</i>	Sword Tussock-grass
	<i>Poa labillardierei</i>	Common Tussock-grass
	<i>Poa poiformis</i>	Coast Tussock-grass
	<i>Poa rodwayi</i>	Velvet Tussock-grass
	<i>Poa sieberiana</i>	Grey Tussock-grass
	<i>Poa</i> spp.	Tussock Grass
	<i>Polyscias sambucifolia</i>	Elderberry Panax
	<i>Polystichum proliferum</i>	Mother Shield-fern
	<i>Pomaderris aspera</i>	Hazel Pomaderris
	<i>Poranthera microphylla</i> s.s.	Small Poranthera
	<i>Pteridium esculentum</i>	Austral Bracken
	<i>Pterostylis melagramma</i>	Tall Greenhood
	<i>Pterostylis nutans</i>	Nodding Greenhood
	<i>Ranunculus inundatus</i>	River Buttercup
	<i>Ranunculus</i> spp.	Buttercup
	<i>Rhodanthe</i> spp.	Sunray
	<i>Rhytidosporum procumbens</i>	White Marianth
	<i>Rubus parvifolius</i>	Small-leaf Bramble
	<i>Rumex</i> spp.	Dock
	<i>Rytidosperma laeve</i>	Smooth Wallaby-grass
	<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass
	<i>Rytidosperma penicillatum</i>	Weeping Wallaby-grass
	<i>Rytidosperma pilosum</i>	Velvet Wallaby-grass
	<i>Rytidosperma racemosum</i>	Slender Wallaby-grass
	<i>Rytidosperma semiannulare</i>	Wetland Wallaby-grass
	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass
	<i>Rytidosperma</i> spp.	Wallaby Grass
	<i>Sarcocornia quinqueflora</i>	Beaded Glasswort

Status	Scientific Name	Common Name
	<i>Schoenus apogon</i>	Common Bog-sedge
	<i>Schoenus brevifolius</i>	Zig-zag Bog-sedge
	<i>Schoenus nitens</i>	Shiny Bog-sedge
	<i>Schoenus</i> spp.	Bog Sedge
	<i>Senecio glomeratus</i>	Annual Fireweed
	<i>Senecio hispidulus</i> s.s.	Rough Fireweed
	<i>Senecio minimus</i>	Shrubby Fireweed
	<i>Senecio quadridentatus</i>	Cotton Fireweed
	<i>Senecio tenuiflorus</i> spp. agg.	Slender Fireweed
	<i>Solanum laciniatum</i>	Large Kangaroo Apple
	<i>Sporobolus</i> spp.	Rat-tail Grass
	<i>Stackhousia monogyna</i> s.s.	Creamy Candles
	<i>Stackhousia viminea</i>	Slender Stackhousia
	<i>Stylidium armeria</i>	Common Triggerplant
	<i>Suaeda australis</i>	Austral Seablite
	<i>Tecticornia arbuscula</i>	Shrubby Glasswort
	<i>Tetrarrhena juncea</i>	Forest Wire-grass
	<i>Tetraloche ciliata</i>	Pink-bells
	<i>Tetraloche pilosa</i>	Hairy Pink-bells
	<i>Thelymitra antennifera</i>	Rabbits Ears
	<i>Thelymitra carnea</i>	Pink Sun-orchid
	<i>Thelymitra media</i>	Tall sun-orchid
	<i>Thelymitra ixiooides</i>	Spotted Sun-orchid
	<i>Thelymitra</i> sp.	Sun Orchid
	<i>Themeda triandra</i>	Kangaroo Grass
	<i>Thysanotus patersonii</i>	Twining Fringe-lily
	<i>Todea barbara</i>	Austral King-fern
	<i>Tricoryne elatior</i>	Yellow Rush-lily
	<i>Triglochin procera</i> s.s.	Common Water-ribbons
	<i>Triglochin striata</i>	Streaked Arrowgrass
	<i>Typha domingensis</i>	Narrow-leaf Cumbungi
	<i>Urtica incisa</i>	Scrub Nettle
	<i>Veronica plebeia</i>	Trailing Speedwell
	<i>Viola hederacea</i> sensu Entwisle (1996)	Ivy-leaf Violet
	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell
	<i>Wahlenbergia</i> spp.	Bluebell
	<i>Wahlenbergia stricta</i> subsp. <i>stricta</i>	Tall Bluebell
	<i>Wurmbea dioica</i>	Common Early Nancy
	<i>Xanthorrhoea minor</i> subsp. <i>lutea</i>	Small Grass-tree
	<i>Xanthosia dissecta</i> s.s.	Native Parsley
	<i>Zoysia macrantha</i>	Prickly Couch
#	<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coast Wattle
	<i>Imperata cylindrica</i>	Blady Grass
#	<i>Leptospermum laevigatum</i>	Coast Tea-tree

Status	Scientific Name	Common Name
r, #	<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle
#	<i>Melaleuca ericifolia</i>	Swamp Paperbark
#	<i>Melaleuca parvistaminea</i>	Rough-barked Honey-myrtle
#	<i>Pittosporum undulatum</i>	Sweet Pittosporum
Introduced Species		
	<i>Agrostis capillaris</i>	Brown-top Bent
	<i>Aira cupaniana</i>	Quicksilver Grass
	<i>Alopecurus pratensis</i>	Meadow Fox-tail
	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
	<i>Arctotheca calendula</i>	Cape Weed
RR	<i>Asparagus asparagoides</i>	Bridal Creeper
	<i>Billardiera heterophylla</i>	Bluebell Creeper
	<i>Brassica</i> spp.	Turnip
	<i>Briza maxima</i>	Large Quaking-grass
	<i>Briza minor</i>	Lesser Quaking-grass
	<i>Bromus catharticus</i>	Prairie Grass
	<i>Bromus diandrus</i>	Great Brome
	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>	Soft Brome
	<i>Callitriche stagnalis</i>	Common Water-starwort
	<i>Cenchrus clandestinus</i>	Kikuyu
	<i>Centaureum erythraea</i>	Common Centaury
	<i>Centaureum tenuiflorum</i>	Slender Centaury
	<i>Cerastium glomeratum</i> s.s.	Sticky Mouse-ear Chickweed
RC	<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	African Boneseed
RC	<i>Cirsium vulgare</i>	Spear Thistle
RC	<i>Conium maculatum</i>	Hemlock
	<i>Cotula coronopifolia</i>	Water Buttons
	<i>Cynodon dactylon</i>	Couch
	<i>Cynosurus echinatus</i>	Rough Dog's-tail
	<i>Cyperus eragrostis</i>	Drain Flat-sedge
	<i>Dactylis glomerata</i>	Cocksfoot
	<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass
	<i>Festuca arundinacea</i>	Tall Fescue
	<i>Galium aparine</i>	Cleavers
	<i>Gamochaeta purpurea</i> s.s.	Spiked Cudweed
RC	<i>Genista monspessulana</i>	Montpellier Broom
	<i>Hedera helix</i>	English Ivy
	<i>Holcus lanatus</i>	Yorkshire Fog
	<i>Hypochaeris glabra</i>	Smooth Cat's-ear
	<i>Hypochaeris radicata</i>	Flatweed
RC	<i>Jacobaea vulgaris</i>	Ragwort
	<i>Juncus articulatus</i> subsp. <i>articulatus</i>	Jointed Rush
	<i>Juncus capitatus</i>	Capitate Rush

Status	Scientific Name	Common Name
	<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit
	<i>Lolium perenne</i>	Perennial Rye-grass
	<i>Lysimachia arvensis</i>	Pimpernel
	<i>Malus</i> spp.	Apple
	<i>Melilotus indicus</i>	Sweet Melilot
	<i>Paspalum dilatatum</i>	Paspalum
	<i>Paspalum distichum</i>	Water Couch
	<i>Phalaris aquatica</i>	Toowoomba Canary-grass
	<i>Pinus pinaster</i>	Cluster Pine
	<i>Pinus radiata</i>	Radiata Pine
	<i>Plantago coronopus</i>	Buck's-horn Plantain
	<i>Plantago lanceolata</i>	Ribwort
	<i>Polygonum aviculare</i> s.s.	Hogweed
	<i>Prunus cerasifera</i>	Cherry Plum
	<i>Ranunculus repens</i>	Creeping Buttercup
	<i>Romulea rosea</i>	Onion Grass
RC	<i>Rubus fruticosus</i> spp. agg.	Blackberry
	<i>Rumex crispus</i>	Curled Dock
RR	<i>Salix</i> spp.	Willow
	<i>Setaria</i> spp. (naturalised)	Pigeon Grass
	<i>Sherardia arvensis</i>	Field Madder
	<i>Solanum nigrum</i> s.s.	Black Nightshade
	<i>Trifolium repens</i> var. <i>repens</i>	White Clover
	<i>Trifolium</i> spp.	Clover
RC	<i>Ulex europaeus</i>	Gorse
	<i>Vulpia</i> spp.	Fescue
RC	<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia

A3.2 Significant flora species

The following table includes a list of the significant flora species that have potential to occur within the survey envelope. The list of species is sourced from the Victorian Flora Information System and the Protected Matters Search Tool (DSEWPaC; accessed on 30.05.13). Implications have been determined based on the expectation that state planning policy for advisory listed species will change after September, when further assessment is proposed to take place.

Table A3.2. Significant flora species recorded / predicted to occur within 1 km of the survey envelope.

Scientific name	Common name	Conservation Status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
National Significance									
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VU			-	PMST	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	Present	Recorded in Bluescope Steel land to the south of the Tyabb Waste Disposal Centre. This population occurs within Swamp Scrub and first recorded in spring 2013. It is one of two populations on the Mornington Peninsula.
<i>Caladenia orientalis</i>	Eastern Spider-orchid	EN	e	L	-	PMST	Heath and heathy woodlands in coastal areas between the Mornington Peninsula and Wilsons Promontory.	Low	Not found during targeted surveys.
<i>Dianella amoena</i>	Matted Flax-lily	EN	e	L	2002	PMST	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	Medium	While no plants were found in likely habitat during November, there is still a medium likelihood that this species may be found during different conditions. Plants have been recorded nearby on the Princes Hwy to the survey envelope crossing.

Scientific name	Common name	Conservation Status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Eucalyptus strzeleckii</i>	Strzelecki Gum	VU	v	L	1996	PMST	Ridges, slopes and along the banks of streams on deep, fertile loam soils that are seasonally waterlogged; less commonly found on undulating or flat terrain.	Present	Some waterways and floodplain areas contain Strzelecki Gum including a significant stand along Shady Creek east of Warragul.
<i>Prasophyllum correctum</i>	Gaping Leek-orchid	EN	e	L	-	PMST	Well-drained sandy soils in Central Gippsland Plains Grassland, Forest Red Gum Grassy Woodland, and She-oak Grassy Woodland communities.	Low	No additional survey recommended as the nearest database record is >5 km from the survey envelope. Also, some of the general vegetation types associated with the species are present although they are already degraded to a condition which is unlikely to provide habitat e.g. understorey vegetation highly modified.
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	EN	e	L	-	PMST	Grassland and grassy woodland environments on sandy or black clay loam soils that are generally damp but well drained.	Low	No additional survey recommended as the nearest database record is >5 km from the survey envelope. Also, some of the general vegetation types associated with the species are present although they are already degraded to a condition which is unlikely to provide habitat e.g. understorey vegetation highly modified.
<i>Prostanthera galbraithiae</i>	Wellington Mint-bush	VU	v	L	2006	PMST	Heathy open forest, heathland and heathy woodland, usually on gravelly sand (Carter 2006b).	Recorded	Two additional plants found within areas surveyed. All Heathy Woodland and Damp Sands Herb-rich Woodland is habitat for this species, particularly treed areas.

