

Final Report

# Targeted Fauna Survey, Halladale and Speculant Project

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Origin Energy Resources Ltd

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## GLOSSARY

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Acronym	Description
AVW	Atlas of Victorian Wildlife
MEG	Mono-ethylene glycol (pipeline)
ARI	Arthur Rylah Institute
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Authority
DELWP	Victorian Department of Environment, Land, Water and Planning
DoE	Federal Department of the Environment
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVC	Ecological Vegetation Class
SPFL	Scientific Procedures Fieldwork Licence
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
NES	National Environmental Significance
PMST	Protected Matters Search Tool (DoE)
VBA	Victorian Biodiversity Atlas (DELWP)

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# 1 INTRODUCTION

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## 1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Worley Parsons Services Pty Ltd on behalf of Origin Energy Resources Ltd (hereafter 'Origin') to conduct significant fauna surveys within a study area associated with a proposed new and replacement natural gas pipeline within the Otway Basin, Victoria.

The survey targeted the Southern Brown Bandicoot *Isoodon obesulus obesulus*, Long-nosed Potoroo *Potorous tridactylus tridactylus* and Growling Grass Frog *Litoria raniformis*. All three species are of national significance (i.e. listed under the *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act]) and were identified by previous ecological assessments as having a medium-high likelihood of occurring within the preferred project footprint (Biosis Pty Ltd 2014; Biosis Research Pty Ltd 2011). Each target species is also listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) and on the Victorian Advisory List (DSE 2013).

In order to facilitate the transport of raw gas from onshore well sites to the Otway Gas Plant for processing, Origin are proposing the following works within a 33 kilometre pipeline alignment:

- West Section (approximately 1.5 kilometres): Halladale Blackwatch Gas Field to Croft tie-in point (existing pipeline network). Construction of a new 200 millimetre gas pipeline, Mono-ethylene glycol (MEG) pipeline and fibre optic cable;
- Central Section (approximately 24 kilometres): Croft tie-in point to Heytesbury Gas Plant. Construction of a 200 millimetre gas pipeline, MEG pipeline and fibre optic cable; and,
- East Section (approximately 7.5 kilometres): Heytesbury Gas Plant to Otway Gas Plant. Construction of a 200 millimetre gas pipeline, MEG pipeline and fibre optic cable.

The pipeline alignment begins approximately three kilometres south-west of Nirranda South (well sites) and ends at a location approximately two kilometres west of Newfield (Otway Gas Plant) (Figure 1). The entire 33 kilometre alignment has been subject to ecological assessments, with field surveys of the East and West sections completed in 2009/10 (Biosis Research Pty Ltd 2011) and surveys of the Central section undertaken in 2014 (Biosis Pty Ltd 2014). The targeted fauna survey focussed on the Central section and addresses recommendations provided in the 2014 flora and fauna assessment report (Biosis Pty Ltd 2014).

## 1.2 Objectives

The fauna survey focussed on the three target species and areas of potential habitat within and adjoining the project footprint. Targeted surveys for the three target species were recommended in the 2014 flora and fauna assessment report (Biosis Pty Ltd 2014). As part of this assessment, a review of previous studies and information sources noted in Section 3.1 was undertaken to identify if any additional significant fauna species required targeted field survey (Section 4.1).

The key objectives of the study were to:

- Complete a desktop review and field survey to confirm the likelihood of significant fauna species occurring within the study area and surrounding landscape;
- Identify known and potential impacts on the target species associated with the pipeline construction works and determine the significance of impacts with reference to the significant impact criteria specified in the *Matters of National Environmental Significance, Significant Impact Guidelines 1.1* (Department of the Environment 2013); and,
- Review the suitability of mitigation measures previously recommended for the project (Biosis Pty Ltd 2014) and where appropriate, identify additional measures to be incorporated into the Construction Environmental Management Plan (CEMP).

### 1.3 Study Area

The targeted fauna surveys focussed on all areas of potential habitat for the target species potentially impacted by the project, as identified in the 2014 flora and fauna assessment report (Biosis Pty Ltd 2014) (Figure 2). These included:

- Nine sites (S1-S9) of potential habitat for the Southern Brown Bandicoot and Long-nosed Potoroo, comprising remnant patches of Damp Heathy Woodland (Ecological Vegetation Class [EVC] 793), Damp Heath Scrub (EVC 165), Lowland Forest (EVC 16) and Swampy Riparian Woodland (EVC 83).
- Two sites of potential habitat for the Growling Grass Frog:
  - Site GGF 1 - A section of an unnamed tributary located approximately 50 metres north of the Callaghans Road/ Sodas Lane intersection, Nirranda South.
  - Site GGF 2 - A large (~1 ha) wetland located approximately 320 metres south-east of the Boundary Road/ Squibbs Road intersection, Timboon West.

The survey sites are located approximately 5.9 kilometres north of Port Campbell and 28.5 kilometres east of Warrnambool. They lie within the Warrnambool Plain bioregion and the management boundaries of the Moyne and Corangamite Councils and the Corangamite Catchment Management Authority (CMA).