Scientific name	Common name	Conservation Status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Pterostylis chlorogramma</i>	Green-striped Greenhood	VU	v	L	-	PMST	Heathy woodland; although habitat requirements are poorly known.	Low	Not found during targeted surveys.
<i>Pomaderris vacciniifolia</i>	Round-leaf Pomaderris	CR	e	L	1924		Moist loamy soils in moist forest and scrubs	Medium	Not found during targeted surveys within the survey envelope. A review of additional desktop assessed areas indicates that there is sufficient quantity of habitat to expect recruitment under particular management e.g. following fire. The likelihood of presence has been determined as medium although records within the vicinity of the survey envelope are several decades old.
<i>Rulingia prostrata</i>	Dwarf Kerrawang	EN	e	L	2005	PMST	Swampy, sometimes ephemeral, wetlands and lake margins, that are often dominated by <i>Lepidosperma</i> spp.	Low	Not found during targeted surveys. There is very habitat for this species within the survey envelope.
<i>Senecio psilocarpus</i>	Swamp Fireweed	VU	v		-	PMST	Seasonally-inundated herb-rich swamps, growing on peaty soils or volcanic clays.	Low	Not found in survey envelope during targeted surveys.
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	EN	e	L	-	PMST	Moist or dry sandy loams or loamy sands, primarily in coastal heaths, grasslands and woodlands, but also in similar communities at drier inland sites.	Low	Not found in survey envelope during targeted surveys.

Scientific name	Common name	Conservation Status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Thelymitra matthewsii</i>	Spiral Sun-orchid	VU	v	L	-	PMST	Typically on well-drained soils on slightly elevated sites, but also on coastal sandy flats. Often in open situations following disturbance.	Low	Not found in survey envelope during targeted surveys.
<i>Xerochrysum palustre</i>	Swamp Everlasting	VU	v	L	-	PMST	Sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils.	Low	No additional survey recommended.
State Significant									
<i>Atriplex paludosa</i> subsp. <i>paludosa</i>	Marsh Saltbush		r		2008		Boggy, saline soils on coastal or near-coastal saltmarshes and tidal-flats.	Recorded. As per DEPI habitat model.	Present in Saltmarsh north of Westernport Bay. Apply DEPI assessment policy for state advisory listed threatened species.
<i>Avicennia marina</i> subsp. <i>australasica</i>	Grey Mangrove		r		2008		Low energy coastlines in the inter-tidal zone.	Recorded. As per DEPI habitat model.	Apply DEPI assessment policy for state advisory listed threatened species.
<i>Bossiaea heterophylla</i>	Variable Bossiaea		r		1953		Coastal areas on sandy soil.	Recorded. As per DEPI habitat model.	Found in scattered locations within Holey Plains. Apply DEPI assessment policy for state advisory listed threatened species.
<i>Dianella</i> sp. aff. <i>longifolia</i> (Benambra)	Arching Flax-lily		v		2008		The habitat requirements of this species are poorly known. Known to occur in Plains Grassland and some grassy woodlands.	As per DEPI habitat model.	-

Scientific name	Common name	Conservation Status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Eucalyptus arenicola</i>	Gippsland Lakes Peppermint		r		1978		Sandy soils in both coastal and near coastal environments.	Recorded. As per DEPI habitat model.	One of the most common tree species within Holey Plains survey envelope. Apply DEPI assessment policy for state advisory listed threatened species. Adhere to Australian Standard for tree protection for all indigenous canopy trees.
<i>Eucalyptus fulgens</i>	Green Scentbark		r		1997		Forests and woodlands of the Gippsland Plain and adjacent foothills.	As per DEPI habitat model.	-
<i>Euchiton umbricola</i>	Cliff Cudweed		r		1982		Uncommon in Victoria, confined almost exclusively to shaded cliff-faces (often near waterfalls) and boulders above c. 1000 m.	As per DEPI habitat model.	-
<i>Grevillea chrysophaea</i>	Golden Grevillea		r		2002		Eucalypt or Banksia woodland in silty sand or sand loam.	Recorded. As per DEPI habitat model.	Common and scattered throughout parts of the survey envelope within Holey Plains. Apply DEPI assessment policy for state advisory listed threatened species.
<i>Juncus revolutus</i>	Creeping Rush		r		2008		Saltmarshes and other similarly saline inland habitats.	As per DEPI habitat model.	-
<i>Lachnagrostis robusta</i>	Salt Blown-grass		r		2008		Saline swamps and lake edges	As per DEPI habitat model.	-
<i>Lawrenzia spicata</i>	Salt Lawrenzia		r		2006		Fringe habitats of coastal saltmarsh communities.	As per DEPI habitat model.	-

Scientific name	Common name	Conservation Status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Limonium australe</i>	Yellow Sea-lavender		r		2008		Margins of Saltmarshes and other similarly saline inland habitats.	As per DEPI habitat model.	-
<i>Pomaderris aurea</i>	Golden Pomaderris		r		1993		Dry foothill forests and heathy woodlands to wetter montane forests.	As per DEPI habitat model.	-
<i>Lomandra glauca</i>	Blue Mat-rush		k		-	Biosis	Heathy Woodland	As per DEPI habitat model	Found in several locations within Holey Plains. Apply DEPI assessment policy for state advisory listed threatened species.
<i>Thelymitra pallidiflora</i>	Pallid Sun-orchid		e		2008		Near the coast in heathy or grassy woodland. Within the survey envelope restricted to a few records near Crib Point.	As per DEPI habitat model.	-
<i>Triglochin minutissima</i>	Tiny Arrowgrass		r		2008		Scattered occurrences on damp saline soils near salt-lakes, and forming part of herbfields in coastal saltmarshes.	As per DEPI habitat model.	-
<i>Xanthosia leiophylla</i>	Parsley Xanthosia		r		1957		Sandy soils of heathlands or heathy woodlands	As per DEPI habitat model.	-

Appendix 4: Fauna

Notes to tables:

EPBC Act:

EX - Extinct

CR - Critically Endangered

EN - Endangered

VU - Vulnerable

CD - Conservation dependent

PMST – Protected Matters Search Tool

* - introduced species

** - pest species listed under the CaLP Act

DEPI 2013a:

ex - extinct

cr - critically endangered

en - endangered

vu - vulnerable

nt - near threatened

dd - data deficient

rx - regionally extinct

FFG Act:

L - listed as threatened under FFG Act

N - nominated for listing as threatened

I - determined ineligible for listing

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A4.1 Significant aquatic fauna species

The following table includes a list of the significant aquatic fauna species that have potential to occur within the survey envelope. The list of species is sourced from the Melbourne Water fish database.

Table A4.1. Significant aquatic fauna species recorded / predicted to occur within 1 km of the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
Fishes									
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	en	L	2008		Occurs in relatively shallow still or slow flowing water bodies including streams, wetlands, drains, that in many instances are ephemeral and partially dry up over summer. Typically requires abundant marginal and aquatic vegetation.	Recorded	Recorded at three sites. Where otherwise indicated (i.e. not recorded) suitable habitat exists for Dwarf Galaxias at sites in close proximity to existing records of significant populations of the species.
<i>Maccullochella peelii peelii</i>	Murray Cod	VU	vu	L	1988		Found within the Murray River catchment usually in sluggish turbid rivers, in deep holes or amongst fallen timber and other debris. Also occurs in upper reaches of rivers where water is clear and there is little fallen timber.	Negligible	Outside of natural range. No targeted searches recommended.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Macquaria australasica</i>	Macquarie Perch	EN			1970		A riverine fish preferring deep holes, its natural distribution extends north of the Great Dividing Range in tributaries of the Murray River. Early this century it was introduced to many waters south of the Great Dividing Range but has only been recorded in the Yarra with any regularity since.	Negligible	Outside of natural range. No targeted searches recommended.
<i>Prototroctes maraena</i>	Australian Grayling	VU	vu	L	1998		A diadromous species which spends most of its life in freshwater. Juveniles inhabit estuaries and coastal seas. Adults occur in freshwater habitats, typically rivers and streams with cool, clear waters and gravel substrates, but occasionally also in turbid waters.	High	This species is known from a few waterways crossing the survey envelope. It may be assumed present and appropriate mitigation strategy used to avoid impacts as outlined in Table A5.3.
<i>Mugilogobius platynotus</i>	Pale Mangrove Goby		vu	L	2000		In Victoria it is found almost exclusively in the tidal mangrove shrublands of estuaries.	High	Apply DEPI assessment policy for state advisory listed threatened species.
Invertebrates									

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood
		EPBC	DSE	FFG					
<i>Tanjistomella verna</i>	Caddisfly		cr		1987		Known to occur in the Tanjil River north of Moe.	As per DEPI habitat model.	-
Crustaceans									
<i>Engaeus sternalis</i>	Warragul Burrowing Crayfish		cr				This species typically occupies distinctive burrows somewhat removed from the defined adjacent watercourse but not isolated from the corresponding water table. This species is recorded from the vicinity of the survey envelope but not confirmed through survey. This species is the subject additional reporting developed by Invert-Eco.	As per DEPI habitat model.	-

A4.2 Significant terrestrial fauna species

The following tables include a list of the significant terrestrial fauna species that have potential to occur within the survey envelope. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DoE; accessed on 10.12.13). Additional species are included based on the results of the present assessment. Marine species, including Albatross and Petrels have not been included as they are not relevant to the land-based environment of the survey envelope.

Table A4.2. EPBC Act listed threatened and migratory fauna species recorded, or predicted to occur, within 1 km of the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
Mammals									
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	EN	en	L	1966	PMST	Spot-tailed Quolls formerly inhabited a wide variety of natural environments in Victoria from tall forests to dry, open habitats. The species is now extremely rare in Victoria outside of the eastern highlands. In early 2013, a road killed animal was collected between Stratford and Bairnsdale. While this is relatively close to the eastern end of the survey envelope, it is a very rare observation and it is considered low likelihood that this species would be found in Holey Plains or nearby.	Low	Low abundance throughout state.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	EN	nt	L	2008	PMST	This species typically occurs in heathland, shrubland, heathy forest and woodland habitat across southern Victoria. Previously recorded on the outskirts of Stawell and also known from within the Grampians National Park, and the Cranbourne and Koo Wee Rup areas.	Present	Recorded at Remote Camera location 21, in property parcel number E03610. An extant population known to occur in the Koo Wee Rup area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	VU	cr	L	-	PMST	Currently known only from the tributaries of the Snowy River in East Gippsland and the Grampians in the west. Found in a variety of habitat types, including rainforest gullies, wet and dry sclerophyll forest, and open woodlands, preferring rock faces with large tumbled boulders, ledges and caves and areas that are relatively open and receiving direct sunlight for much of the day.	Negligible	No suitable habitat and outside species range.
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo	VU	nt	L	-	PMST	Six populations of Long-nosed Potoroo occur in Victoria within a range of habitats from open forests to heathy woodlands. The majority of their habitat is dominated by Eucalypts.	Low	Survey envelope outside species' range.
<i>Pseudomys fumeus</i>	Smoky Mouse	EN	en	L	-	PMST	Disjunct Victorian distribution with populations in the Snowfields, Eastern Highlands, East Gippsland, Otway Range and the Grampians. Recorded from a variety of vegetation communities ranging from coastal heath and heathy woodland in East Gippsland to subalpine heath and dry forest. The understorey vegetation is typically dominated by heathy shrubs, with seeds and berries providing an important food resource.	Low	Survey envelope outside species' range.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	VU	vu	L	1972	PMST	Inhabits a variety of habitats along the coast of south-eastern Australia, including coastal heath, heathy woodland and coastal scrub habitats with a high density of leguminous ground plants.	Medium	Targeted survey did not detect the species, however, potential to occur within Holey Plains based on habitat and nearby records.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu	L	-	PMST	Utilises a wide range of habitats from lowland rainforest in East Gippsland and coastal Stringybark forests to agricultural land and suburban gardens, with permanently established colonies in Melbourne, Geelong and Mallacoota.	Low	Individuals may forage on scattered trees throughout broader foraging movements, however, the survey envelope does not provide important habitat for this species.
Birds									
<i>Anthochaera phrygia</i>	Regent Honeyeater	EN	cr	L	1970	PMST	Inhabits dry woodlands and forests dominated by Box Ironbark eucalypts. Distribution currently restricted to the Chiltern - Mt Pilot National Park in north-eastern Victoria following severe range contraction and population decline.	Negligible	Survey envelope is outside the species' range.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	en	L	1988	PMST	Occurs in wetlands with tall, dense vegetation where it forages in shallow water at the edges of pools or waterways. Prefers permanent freshwater habitats, particularly when dominated by sedges, rushes and reeds.	Medium	Potential wetland habitat throughout survey envelope.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	EN	en	L	-	PMST	Occupies various habitats, with low, dense vegetation used for cover. Vegetation types include forest, woodland, rainforest, heathland,	Low	Survey envelope outside species' range.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							sedgeland and shrubland.		
<i>Lathamus discolor</i>	Swift Parrot	EN	en	L	-	PMST	Migrates to south-east mainland Australia during the winter months where it prefers dry, open eucalypt forests and woodlands, especially Box Ironbark Forest in north-central Victoria. Has also been recorded in urban parks, gardens, street trees and golf courses with flowering ornamental trees and shrubs.	Low	May utilise woodland habitats within or near the survey envelope on occasions. Survey envelope does not provide core habitat requirements.
<i>Leipoa ocellata</i>	Malleefowl	VU	en	L	-	PMST	Malleefowl occur mainly in semi-arid mallee habitats; in Victoria this type of habitat is largely restricted to the north-west area of the State.	Negligible	No habitat present and outside species' range.
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CR	cr	L	-	PMST	Annual migrant to coastal Victoria from breeding grounds in south-west Tasmania, appearing from approximately March to October. Forages on coastal or near-coastal areas such as saltmarshes, coastal dunes, pastures, shrublands, estuaries, islands, beaches and moorlands.	Low	Extremely rare species. Survey envelope unlikely to provide core foraging habitat.
<i>Rostratula australis</i>	Australian Painted Snipe	EN	cr	L	-	PMST	Generally found in shallow, terrestrial freshwater wetlands with rank, emergent tussocks of grass, sedges and rushes. Australian Painted Snipe can occur in well vegetated lakes, swamps, inundated pasture, saltmarsh and dams.	Low	Limited suitable wetland habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Sternula nereis</i>	Fairy Tern	VU	en	L	-	PMST	Fairy Terns inhabit coastal environments including intertidal mudflats, sand flats and beaches. Nests above high-water mark on sandy shell-grit beaches.	Negligible	No suitable habitat within the survey envelope.
Frogs									
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	VU	cr	L	-	PMST	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Also known to occur within shale outcrops within sandstone formations.	Negligible	No suitable habitat within the survey envelope.
<i>Litoria raniformis</i>	Growling Grass Frog	VU	en	L	1999	-	Occupies a variety of permanent and semi-permanent water bodies generally containing abundant submerged and emergent vegetation, within lowland grasslands, woodlands and open forests.	Present	Recorded from Deep Creek/Cardinia Creek/Toomuc Creek drain complex. Known from Koo Wee Rup area.
Invertebrates									
<i>Megascolides australis</i>	Giant Gippsland Earthworm	VU	en	L	1980	PMST	Restricted to south and west Gippsland, roughly between Loch, Korumburra and Warragul. Occurs in blue-grey clay soils on flats near the banks of streams, in soaks and watercourses on southern or western slopes.	Present	Refer to Eco-Invert (2014) report.
<i>Synemon plana</i>	Golden Sun Moth	CR	cr	L	-	PMST	This medium-sized diurnal moth inhabits grassy woodlands and grasslands. Once thought to be a specialised species inhabiting grasslands dominated by Wallaby-grasses, it is now recognised that this	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							species can occur in exotic grasslands dominated by Chilean Needle Grass.		

Table A4.3. FFG Act & DEPI Advisory listed fauna species recorded, or predicted to occur, within 1 km of the survey envelope.

Species also listed under provisions of the EPBC Act are shown in Table A4.2 and are not repeated here.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
Mammals									
<i>Petauroides volans</i>	Greater Glider		vu		1899		This hollow-dependent, gliding possum feeds largely on eucalypt leaves. It occurs throughout eastern Australia, where it is most common in damp and wet forest with a high density of hollow-bearing trees, especially at higher altitudes.	As per DEPI habitat models	-
<i>Sminthopsis leucopus</i>	White-footed Dunnart		nt	L	-	-	Occurs in coastal areas and adjacent plains and foothills, also extending inland along some major river valleys. Preferred habitats include coastal tussock grassland and	Present	Recorded from Remote Camera locations 12 & 14 in Holey Plains.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							sedgeland, wet heath, and forest or woodland with a dense heathy understorey or mid-storey vegetation.		
Birds									
<i>Accipiter novaehollandiae</i>	Grey Goshawk		vu	L	2000		Favours tall, wet forests in gullies but can occur in woodlands, dry forests, wooded farmlands and suburban parks. Relies on mature forests for breeding.	Low	Limited suitable habitat within the survey envelope.
<i>Actitis hypoleucos</i>	Common Sandpiper		vu		-	PMST	Migrates to Australia from Eurasia in August where it inhabits a wide variety of coastal and inland wetlands with muddy margins. Departs for Eurasia in March.	Low	Limited suitable wetland habitat present.
<i>Anas rhynchos</i>	Australasian Shoveler		vu		2000		Prefers large, permanent lakes and swamps with deep water, stable conditions and abundant aquatic vegetation. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams.	As per DEPI habitat models	-

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							Forages in open water but nests in densely vegetated freshwater wetlands.		
<i>Anseranas semipalmata</i>	Magpie Goose		nt	L	1994		Uses aquatic and terrestrial habitat, although most activity occurs on wetlands such as those associated with flood plains. Historically occurring in south-eastern Australia, however, loss of wetland habitats meant the species became extinct in Victoria in the early 1900s. Re-introduction attempts have had mixed results.	Negligible	No suitable habitat within the survey envelope.
<i>Ardea modesta</i>	Eastern Great Egret		vu	L	2000	PMST	Usually found in terrestrial wetland, estuarine and wet grassland habitats, with particular preference for permanent well-vegetated water bodies. Will also use freshwater meadows, channels and larger dams. May use estuarine mudflats as summer-autumn or drought refuges.	Medium	Many wetlands, grassy wetlands and drainage lines provide suitable habitat for this species.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Arenaria interpres</i>	Ruddy Turnstone		vu		-	PMST	A coastal species that favours exposed rocks, beaches, mudflats and exposed reefs.	Negligible	No suitable habitat within the survey envelope.
<i>Aythya australis</i>	Hardhead		vu		2002		A mainly aquatic species preferring large, deep freshwater environments with abundant aquatic vegetation, including slow moving areas of rivers. Also occurs in brackish wetlands and can be found in deep dams and water storage ponds. Occasionally in estuarine and littoral habitats such as saltpans, coastal lagoons and sheltered inshore waters.	As per DEPI habitat models	-
<i>Biziura lobata</i>	Musk Duck		vu		2001		A largely aquatic species preferring deep water on large, permanent swamps, lakes and estuaries with abundant aquatic vegetation. Often occurs in areas of dense vegetated cover within a wetland. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and	As per DEPI habitat models	-

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							densely vegetated farm dams.		
<i>Calidris canutus</i>	Red Knot		en		-	PMST	This non-breeding migrant typically occurs on intertidal mudflats, sandflats and sandy beaches of sheltered coasts, and a range of other coastal and near-coastal environments such as lakes, lagoons, pools and pans.	Negligible	No suitable habitat within the survey envelope.
<i>Calidris ferruginea</i>	Curlew Sandpiper		en		1999	PMST	Curlew Sandpipers occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons. Also found on non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Calidris tenuirostris</i>	Great Knot		en	L	-	PMST	Mainly found on intertidal mudflats, sandflats and sandy beaches.	Negligible	No suitable habitat within the survey envelope.
<i>Ceyx azureus</i>	Azure Kingfisher		nt		1976		Azure Kingfishers are found in association with well vegetated freshwater wetlands and slow-flowing creeks and rivers, including artificial wetlands and drains of open riverine or swamp forest or woodland environments. Occasionally found among mangroves in sheltered coastal areas.	Low	Limited suitable habitat within survey envelope.
<i>Charadrius leschenaultii</i>	Greater Sand Plover		cr		-	PMST	A migratory species that forages on exposed sand and mudflats. High tide roost sites are often located on beaches. This species has been recorded at Mud Islands within Port Phillip Bay and Reef Island within Westernport Bay.	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Charadrius mongolus</i>	Lesser Sand Plover		cr		-	PMST	A migratory species that roosts on beaches during high tides and forages on exposed sand and mudflats. This species has been recorded at Mud Islands within Port Phillip Bay and Reef Island within Westernport Bay.	Negligible	No suitable habitat within the survey envelope.
<i>Chlidonias hybrida</i>	Whiskered Tern		nt		1999		A breeding migrant to Australia from September to March where it occurs in wetlands, lakes, swamps, rivers, and other water bodies with submerged and emergent vegetation such as grasses, sedges, reeds and rushes. Rarely recorded along rivers or creeks.	Low	Limited suitable wetland habitat within survey envelope.
<i>Cinlosoma punctatum</i>	Spotted Quail-thrush		nt		1998	-	Occurs in drier forests, woodlands and scrub of south eastern Australia. Prefers areas with leaf litter, branches, rocks and tussocks. Often found on the sunny side of dry ridges.	Present	Recorded from Remote Camera location 12 in Holey Plains.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Dromaius novaehollandiae</i>	Emu		nt		2000	-	A nomadic species that moves in response to seasonal conditions. Emus occur in most environments from semi-arid grasslands to dense forests and alpine areas.	Present	Recorded from Remote Camera locations 2, 9, 10, 11 & 12 in Holey Plains.
<i>Egretta garzetta</i>	Little Egret		en	L	1978		Occupies a wide range of wetlands and typically prefers the shallows of wetlands for foraging activities. Occasionally they will forage in small waterways or wet grassland areas.	Medium	Many wetlands, grassy wetlands and drainage lines provide suitable habitat for this species.
<i>Excalfactoria chinensis</i>	King Quail		en	L	1911		The species has a preference for wet heath environments where they feed and nest on the ground, but have also been recorded in coastal heath. The current range of this species in Victoria is not known but it is likely to be severely restricted.	Low	Rare species within unknown distribution.
<i>Falco subniger</i>	Black Falcon		vu		1999		Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria, though can be forced into more coastal areas by droughts and subsequent food shortages. Occurs in woodlands, open country	As per DEPI habitat models	-

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							and around terrestrial wetlands areas, including rivers and creeks. Hunts mostly over open plains and undulating land with large tracts of low vegetation.		
<i>Gallinago hardwickii</i>	Latham's Snipe		nt		2001	PMST	A migrant to Australia from July to April occurring in a wide variety of permanent and ephemeral wetlands. Prefers open freshwater wetlands with nearby cover, but also recorded on the edges of creeks and rivers, river-pools and floodplains.	Medium	Several wetlands provide potential habitat for this species.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		vu	L	2008	PMST	Occurs in marine habitats and terrestrial wetlands along or near coastal areas in eastern Victoria. Particularly observed around large open wetlands such as deep freshwater swamps, lakes, reservoirs and billabongs. Uses tall trees in or near	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							water for breeding.		
<i>Hirundapus caudacutus</i>	White-throated Needletail		vu		1976	PMST	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas. Less often seen over open farm paddocks but has been recorded in vineyards flying between the rows of trees.	Low	Species may fly over the survey envelope but unlikely to utilise specific habitat within it.
<i>Hydroprogne caspia</i>	Caspian Tern		nt	L	1979		Occurs on exposed ocean beaches or in sheltered coastal embayments including harbours, lagoons, inlets, estuaries and river deltas usually with sandy or muddy margins.	Negligible	No suitable habitat within the survey envelope.
<i>Hylacola pyrrhopygia</i>	Chestnut-rumped Heathwren		vu	L	1981		Occurs in shrubland and heathland areas, and in dense scrubby areas of forests and woodlands. This is a shy species that typically forages on or near the ground and therefore requires habitat with suitable structure.	Medium	Previously recorded from Holey Plains (VBA).

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Larus pacificus</i>	Pacific Gull		nt		2008		Occurs along sandy and rocky coasts in areas protected from ocean swells, such as bays estuaries and lagoons. Breeds in a variety of coastal habitats including rocky outcrops, small hillocks, ridges, sides of cliffs and sometimes low-lying beaches. Sometimes occur up to 10 kilometres inland, especially at rubbish tips and wetlands.	Low	Limited suitable habitat within the survey envelope.
<i>Lewinia pectoralis</i>	Lewin's Rail		vu	L	1999		Inhabits densely vegetated wetlands, including swamps, farm dams, saltmarshes, lakes and small pools that can range from fresh to saline water. May also use riverine forest.	Medium	Several wetlands provide potential habitat for this species.
<i>Melanodryas cucullata</i>	Hooded Robin		nt	L	1976		Occupies a range of open woodlands including those dominated by Eucalypts, Acacias and Callitris with an understorey of smaller trees, shrubs and grasses.	Low	Limited suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Neophema pulchella</i>	Turquoise Parrot		nt	L	1982		Occupies woodlands and open forests in the foothills of the Great Dividing Range, in areas supporting a ground-cover of grasses and an understorey of low shrubs. Individuals typically forage amongst grasses on or near the ground.	Low	Limited suitable habitat within the survey envelope.
<i>Ninox strenua</i>	Powerful Owl		vu	L	2007		Prefers tall open sclerophyll forest and woodlands and requires large, hollow-bearing eucalypts for breeding. While the species has been recorded from a wide range of woodland habitats, preferred habitat typically contains a dense understorey and suitable roost trees with a dense canopy cover.	Low	Limited suitable habitat within the survey envelope.
<i>Numenius madagascariensis</i>	Eastern Curlew		vu		2008	PMST	A migratory bird arriving in Australia from Russia and China from August and departing around February. Occurs in a variety of sheltered coastal habitats including harbours, inlets and coastal lagoons, usually	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							with large sand flats or intertidal mudflats with seagrass. Occasionally observed on coastal rock platforms.		
<i>Numenius phaeopus</i>	Whimbrel		vu		-	PMST	Whimbrels are summer migrants to Victoria where they are typically found in coastal environments foraging in mudflats, sandy shores and the crevices of rock platforms. The species is rarely recorded inland.	Negligible	No suitable habitat within the survey envelope.
<i>Nycticorax caledonicus hillii</i>	Nankeen Night Heron		nt		2000		Occurs in a variety of estuarine and terrestrial wetlands where it forages on the margins in shallow still or slow-moving water or exposed banks. Also uses wet meadows and pastures, urban wetlands and ponds in which it prefers wetland areas with swampy fringing vegetation and nearby trees for roosting.	Low	Limited suitable habitat within the survey envelope.
<i>Oxyura australis</i>	Blue-billed Duck		en	L	1999		A largely aquatic species preferring deep, large permanent wetlands with	Low	Limited suitable wetland habitat within survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							stable conditions and abundant aquatic vegetation, including Melaleuca swamps. Occurs less commonly on river frontages, billabongs and flooded depressions.		
<i>Phalacrocorax varius</i>	Pied Cormorant		nt		2008		Mainly inhabits marine environments and coastal waters including beaches, coastal lagoons, estuaries and rock platforms. Also found in terrestrial wetlands with open expanses of permanent water including rivers, inland lakes and billabongs. Breeds and roosts in trees or bushes along the edges of water body.	Low	Limited suitable wetland habitat within survey envelope.
<i>Platalea regia</i>	Royal Spoonbill		nt		2000		Often seen around permanent and ephemeral waters in the arid interior of east Australia foraging in shallow waters. Prefers terrestrial wetlands and wet grassland areas, particularly large expanses of water such as lakes, swamps or lagoons. Also utilises rivers for its feeding activities and has	Low	Limited suitable wetland habitat within survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							regularly been recorded in coastal habitats such as estuaries, inlets and intertidal mudflats.		
<i>Plegadis falcinellus</i>	Glossy Ibis		nt		1999		Glossy Ibis are usually found foraging in wet pasture environments and low lying wetland areas. This species is only rarely recorded in Victoria. Prefers freshwater wetlands especially permanent or ephemeral water bodies on floodplains but is also found in sheltered coastal environments.	Low	Rare species. Limited habitat within the survey envelope.
<i>Pluvialis fulva</i>	Pacific Golden Plover		vu		-	PMST	A migratory shorebird that usually occurs in small flocks and occupies a range of coastal habitats including mudflats, sandflats rocky shores and saltmarsh.	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Pluvialis squatarola</i>	Grey Plover		en		-	PMST	A summer migrant to Australia which inhabits mudflats, saltmarsh, tidal reefs and estuaries.	Negligible	No suitable habitat within the survey envelope.
<i>Porzana pusilla</i>	Baillon's Crake		vu	L	2008		Occurs in a variety of densely vegetated terrestrial and coastal wetlands including billabongs, swamps, creeks and rivers, including freshwater, brackish and saline environments.	Low	Limited suitable wetland habitat within survey envelope.
<i>Sternula albifrons</i>	Little Tern		vu	L	-	PMST	Little Terns are mostly recorded in sheltered coastal environments, including bays, lagoons and estuaries. Nests on sandy substrates containing much shell-grit, which provides camouflage for their eggs.	Negligible	No suitable habitat within the survey envelope.
<i>Thinornis rubricollis</i>	Hooded Plover		vu	L	-	PMST	In south-east Australia, Hooded Plover prefers sandy ocean beaches, especially those that are broad and flat, with a wide beach zone for feeding. Prefer beachcast	Negligible	No suitable habitat present within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							seaweed for feeding activities and sparsely vegetated back dunes for shelter and nesting.		
<i>Tringa glareola</i>	Wood Sandpiper		vu		-	PMST	Inhabits well vegetated shallow freshwater wetlands with emergent aquatic plants and dense fringing vegetation. This species is a migratory species from Eurasia with only a small number reaching Australia.	Low	Limited suitable wetland habitat within the survey envelope.
<i>Tringa stagnatilis</i>	Marsh Sandpiper		vu		1999	PMST	Marsh Sandpipers inhabit permanent or ephemeral wetlands, in coastal and inland environments. They forage in shallow waters and flats, and have been recorded roosting on mudflats, near saltmarshes and on the margins of swamps.	Low	Limited suitable wetland habitat within the survey envelope.
<i>Xenus cinereus</i>	Terek Sandpiper		en	L	-	PMST	This species is mainly found on saline intertidal mudflats in sheltered estuaries,	Negligible	No suitable habitat within the survey envelope.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
							embayments, harbours and lagoons.		
Reptiles									
<i>Chelodina longicollis</i>	Common Long-necked Turtle		dd		2009		Occurs in swamps, dams, billabongs and slow-moving rivers and creeks throughout coastal and inland waters of eastern Australia. Also known to travel long distances overland.	Present	Recorded adjacent to survey envelope at Holey Plains. Likely to occur in many of the wetland environments within the survey envelope.
<i>Lissolepis coventryi</i>	Swamp Skink		vu	L	2000		Occupies swamp scrub habitat in cool, temperate, low-lying wetlands and swamp margins with a dense shrub layer. Particularly found in near-coastal areas ranging from the Mt Gambier region in the west, across southern Victoria to just beyond the New South Wales border to the east.	High	Several areas of Swamp Scrub habitat identified as likely habitat for this species.
<i>Varanus varius</i>	Lace Goanna		en		-	-	Occurs in variety of wooded habitats, including cool temperate forests to dry woodlands. Shelters in hollow trunks, limbs and logs.	Present. As per DEPI habitat model.	Recorded from Remote Camera locations 2, 5, 6, 10, 12, 13, 14 & 16 in Holey Plains.
Frogs									

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likelihood of occurrence	Rationale for likelihood (refer to Figure 2)
		EPBC	DSE	FFG					
<i>Pseudophryne dendyi</i>	Dendy's Toadlet		dd		1973		Occurs in wet and dry forests and alpine areas in north-eastern Victoria. Individuals are often found beneath leaf litter and other debris in moist depressions.	Medium	Potential habitat at various sites at the eastern end of the survey envelope.
<i>Pseudophryne semimarmorata</i>	Southern Toadlet		vu		1994		Occupies a variety of habitats in south-eastern Australia, such as open forests, lowland woodlands and heathlands where adults shelter beneath leaf litter and other debris in moist soaks and depressions.	As per DEPI habitat models	-
<i>Uperoleia martini</i>	Martin's Toadlet		cr		1990		Found in dry grasslands, woodlands and heathlands at scattered locations on the coastal border of eastern Victoria and New South Wales.	As per DEPI habitat models	-
<i>Uperoleia tyleri</i>	Tyler's Toadlet		dd		1997		Prefers the borders of shallow temporary pools in woodlands and heathlands in coastal eastern Victoria.	Medium	Previously recorded from Holey Plains. Potential habitat at various sites at the eastern end of the survey envelope.

A4.3 Terrestrial migratory species (EPBC Act listed)

The following tables include a list of the EPBC Act listed terrestrial migratory species that have potential to occur within the survey envelope. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DoE; accessed on 10.12.13). Marine species, including Albatrosses and Petrels have not been included as they are not relevant to the land-based environment of the survey envelope.

Table A4.4. EPBC Act listed terrestrial migratory fauna species recorded, or predicted to occur, within 1 km of the survey envelope.

Scientific Name	Common Name	Most recent record
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	2008
<i>Actitis hypoleucos</i>	Common Sandpiper	-
<i>Anas clypeata</i>	Northern Shoveler	1999
<i>Anthochaera phrygia</i>	Regent Honeyeater	1970
<i>Apus pacificus</i>	Fork-tailed Swift	-
<i>Ardea modesta</i>	Eastern Great Egret	2000
<i>Ardenna carneipes</i>	Flesh-footed Shearwater	-
<i>Arenaria interpres</i>	Ruddy Turnstone	-
<i>Bubulcus ibis</i>	Cattle Egret	2001
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	1999
<i>Calidris canutus</i>	Red Knot	-
<i>Calidris ferruginea</i>	Curlew Sandpiper	1999
<i>Calidris ruficollis</i>	Red-necked Stint	2007
<i>Calidris tenuirostris</i>	Great Knot	-
<i>Charadrius bicinctus</i>	Double-banded Plover	2007
<i>Charadrius leschenaultii</i>	Greater Sand Plover	-
<i>Charadrius leschenaultii</i>	Greater Sand Plover	-
<i>Charadrius mongolus</i>	Lesser Sand Plover	-
<i>Gallinago hardwickii</i>	Latham's Snipe	2001
<i>Gallinago megala</i>	Swinhoe's Snipe	-
<i>Gallinago stenura</i>	Pin-tailed Snipe	-
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	2008
<i>Hirundapus caudacutus</i>	White-throated Needletail	1976

Scientific Name	Common Name	Most recent record
<i>Hydroprogne caspia</i>	Caspian Tern	1979
<i>Leipoa ocellata</i>	Malleefowl	-
<i>Lewinia pectoralis</i>	Lewin's Rail	1999
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	-
<i>Limosa lapponica</i>	Bar-tailed Godwit	-
<i>Merops ornatus</i>	Rainbow Bee-eater	-
<i>Monarcha melanopsis</i>	Black-faced Monarch	-
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	1999
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	-
<i>Numenius madagascariensis</i>	Eastern Curlew	2008
<i>Numenius minutus</i>	Little Curlew	-
<i>Numenius phaeopus</i>	Whimbrel	-
<i>Pandion cristatus</i>	Eastern Osprey	-
<i>Plegadis falcinellus</i>	Glossy Ibis	1999
<i>Pluvialis fulva</i>	Pacific Golden Plover	-
<i>Pluvialis squatarola</i>	Grey Plover	-
<i>Rhipidura rufifrons</i>	Rufous Fantail	1999
<i>Rostratula australis</i>	Australian Painted Snipe	-
<i>Sternula albifrons</i>	Little Tern	-
<i>Tringa brevipes</i>	Grey-tailed Tattler	-
<i>Tringa glareola</i>	Wood Sandpiper	-
<i>Tringa incana</i>	Wandering Tattler	-
<i>Tringa stagnatilis</i>	Marsh Sandpiper	1999
<i>Xenus cinereus</i>	Terek Sandpiper	-

Appendix 5: Summary of Mitigation Measures and Site Details

The following tables includes a list of the EPBC Act listed flora and fauna species and ecological communities that have potential to occur at specific locations within the survey envelope and relevant mitigation measures recommended to reduce impacts by the project. The tables also include EVC patches which have the majority of their area occupied by modelled high contribution to natural values (NaturePrint).

Notes to table:

Fauna Habitat Patch: **A** = Aquatic and **T** = Terrestrial

Locations are referenced by coordinates (MGA, Zone 55) with the Easting and Northing providing the centre point.

Table A5.1. Sites of importance for matters of national environmental significance - listed ecological communities and fauna species.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.2–3.3	Growling Grass Frog	T1	Mudlark Lane	511637	5769519	Seasonally inundated wetland. Not surveyed as the site was dry during the preliminary assessment. Potential to occur under suitable conditions.		Undertake works outside breeding season (October – March) and/or when the wetland is dry. Enforce hygiene protocols for Chytrid fungus. Undertake pre-construction habitat searches within a 200 m buffer of wetland habitat. Implement sediment and water quality controls. Re-instate vegetation and habitat connectivity across the construction alignment.
3.9–3.15	New Holland Mouse	T2	Holey Plains	493126	5771604	Although not detected by targeted survey, there is some potential for the species to occur. Lack of recent fire within the site may reduce suitability of habitat present.	High Sensitivity	Restrict works to the currently cleared and maintained pipeline easement. Enforce hygiene protocols for all work within Holey Plains to reduce the risk of spread of weeds and Cinnamon Fungus. Time works to avoid the breeding season (August to January). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Ensure connectivity between habitat patches on one or the other side of construction easement.
3.9–3.16	New Holland Mouse	T3	Holey Plains	491636	5772165	Although not detected by targeted survey, there is some potential for the species to occur. Lack of recent fire within the site may reduce suitability of habitat present.	High Sensitivity	Restrict works to the currently cleared and maintained pipeline easement. Enforce hygiene protocols for all work within Holey Plains to reduce the risk of spread of weeds and Cinnamon Fungus. Time works to avoid the breeding season (August to January). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Ensure connectivity between habitat patches on one or the other side of construction easement.
3.14–3.16	New Holland Mouse	T4	Holey Plains	485233	5772360	Although not detected by targeted survey, there is some potential for the species to occur. Lack of recent fire within the site may reduce suitability of habitat present.	High Sensitivity	Restrict works to the currently cleared and maintained pipeline easement. Enforce hygiene protocols for all work within Holey Plains to reduce the risk of spread of weeds and Cinnamon Fungus. Time works to avoid the breeding season (August to January). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Ensure connectivity between habitat patches on one or the other side of construction easement.
3.2	Dwarf Galaxias	A1	Blind Joe Creek	477193	5772741	Species predicted to occur. Marginal ephemeral spawning habitat present.		A) Trenching through the watercourse is to be conducted during dry periods with appropriate water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.22	Dwarf Galaxias	A2	Flynns Creek	472985	5772996	Species predicted to occur. Permanent spawning habitat present.		A) Trenching through the watercourse is to be conducted during dry periods with appropriate water quality control measures implemented. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.24	Dwarf Galaxias	A3	Sandy Creek	468442	5773282	Species predicted to occur. Marginal ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.25	Dwarf Galaxias	A4	Sheepwash Creek	466282	5773465	Species predicted to occur. Permanent spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.27	Dwarf Galaxias	A5	Unnamed tributary of Loy Yang Creek	463356	5774198	Species predicted to occur. Ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.27	Dwarf Galaxias	A6	Unnamed tributary of Loy Yang Creek	463192	5774309	Species predicted to occur. Ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.28	Dwarf Galaxias	A7	Unnamed tributary of Loy Yang Creek	461202	5774899	Species predicted to occur. Highly ephemeral and marginal spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.29	Australian Grayling	A8	Latrobe River	458678	5775400	Species predicted to occur. Permanent habitat present.		A) Trenchless construction is the proposed mitigation method for sites of environmental sensitivity. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species
3.3	Dwarf Galaxias	A9	Rintoul Creek	456937	5776087	Species predicted to occur. Marginal permanent dispersal habitat. Close proximity to Loy Yang Creek population.		A) Trenchless construction is the proposed mitigation method for this site. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species B) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. C) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.3	Australian Grayling	A9	Rintoul Creek	456937	5776087	Species predicted to occur. Marginal permanent habitat present. Close proximity to records at the Traralgon Creek and Latrobe River confluence.		A) Trenchless construction is the proposed mitigation method for this site. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species B) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. C) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.44	Dwarf Galaxias	A10	Unnamed tributary of Moe Drain	427772	5776337	Species predicted to occur. Ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.48	Australasian Bittern	T5	Shady Creek	421062	5775676	Densely vegetated and low-lying sedge-land provides potential habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.
3.48	Dwarf Galaxias	A11	Shady Creek	421059	5775658	Recorded during targeted surveys. High environmental sensitivity. Extensive ephemeral spawning habitat present.	High Sensitivity	A) Trenchless construction is the proposed mitigation method for sites of environmental sensitivity. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as sound and unlikely to result in impacts to water quality / availability and hence impacts upon the species.
3.48	Dwarf Galaxias	A12	Shady Creek	420996	5775642	Recorded during targeted surveys. High environmental sensitivity. Permanent and extensive ephemeral refuge and spawning habitat present.	High Sensitivity	A) Trenchless construction is the proposed mitigation method for sites of environmental sensitivity. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species. B) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction.
3.48	Dwarf Galaxias	A13	Unnamed tributary of Shady Creek	419771	5775737	Species predicted to occur. Ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.5	Southern Brown Bandicoot	T6	Saxton Swamp	416447	5776035	Targeted survey did not detect the species. Habitat suitable but no nearby records.	High Sensitivity	Restrict works to the currently cleared pipeline easement, where possible. Enforce hygiene protocols. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours.
3.5	Dwarf Galaxias	A14	Saxton Swamp	416435	5776023	Recorded during targeted surveys. High environmental sensitivity. Ephemeral spawning habitat present. Potential refuge habitat immediately upstream.	High Sensitivity	A) Trenchless construction is the proposed mitigation method for sites of environmental sensitivity. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species. The existing farm crossing may be used for the transit or 'walk over' of construction machinery provided soil disturbance is minimal and appropriate sediment controls are used to minimise possible impacts to the adjacent watercourse.
3.56	Australasian Bittern	T7	Hazel Creek	404565	5773300	Low-lying wetland provides potential habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.
3.57	Australasian Bittern	T8	Hazel Creek	402560	5773271	Low-lying wetland provides potential habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.62	Southern Brown Bandicoot	T9	Westernport Road	393069	5772854	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.62	Southern Brown Bandicoot	T10	Westernport Road	393034	5772848	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.65	Southern Brown Bandicoot	T11	Chambers Road	387186	5772476	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.65	Southern Brown Bandicoot	T12	Bridge Road	386927	5772380	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.65	Southern Brown Bandicoot	T13	Bridge Road	386905	5772376	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.66	Southern Brown Bandicoot	T14	Caldermeade Road	384336	5772283	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.66	Southern Brown Bandicoot	T15	Caldermeade Road	384318	5772279	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.66	Southern Brown Bandicoot	T16	McColls Road	383969	5772217	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.7	Southern Brown Bandicoot	T17	Hall Road	377346	5771651	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.7	Southern Brown Bandicoot	T18	Obriens Road	376569	5771503	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.7	Southern Brown Bandicoot	T19	Obriens Road	376550	5771505	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.71	Dwarf Galaxias	A15	Number Five Drain			Species predicted to occur. Ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.73	Dwarf Galaxias	A16	Yallock Creek	371289	5771543	Species known to occur within Yallock Creek. High environmental sensitivity. Permanent spawning and refuge habitat present.	High Sensitivity	A) Trenchless construction is the proposed mitigation method for sites of environmental sensitivity. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.74	Southern Brown Bandicoot	T20	Southern Gippsland Railway Reserve	368667	5770241	Species recorded during camera surveys. Good quality habitat present.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) A significant impact is considered possible if current survey envelope is impacted. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Supplement habitat with artificial shelters to allow connectivity while habitat regenerates. Ensure connectivity between habitat patches on one or the other side of construction easement both during and after construction. Minimise construction time through this site. Enforce hygiene protocols.
3.74	Dwarf Galaxias	A17	Unnamed tributary of Yallock Creek	368672	5770244	Species predicted to occur. Ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.75	Southern Brown Bandicoot	T21		367420	5770168	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.75	Southern Brown Bandicoot	T22	Mc Donalds Drain / Bunyip River complex	366401	5770949	Known extant population along this network of drains. Suitable and important habitat within the survey envelope.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) A significant impact is considered possible if current survey envelope is impacted. Would need to explore options to maintain connectivity of habitat across the construction easement.
3.75	Australasian Bittern	T23	Mc Donalds Drain / Bunyip River complex	366398	5770952	Suitable habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.
3.75	Australasian Bittern	T23	Mc Donalds Drain / Bunyip River complex	366398	5770952	Suitable habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.
3.75	Growling Grass Frog	T24	Mc Donalds Drain / Bunyip River complex	366397	5770953	Records of Growling Grass Frog from this network of drains upstream. Suitable habitat present within the survey envelope.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction. B) Undertake works outside breeding season (October – March). Enforce hygiene protocols for Chytrid fungus. Undertake pre-construction habitat searches within a 200 m buffer of wetland habitat and have an ecologist on site during works to capture and release animals outside of the construction area. Implement sediment and water quality controls. Re-instate vegetation and habitat connectivity across the construction alignment.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.75	Southern Brown Bandicoot	T25	Grassland habitat	366262	5771115	Provides foraging habitat for Southern Brown Bandicoots between patches of core habitat.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site.
3.75	Growling Grass Frog	T26	Railway Road	366037	5771233	Recorded by Ecology Australia (2013) and presumed present within this wetland adjacent to survey envelope. Species likely to use surrounding terrestrial environment.	High Sensitivity	Undertake works outside breeding season (October – March). Enforce hygiene protocols for Chytrid fungus. Undertake pre-construction habitat searches within a 200 m buffer of wetland habitat. Implement sediment and water quality controls. Re-instate vegetation and habitat connectivity across the construction alignment.
3.75–3.77	Southern Brown Bandicoot	T27	Railway Road	364753	5771437	Recorded within this corridor of habitat and presumed present throughout. This linear corridor is considered core habitat for the Koo Wee Rup population.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) Undertake works within the existing pipeline easement to avoid removal/impact to core habitat along the rail reserve to the north. Install exclusion fencing to ensure animals cannot enter the works area. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Enforce hygiene protocols. C) A significant impact is considered highly likely if the entire survey envelope is impacted, including the core dense habitat along the rail reserve.
3.75	Australian Grayling	A18	Bunyip River	366430	5770915	Species known to occur within Bunyip River. High environmental sensitivity. Permanent spawning habitat / breeding aggregation site for the catchment.	High Sensitivity	A) Trenchless construction is the proposed mitigation method for sites of environmental sensitivity. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species.
3.77	Growling Grass Frog	T28	Deep Ck, Toomuc Ck, Cardinia Ck complex	363287	5771630	Recorded downstream of survey envelope during targeted surveys. This creek system provides habitat both up and downstream from survey envelope.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction. B) Undertake works outside breeding season (October – March). Enforce hygiene protocols for Chytrid fungus. Undertake pre-construction habitat searches within a 200 m buffer of wetland habitat and have an ecologist on site during works to capture and release animals outside of the construction area. Implement sediment and water quality controls. Re-instate vegetation and habitat connectivity across the construction alignment.
3.77	Australasian Bittern	T29	Deep Ck, Toomuc Ck, Cardinia Ck complex	363287	5771630	Suitable habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.
3.77	Southern Brown Bandicoot	T30	Deep Ck, Toomuc Ck, Cardinia Ck complex	363275	5771631	Recorded within this corridor of habitat and presumed present throughout.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) A significant impact is considered possible if current survey envelope is impacted. Would need to explore options to maintain connectivity of habitat across the construction easement.
3.77	Southern Brown Bandicoot	T31	Railway Road	362590	5771770	Recorded within this corridor of habitat and presumed present throughout. This linear corridor is considered core habitat for the Koo Wee Rup population.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) Undertake works within the existing pipeline easement to avoid removal/impact to core habitat along the rail reserve to the north. Install exclusion fencing to ensure animals cannot enter the works area. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Enforce hygiene protocols. C) A significant impact is considered highly likely if the entire survey envelope is impacted, including the core dense habitat along the rail reserve.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.77	Southern Brown Bandicoot	T32	Railway Road	361862	5771866	Recorded within this corridor of habitat and presumed present throughout. This linear corridor is considered core habitat for the Koo Wee Rup population.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) Undertake works within the existing pipeline easement to avoid removal/impact to core habitat along the rail reserve to the north. Install exclusion fencing to ensure animals cannot enter the works area. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Enforce hygiene protocols. C) A significant impact is considered highly likely if the entire survey envelope is impacted, including the core dense habitat along the rail reserve.
3.77	Southern Brown Bandicoot	T33	Railway Road	361719	5771862	Recorded within this corridor of habitat and presumed present throughout. This linear corridor is considered core habitat for the Koo Wee Rup population.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) Undertake works within the existing pipeline easement to avoid removal/impact to core habitat along the rail reserve to the north. Install exclusion fencing to ensure animals cannot enter the works area. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Enforce hygiene protocols. C) A significant impact is considered highly likely if the entire survey envelope is impacted, including the core dense habitat along the rail reserve.
3.77	Australian Grayling	A19	Cardinia Creek	363288	5771629	Species predicted to occur. Permanent habitat present. Records within the catchment.		A) Trenchless construction is the proposed mitigation method for this site. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species.
3.77	Australian Grayling	A19	Deep Creek	363288	5771629	Species predicted to occur. Presumed permanent habitat. No records within the catchment.		A) Trenchless construction is the proposed mitigation method for this site. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species.
3.78	Southern Brown Bandicoot	T34	Disused rail reserve, west of Dalmore Road	361082	5771983	Recorded within this corridor of habitat and presumed present throughout. This linear corridor is considered core habitat for the Koo Wee Rup population.	High Sensitivity	A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) Restrict construction to grassed areas and avoid impacts on dense vegetation to north. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Supplement habitat with artificial shelters within dense habitat. Enforce hygiene protocols.
3.78	Southern Brown Bandicoot	T35	Private property, south of disused rail reserve	360265	5771869	Small section of habitat that may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.78	Southern Brown Bandicoot	T36	Private property, south of disused rail reserve	359864	5771924	Small section of habitat that may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.78	Southern Brown Bandicoot	T37	Private property, south of disused rail reserve	359774	5771938	Small section of habitat that may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.78	Southern Brown Bandicoot	T38	Private property, south of disused rail reserve	359736	5771943	Small section of habitat that may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.79	Southern Brown Bandicoot	T39	Tooradin Station Road	358985	5771961	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.79	Southern Brown Bandicoot	T40	Tooradin Station Road	358945	5771958	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.79	Southern Brown Bandicoot	T41	Landale Road	358119	5772090	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.8	Southern Brown Bandicoot	T42	Lynes Road	356858	5771901	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.8	Southern Brown Bandicoot	T43	Lynes Road	356835	5771874	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.8	Southern Brown Bandicoot	T44	South of Lynes Road	356741	5771755	Small section of habitat within road reserve and drainage line that may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.8	Southern Brown Bandicoot	T45	South of Lynes Road	356666	5771757	Small section of habitat within road reserve and drainage line that may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.81	Southern Brown Bandicoot	T46	South Gippsland Highway	355344	5771669	Small patch of potential habitat.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.82	Southern Brown Bandicoot	T47	Fisheries Road	352122	5770952	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.82	Southern Brown Bandicoot	T48	Fisheries Road	352070	5770924	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.83	Southern Brown Bandicoot	T49	Baxter-Tooradin Road	349976	5770251	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.84	Australasian Bittern	T50	Vowell Drive	348660	5769672	Suitable habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.
3.84	Australasian Bittern	T51	Vowell Drive	348642	5769646	Suitable habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.85	Southern Brown Bandicoot	T52	Callanans Lane	346873	5768818	Targeted survey did not detect the species at this site. Small patch of habitat within the survey envelope connected to larger potential habitat to the north.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Ensure connectivity on one or the other side of construction corridor during and following construction. Enforce hygiene protocols.
3.85	Dwarf Galaxias	A20	Langwarrin Creek	346854	5768811	Species predicted to occur. Marginal ephemeral spawning habitat present.		A) Trenching through the watercourse is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. B) When trenching coincides with periods of flow the crossing shall employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.86	Southern Brown Bandicoot	T53	Sth Boundary Road East	346238	5768069	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.87	Southern Brown Bandicoot	T54	Bungower Road	346018	5766223	Small section of habitat within road reserve may be used for movement.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.86–3.87	Southern Brown Bandicoot	T55	Watson Creek	345983	5766884	Small section of habitat within creek corridor that may be used for movement. Connected to larger patches of potential habitat.		A) Avoid impacts on habitat by using trenchless construction, allowing a buffer of 30 m from edge of dense (shrubby) habitat. B) Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Supplement habitat with artificial shelters to allow connectivity while habitat regenerates. Ensure connectivity between habitat patches to east and west during construction. Enforce hygiene protocols.
3.86–3.87	Dwarf Galaxias	A21	Watson Creek	345989	5767032	Species predicted to occur. Permanent spawning habitat present.		A) Trenchless construction is the proposed mitigation method for this site. This method is to be implemented dependant on geotechnical and hydrological assessment of the method as minimal risk of resulting in impacts to water quality / availability and hence impacts upon the species. B) Under certain circumstances this watercourse may be dry. Trenching through the watercourse in these circumstances is possible during dry periods with appropriate instream water quality control measures implemented to manage incidental flows during construction. C) During periods of flow this watercourse crossing will employ coffer dams, followed by dewatering and salvage of threatened species for translocation downstream. Once salvage is completed the water course may be open-cut provided mitigation measures for general waterway crossings are adhered to.
3.87	Southern Brown Bandicoot	T55	Sth of Watson Creek	345983	5766884	Targeted survey not undertaken due to no access. Potential habitat with connectivity to surrounding habitat.		Keep construction to a minimum to avoid impacts on areas of dense vegetation, particularly to west of survey envelope. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Supplement habitat with artificial shelters to allow connectivity while habitat regenerates. Ensure connectivity between habitat patches to east and west during construction. Enforce hygiene protocols.
3.88	Southern Brown Bandicoot	T56	Pikes Road	344697	5764714	Small patch of potential habitat.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Supplement habitat with artificial shelters to allow connectivity while habitat regenerates. Ensure connectivity between habitat patches to north and south during construction. Enforce hygiene protocols.

Figure	EPBC matter	Fauna Habitat (A - aquatic; T - terrestrial)	Location	Centroid Easting MGA,55	Centroid Northing MGA,55	Habitat	Sensitivity	Mitigation options
3.88–3.89	Southern Brown Bandicoot	T57	BlueScope Steel	344366	5763736	Targeted survey did not detect the species. Good quality habitat present, however, high numbers of Red Fox may have impacted persistence of a population.		Restrict works to the currently cleared and maintained pipeline easement. Enforce hygiene protocols to reduce the risk of spread of weeds and Cinnamon Fungus. Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Ensure connectivity between habitat patches on one or the other side of construction easement.
3.88–3.89	New Holland Mouse	T58	BlueScope Steel	344359	5763726	Lack of recent fire within the site may reduce suitability of habitat present. Presence of high numbers of Red Fox may have impacted populations.		Restrict works to the currently cleared and maintained pipeline easement. Enforce hygiene protocols to reduce the risk of spread of weeds and Cinnamon Fungus. Time works to avoid the breeding season (August to January). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Ensure connectivity between habitat patches on one or the other side of construction easement.
3.9	Southern Brown Bandicoot	T59	Thornells Road	343258	5762962	Small patch of potential habitat.		Time works to avoid the breeding season (July to November). Limit construction activities to daylight hours. Undertake pre-construction walk-over to ensure no animals within the construction site. Revegetate site with dense native understorey species. Enforce hygiene protocols.
3.91	Australasian Bittern	T60	Bayview Road	342770	5760442	Suitable habitat that may be used on occasions. Unlikely to have implications for this species at this location.		Re-instate vegetation following construction.

Table A5.2. Sites of importance for matters of national environmental significance - listed flora species habitat and ecological communities.

Figure	EPBC matter	Ecological Vegetation Class	Centroid Easting MGA,55	Centroid Northing MGA,55	Mitigation options
2.2, 2.3	Seasonally Herbaceous Wetlands	125 Plains Grassy Wetland	511633	5769520	Due to larger size and higher quality of the patch compared with other examples within the survey envelope, trenchless construction is preferred mitigation option. Where trenching cannot be avoided, preferred mitigation is to remove surface soil and plant material (intact sections) to 0.5 m in depth and store for reinstatement following trenching. Salvage should be undertaken when the soil is moist but not saturated or inundated. Monitoring of weed spread should follow construction and in accordance with an approved monitoring plan. Permanent loss of River Swamp Wallaby-grass and associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.

Figure	EPBC matter	Ecological Vegetation Class	Centroid Easting MGA,55	Centroid Northing MGA,55	Mitigation options
2.9, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16	Wellington Mint-bush habitat	3 Damp Sands Herb-rich Woodland 48 Heathy Woodland 48 Heathy Woodland 48 Heathy Woodland 3 Damp Sands Herb-rich Woodland 3 Damp Sands Herb-rich Woodland 48 Heathy Woodland 3 Damp Sands Herb-rich Woodland 48 Heathy Woodland 48 Heathy Woodland 48 Heathy Woodland 48 Heathy Woodland 3 Damp Sands Herb-rich Woodland 48 Heathy Woodland 48 Heathy Woodland 48 Heathy Woodland 48 Heathy Woodland 48 Heathy Woodland	499140 498476 497532 496237 495157 494901 494637 494172 493797 491687 489542 487946 487288 486142 485411 484606 484062 483996	5770934 5771078 5771230 5771330 5771417 5771435 5771455 5771524 5771655 5771835 5771929 5772017 5772052 5772232 5772358 5772457 5772543 5772537	As a priority, avoid removal of native vegetation in treed areas of Holey Plains (particularly Heathy Woodland and Damp Sands Herb-rich Woodland); these are areas that contain vegetation generally taller than 1 m and outside of the existing slashed easement. Construct sediment barrier along edge of slashed easement and treed area boundary to avoid spread of soil stock piles into treed area. Where impacts to treed areas cannot be avoided, undertake survey to locate any individuals which may be present and collect material for propagation if present. Permanent loss of individuals or associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.
2.18, 2.26	Gippsland Red Gum Grassy Woodland	55_61 Plains Grassy Woodland	480772 480737 465143 465082 464628	5772488 5772493 5773688 5773722 5773537	Preferred mitigation is to remove surface soil and plant material (intact sections) to 0.5 m in depth and store for reinstatement following trenching. Salvage should be undertaken when the soil is moist but not saturated or inundated. Monitoring of weed spread should follow construction in accordance with an approved monitoring plan. Permanent loss of vegetation from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.
2.40, 2.48	Strzelecki Gum present	56 Floodplain Riparian Woodland	437109 436966 421055	5777902 5777885 5775673	Prevent construction activity in tree protection zone. Where tree protection zone cannot be avoided and tree is proposed for retention, engage a qualified arborist to assess whether the activity will lead to the loss of the tree within 1-2 years following construction. For any unavoidable losses of trees or their associated habitat (in this case EVC), offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.
2.73, 2.79, 2.80	Seasonally Herbaceous Wetlands	125 Plains Grassy Wetland	370813 357983 356421 356266	5771684 5772131 5771604 5771619	Due to smaller size and lower quality of the patch compared with other examples in the survey envelope, the preferred mitigation is to remove surface soil and plant material (intact sections) to 0.5 m in depth and store for reinstatement following trenching. Salvage should be undertaken when the soil is moist but not saturated or inundated. Monitoring of weed spread should follow construction and in accordance with an approved monitoring plan. Permanent loss of River Swamp Wallaby-grass and associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.
89	River Swamp Wallaby-grass present	53 Swamp Scrub	344308	5763672	Trenchless construction through this section of the alignment would require a removal of a significant area of native vegetation, including additional habitat for River Swamp Wallaby-grass. Preferred mitigation is to remove surface soil and plant material (intact sections) to 0.5 m in depth and store for reinstatement following trenching. Salvage should be undertaken when the soil is moist but not saturated or inundated. Monitoring of weed spread and any loss of River Swamp Wallaby-grass should follow construction in accordance with an approved monitoring plan. Permanent loss of River Swamp Wallaby-grass and associated habitat from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.
Princes Hwy roadsides	Gippsland Red Gum Grassy Woodland	55_61 Plains Grassy Woodland	-	-	Preferred mitigation trenchless construction. Permanent loss of vegetation from this location may be offset for state matters (DEPI permitted clearing guidelines) and national matters (EPBC Act offset policy) where permitted.

Two general approaches for mitigating loss of scattered trees are provided. For trees that are not listed as threatened under the EPBC Act, construction should avoid TPZ where possible. If trees removal cannot be avoided, offset according to the Permitted Clearing Guidelines. For EPBC Act listed species, construction should avoid TPZ. If TPZ cannot be avoided, do not remove top soil from associated high sensitivity areas (Figure 2), minimise machinery use, examine use of ground protection mats, keep stock piles away from TPZ and engage an arborist to determine residual impacts to trees for offset purposes. If trees removal cannot be avoided, offset according to the Permitted Clearing Guidelines.

Table A5.3. Sites of importance for matters of NES, including site specific mitigation options

Tree size classes follow DSE (2007): VLOT – Very Large Old Tree, LOT – Large Old Tree, MOT- Medium Old Tree, ST – Small Tree. A prefix of D in the Tree ID column indicates that the trees were assessed by desktop only; they are given a default size class of large.

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
1	MOT	Swamp Gum	-	342445	5762414
2	LOT	Coast Manna-gum	-	343273	5762816
3	MOT	Swamp Gum	-	343853	5762961
4	LOT	Coast Manna-gum	-	345800	5765922
5	LOT	Coast Manna-gum	-	345805	5765914
6	LOT	Coast Manna-gum	-	345805	5765914
7	MOT	Coast Manna-gum	-	345821	5765873
8	MOT	Coast Manna-gum	-	345832	5765947
9	ST	Coast Manna-gum	-	345836	5765921
10	ST	Coast Manna-gum	-	345839	5765873
11	MOT	Coast Manna-gum	-	345840	5765978
12	VLOT	Coast Manna-gum	-	345845	5765941
13	MOT	Coast Manna-gum	-	345849	5765887
14	ST	Coast Manna-gum	-	345857	5765877
15	VLOT	Coast Manna-gum	-	345868	5765883
16	MOT	Coast Manna-gum	-	345960	5766683
17	MOT	Coast Manna-gum	-	345973	5766675
18	MOT	Coast Manna-gum	-	345984	5766647
19	MOT	Coast Manna-gum	-	345984	5766647

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
20	MOT	Coast Manna-gum	-	345985	5766688
21	MOT	Coast Manna-gum	-	346016	5766654
22	MOT	Coast Manna-gum	-	346261	5768076
23	LOT	Coast Manna-gum	-	348378	5769511
24	ST	Coast Manna-gum	-	348561	5769619
25	ST	Coast Manna-gum	-	348561	5769624
26	MOT	Eucalyptus ovata	-	348581	5769618
27	ST	Coast Manna-gum	-	351588	5770822
28	ST	Coast Manna-gum	-	351588	5770820
29	LOT	Coast Manna-gum	-	351589	5770814
30	ST	Coast Manna-gum	-	351593	5770822
31	ST	Coast Manna-gum	-	351594	5770819
32	MOT	Coast Manna-gum	-	355189	5771672
33	MOT	Coast Manna-gum	-	355236	5771675
34	MOT	Coast Manna-gum	-	355258	5771670
35	MOT	Coast Manna-gum	-	357543	5772182
36	MOT	Dead	-	359746	5771920
37	MOT	Swamp Gum	-	360230	5771878
38	MOT	Swamp Gum	-	360236	5771852
39	LOT	Swamp Gum	-	366052	5771241
40	MOT	<i>Eucalyptus</i> sp.	-	366859	5770432
41	MOT	Swamp Gum	-	367338	5770141
42	MOT	Swamp Gum	-	367365	5770150
43	LOT	Swamp Gum	-	386890	5772338
44	MOT	Swamp Gum	-	386898	5772357
45	MOT	Swamp Gum	-	386898	5772357
46	MOT	Swamp Gum	-	386905	5772338
47	ST	Swamp Gum	-	386917	5772360
48	MOT	Swamp Gum	-	386917	5772360

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
49	MOT	Swamp Gum	-	386919	5772370
50	LOT	Swamp Gum	-	387189	5772463
51	MOT	<i>Eucalyptus</i> sp.	-	390804	5772575
52	MOT	Dead	-	390810	5772573
53	MOT	Dead	-	390823	5772558
54	MOT	Dead	-	390829	5772557
55	MOT	Dead	-	390830	5772581
56	MOT	Dead	-	390838	5772558
57	MOT	Dead	-	390844	5772567
58	MOT	Dead	-	390846	5772558
59	MOT	<i>Eucalyptus</i> sp.	-	390856	5772578
60	MOT	<i>Eucalyptus</i> sp.	-	390865	5772585
61	LOT	<i>Eucalyptus</i> sp.	-	391689	5772664
62	ST	Swamp Gum	-	394523	5773036
63	MOT	Swamp Gum	-	394562	5773022
64	LOT	Swamp Gum	-	394568	5773054
65	VLOT	Swamp Gum	-	394581	5773043
66	LOT	Messmate Stringybark	-	394919	5773067
67	LOT	Messmate Stringybark	-	394926	5773086
68	ST	<i>Eucalyptus</i> sp.	-	395783	5773145
69	LOT	<i>Eucalyptus</i> sp.	-	398073	5773391
70	MOT	<i>Eucalyptus</i> sp.	-	398083	5773365
71	MOT	<i>Eucalyptus</i> sp.	-	398098	5773381
72	MOT	Dead	-	398102	5773387
73	MOT	<i>Eucalyptus</i> sp.	-	398103	5773374
74	MOT	Dead	-	398105	5773364
75	MOT	<i>Eucalyptus</i> sp.	-	398118	5773358
76	LOT	Swamp Gum	-	399198	5773416
77	VLOT	Swamp Gum	-	400988	5773491

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
78	MOT	River Red-gum	-	400999	5773463
79	VLOT	Mountain Grey-gum	-	401211	5773470
80	VLOT	Mountain Grey-gum	-	402582	5773272
81	VLOT	Mountain Grey-gum	-	402585	5773263
82	ST	Swamp Gum	-	404213	5773353
83	LOT	Swamp Gum	-	404354	5773267
84	MOT	Mountain Grey-gum		406073	5773021
85	LOT	Swamp Gum		414016	5775009
86	MOT	Yertchuck		415603	5775379
87	MOT	Yertchuck		415647	5775372
88	MOT	Dead		416717	5776080
89	LOT	<i>Eucalyptus</i> sp.		416736	5776078
90	LOT	<i>Eucalyptus</i> sp.		416834	5776063
91	LOT	<i>Eucalyptus</i> sp.		416870	5776058
92	LOT	<i>Eucalyptus</i> sp.		416966	5776024
93	LOT	<i>Eucalyptus</i> sp.		417018	5776016
94	LOT	<i>Eucalyptus</i> sp.		417163	5775995
95	ST	Yertchuk		419809	5775667
96	MOT	Messmate Stringybark		421184	5775619
97	ST	Dead		421192	5775614
98	MOT	Dead		421277	5775575
99	ST	Dead		421279	5775609
100	MOT	Dead		421968	5775999
101	LOT	<i>Eucalyptus</i> sp.		425453	5775883
102	LOT	<i>Eucalyptus</i> sp.		425460	5775886
103	LOT	<i>Eucalyptus</i> sp.		425463	5775904
104	LOT	<i>Eucalyptus</i> sp.		425483	5775879
105	LOT	Dead		427391	5776257
106	MOT	<i>Eucalyptus</i> sp.		427393	5776268

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
107	LOT	<i>Eucalyptus</i> sp.		427396	5776261
108	LOT	<i>Eucalyptus</i> sp.		427406	5776270
109	LOT	<i>Eucalyptus</i> sp.		427424	5776264
110	LOT	<i>Eucalyptus</i> sp.		427425	5776264
111	LOT	<i>Eucalyptus</i> sp.		427445	5776275
112	LOT	<i>Eucalyptus</i> sp.		427445	5776275
113	LOT	<i>Eucalyptus</i> sp.		427456	5776284
114	MOT	<i>Eucalyptus</i> sp.		427473	5776276
115	MOT	<i>Eucalyptus</i> sp.		427495	5776286
116	LOT	<i>Eucalyptus</i> sp.		427518	5776292
117	LOT	<i>Eucalyptus</i> sp.		427549	5776297
118	LOT	<i>Eucalyptus</i> sp.		427579	5776306
119	LOT	<i>Eucalyptus</i> sp.		427602	5776307
120	LOT	<i>Eucalyptus</i> sp.		427611	5776275
121	LOT	<i>Eucalyptus</i> sp.		427615	5776319
122	LOT	<i>Eucalyptus</i> sp.		427640	5776316
123	LOT	<i>Eucalyptus</i> sp.		428987	5776258
124	LOT	<i>Eucalyptus</i> sp.		433170	5777583
125	ST	Manna Gum		434790	5777999
126	LOT	Manna Gum		434886	5777826
127	LOT	Manna Gum		434891	5777817
128	LOT	But But		435415	5777923
129	LOT	But But	-	435532	5777916
130	VLOT	Manna Gum	-	435773	5777909
131	VLOT	Manna Gum	-	435784	5777869
132	VLOT	Manna Gum	-	435797	5777921
133	LOT	But But	-	436093	5777848
134	MOT	Manna Gum	-	436112	5777855
135	LOT	Manna Gum	-	436122	5777885

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
136	VLOT	But But	-	436150	5777874
137	LOT	Manna Gum	-	436553	5777887
138	LOT	Manna Gum	-	436571	5777862
139	LOT	Manna Gum	-	436576	5777886
140	LOT	Manna Gum	-	436577	5777859
141	LOT	Manna Gum	-	436583	5777854
142	LOT	Manna Gum	-	436630	5777867
143	LOT	Manna Gum	-	436661	5777902
144	LOT	Manna Gum	-	436744	5777902
145	LOT	Strzelecki Gum	EPBC vulnerable	436760	5777835
146	LOT	Manna Gum	-	436837	5777900
147	LOT	Dead	-	437423	5777956
148	LOT	Strzelecki Gum	EPBC vulnerable	437424	5777940
149	LOT	Strzelecki Gum	EPBC vulnerable	437451	5777955
150	LOT	Strzelecki Gum	EPBC vulnerable	437458	5777891
151	LOT	Strzelecki Gum	EPBC vulnerable	437469	5777952
152	LOT	Strzelecki Gum	EPBC vulnerable	437477	5777927
153	LOT	Strzelecki Gum	EPBC vulnerable	437479	5777894
154	LOT	Strzelecki Gum	EPBC vulnerable	437570	5777919
155	LOT	Strzelecki Gum	EPBC vulnerable	437573	5777885
156	LOT	Strzelecki Gum	EPBC vulnerable	437588	5777893
157	ST	Broad-leaf Peppermint	-	438022	5777875
158	LOT	Yertchuk	-	438317	5777996
159	LOT	Yertchuk	-	438433	5778008
160	LOT	Yertchuk	-	438459	5778012
161	LOT	Yertchuk	-	438692	5778047

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
162	LOT	Swamp Gum	-	439003	5778092
163	LOT	Swamp Gum	-	439110	5778046
164	MOT	Brown Stringybark	-	439271	5778110
165	LOT	Eucalyptus sp.	-	441997	5778594
166	LOT	Messmate Stringybark	-	444269	5779169
167	VLOT	Mountain Grey-gum	-	448250	5778491
168	LOT	Mountain Grey-gum	-	448464	5778397
169	VLOT	Mountain Grey-gum	-	448479	5778419
170	ST	Narrow-leaf Peppermint	-	450549	5777974
171	MOT	Dead	-	450555	5777959
172	MOT	Dead	-	450731	5778020
173	LOT	Yellow Box	-	451989	5777908
174	ST	Yellow Box	-	453513	5777349
175	ST	But But	-	453549	5777351
176	MOT	But But	-	453552	5777356
177	LOT	But But	-	453559	5777350
178	LOT	Yellow Box	-	453581	5777375
179	LOT	Yellow Box	-	453600	5777382
180	LOT	Yellow Box	-	453617	5777401
181	LOT	Yellow Box	-	453677	5777294
182	LOT	Yellow Box	-	454489	5776857
183	LOT	Yellow Box	-	454499	5776904
184	LOT	Yellow Box	-	454510	5776894
185	LOT	Yellow Box	-	454543	5776897
186	LOT	Yellow Box	-	454567	5776839
187	LOT	Yellow Box	-	454629	5776863
188	LOT	Yellow Box	-	454660	5776860
189	LOT	Yellow Box	-	454671	5776805
190	LOT	Yellow Box	-	454692	5776827

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
191	LOT	Yellow Box	-	454702	5776846
192	LOT	Yellow Box	-	454722	5776846
193	LOT	Yellow Box	-	454775	5776825
194	LOT	Yellow Box	-	454790	5776825
195	LOT	Yellow Box	-	454837	5776762
196	LOT	Yellow Box	-	454858	5776796
197	LOT	Dead	-	454863	5776792
198	LOT	Yellow Box	-	454872	5776783
199	LOT	Yellow Box	-	454881	5776795
200	LOT	Swamp Gum	-	455573	5776652
201	LOT	Swamp Gum	-	455973	5776554
202	LOT	Swamp Gum	-	458605	5775457
203	VLOT	Swamp Gum	-	458632	5775460
204	MOT	Dead	-	462197	5774692
205	VLOT	Gippsland Red-gum	-	462585	5774624
206	LOT	Gippsland Red-gum	-	462622	5774588
207	LOT	Dead	-	463229	5774282
208	MOT	Gippsland Red-gum	-	464569	5773521
209	MOT	Gippsland Red-gum	-	464722	5773555
210	LOT	Gippsland Red-gum	-	464737	5773560
211	ST	Gippsland Red-gum	-	464820	5773575
212	ST	Gippsland Red-gum	-	464856	5773585
213	ST	Gippsland Red-gum	-	464895	5773592
214	MOT	Swamp Gum	-	464930	5773602
215	VLOT	Gippsland Red-gum	-	465116	5773625
216	VLOT	Swamp Gum	-	466230	5773549
217	VLOT	Swamp Gum	-	466257	5773507
218	LOT	Dead	-	466316	5773453
219	LOT	Dead	-	466322	5773450

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
220	LOT	Gippsland Red-gum	-	466875	5773466
221	VLOT	Dead	-	466993	5773414
222	VLOT	Gippsland Red-gum	-	467527	5773372
223	VLOT	Gippsland Red-gum	-	468105	5773341
224	LOT	Dead	-	473773	5772885
225	LOT	Dead	-	474263	5772868
229	VLOT	Coast Manna-gum	-	486688	5772160
230	VLOT	Apple Box	-	486854	5772099
231	VLOT	Apple Box	-	486927	5772140
232	VLOT	Apple Box	-	486945	5772058
233	VLOT	Apple Box	-	486945	5772062
234	VLOT	Apple Box	-	486957	5772087
235	VLOT	Apple Box	-	486970	5772127
236	VLOT	Apple Box	-	486985	5772084
237	VLOT	Apple Box	-	487107	5772019
238	LOT	<i>Eucalyptus</i> sp.	-	511755	5769537
239	LOT	<i>Eucalyptus</i> sp.	-	511763	5769528
240	LOT	<i>Eucalyptus</i> sp.	-	511770	5769552
241	MOT	<i>Eucalyptus</i> sp.	-	511810	5769539
242	LOT	<i>Eucalyptus</i> sp.	-	511851	5769517
243	LOT	<i>Eucalyptus</i> sp.	-	511853	5769544
244	LOT	<i>Eucalyptus</i> sp.	-	511877	5769572
245	LOT	<i>Eucalyptus</i> sp.	-	511878	5769546
246	LOT	Gippsland Red Gum	-	512320	5769582
D1	LOT	<i>Eucalyptus</i> sp.	-	437418	5777965
D2	LOT	<i>Eucalyptus</i> sp.	-	437411	5777972
D3	LOT	Strzelecki Gum	EPBC vulnerable	437410	5777974

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
D4	LOT	Strzelecki Gum	EPBC vulnerable	437409	5777975
D5	LOT	<i>Eucalyptus</i> sp.	-	437402	5777970
D6	LOT	<i>Eucalyptus</i> sp.	-	437402	5777986
D7	LOT	Strzelecki Gum	EPBC vulnerable	437396	5777974
D8	LOT	<i>Eucalyptus</i> sp.	-	437396	5777974
D9	LOT	<i>Eucalyptus</i> sp.	-	437395	5777983
D10	LOT	Strzelecki Gum	EPBC vulnerable	437394	5777983
D11	LOT	<i>Eucalyptus</i> sp.	-	437390	5777989
D12	LOT	<i>Eucalyptus</i> sp.	-	437387	5777997
D13	LOT	Strzelecki Gum	EPBC vulnerable	437382	5778006
D14	LOT	<i>Eucalyptus</i> sp.	-	437382	5778006
D15	LOT	<i>Eucalyptus</i> sp.	-	437380	5778023
D16	LOT	<i>Eucalyptus</i> sp.	-	437373	5777997
D17	LOT	Strzelecki Gum	EPBC vulnerable	437368	5778019
D18	LOT	<i>Eucalyptus</i> sp.	-	437362	5778023
D19	LOT	<i>Eucalyptus</i> sp.	-	437347	5778032
D20	LOT	Strzelecki Gum	EPBC vulnerable	437345	5778038
D21	LOT	Strzelecki Gum	EPBC vulnerable	437345	5778038
D22	LOT	Strzelecki Gum	EPBC vulnerable	437334	5778044
D23	LOT	<i>Eucalyptus</i> sp.	-	437334	5778044
D24	LOT	<i>Eucalyptus</i> sp.	-	427718	5776164
D25	LOT	<i>Eucalyptus</i> sp.	-	427702	5776167

Tree ID	Size Class	Species	Conservation status	Easting MGA, 55	Northing MGA, 55
D26	LOT	<i>Eucalyptus</i> sp.	-	417158	5775674
D27	LOT	<i>Eucalyptus</i> sp.	-	417151	5775674
D28	LOT	<i>Eucalyptus</i> sp.	-	417005	5775550
D29	LOT	<i>Eucalyptus</i> sp.	-	416373	5776475
D30	LOT	<i>Eucalyptus</i> sp.	-	416348	5776477
D31	LOT	<i>Eucalyptus</i> sp.	-	416339	5776481
D32	LOT	<i>Eucalyptus</i> sp.	-	416325	5776482
D33	LOT	<i>Eucalyptus</i> sp.	-	416306	5776490
D34	LOT	<i>Eucalyptus</i> sp.	-	416297	5776489
D35	LOT	<i>Eucalyptus</i> sp.	-	416240	5776496
D36	LOT	<i>Eucalyptus</i> sp.	-	416240	5776496
D37	LOT	<i>Eucalyptus</i> sp.	-	416231	5776495
D38	LOT	<i>Eucalyptus</i> sp.	-	416170	5776504
D39	LOT	<i>Eucalyptus</i> sp.	-	416153	5776504
D40	LOT	<i>Eucalyptus</i> sp.	-	416127	5776513
D41	LOT	<i>Eucalyptus</i> sp.	-	416109	5776513
D42	LOT	<i>Eucalyptus</i> sp.	-	416075	5776517
D43	LOT	<i>Eucalyptus</i> sp.	-	416074	5775978
D44	LOT	<i>Eucalyptus</i> sp.	-	416071	5775991
D45	LOT	<i>Eucalyptus</i> sp.	-	415881	5776367

Appendix 6: Mapping

Figure 2: Flora and vegetation survey results, Esso Pipeline Replacement Project, Hastings to Longford.

Figure 3. Fauna survey results, Esso Pipeline Replacement Project, Hastings to Longford.

Figure 4. DEPI habitat models for species which are FFG Act listed (only), Esso Pipeline Replacement Project, Hastings to Longford.