## 2 TARGET SPECIES

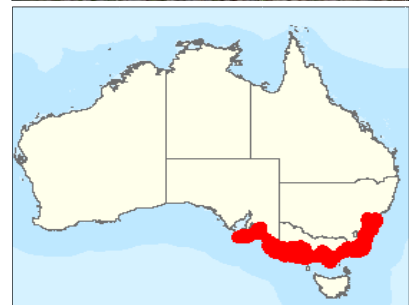
### 2.1 Southern Brown Bandicoot

#### Status

The Southern Brown Bandicoot is listed as Endangered under the EPBC Act and threatened under the FFG Act. Nominations to delist this species under the EPBC Act are currently under review by DoE.

#### Description

Southern Brown Bandicoot is a medium sized ground dwelling marsupial with a long tapering snout, a naked nose, a compact body and a short tail. Males weigh between 500–1850 g and females 400–1200 g (Van Dyck & Strahan 2008). The species has small rounded ears and small black eyes. The dorsal surface of the body usually appears grey-brown at a distance but grizzled (with golden-brown flecks) at close range because of banded spiny guard hairs. The underparts and forefeet are creamy white or pale yellow in colour, and the tail brown above and creamy yellow below. The forelegs are short with curved claws on each of the five digits, and the hind limbs much longer (Brown & Main 2010).



#### Distribution

In Victoria, the species is predominantly coastal and exhibits a disjunct and patchy distribution across the state. Records are clustered around six general regions: far-east lowland Gippsland, western Gippsland Plain, Warnambool-Otway Plains, Glenelg Plain, and the Greater Grampians (Coates *et al.* 2008). As in other states, the species is generally associated with sites supporting heaths, heathy woodlands and forests or other vegetation communities providing a thick ground cover over sandy well-drained soils (Coates *et al.* 2008, Menkhorst and Seebeck 1990). Species experts define suitable habitat for Southern Brown Bandicoots to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 metre height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (*Rubus* spp.), can and often does, provide important habitat (DSEWPaC 2011).

**Inset 2:** Southern Brown Bandicoot.  
Source: Ecology and Heritage Partners, DoE 2015b.

#### Ecology

The breeding season for Southern Brown Bandicoots varies across their range, with peak breeding occurring from winter through to late summer (DoE 2015b). The species is omnivorous, opportunistically exploiting a wide variety of food resources such as invertebrates (mainly insects but also earthworms and other invertebrates), plant material and fungi. The species has been found to be active both day and night, with the activity period varying between location and habitat. The majority of home range studies of the species have all reported estimates which range from 0.5 to 9.0 hectares (DoE 2015b).



## Threats

The following threats to Southern Brown Bandicoot are recognised (DoE 2015b): habitat loss or modification, fragmentation, inappropriate fire regimes and extensive wildfires, introduced predators and the isolation of populations.

## Recovery actions

A draft national recovery plan for the Southern Brown Bandicoot has been prepared (Brown & Main 2010). The plan outlines the following recovery objectives:

- Ensure that existing bandicoot populations and their habitat are protected and managed;
- Identify threats and threat abatement management practices to assist the recovery of the Southern Brown Bandicoot;
- Determine the distribution, abundance and population structure of the Southern Brown Bandicoot;
- Identify the key attributes of existing or potential habitat that are important for the Southern Brown Bandicoot;
- Evaluate population responses of the Southern Brown Bandicoot to recovery actions, and adapt actions as required;
- Build a network of government and non-government organisations and individuals to facilitate recovery of the Southern Brown Bandicoot;
- Manage and review recovery plan implementation;
- Promote public awareness of and involvement in the Southern Brown Bandicoot recovery program; and,
- Assess the requirement for captive populations.

## 2.2 Long-nosed Potoroo

### Status

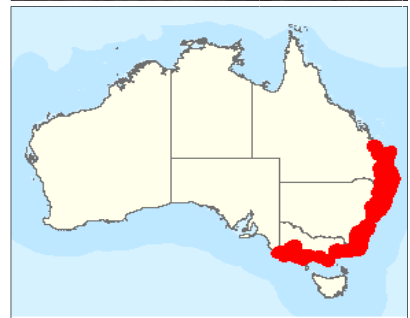
Long-nosed Potoroo is listed as Vulnerable under the EPBC Act, threatened under the FFG Act and Near Threatened on the Victorian Advisory List (DSE 2013).

### Description

Long-nosed Potoroo is a medium sized marsupial. The species can be identified by a brown to grey upper body and paler underbody. They have a long nose that tapers with a small patch of skin extending from the snout to the nose. The length of the feet is shorter than their head length (DoE 2015c).

### Distribution

On the Australian mainland the Long-nosed Potoroo has a patchy distribution along the eastern and south-eastern seaboard from around Gladstone in south-eastern Queensland to Mt Gambier in the south-eastern corner of South Australia (van Dyck and Strahan 2008). Throughout its range, nearly all recent records occur within about 50 kilometres of the coastline, the exception being the Grampians population. In Victoria there are significant populations in the Otways, East Gippsland (east of Lakes Entrance), Wilson's Promontory, French Island, the lower Glenelg River area and the Grampians. These populations, which were probably relatively continuous before European settlement, are now isolated from one another (DEPI 2013a).



**Inset 3:** Long-nosed Potoroo. Source: DEPI 2013a, DoE 2015c.

### Ecology

Long-nosed Potoroos are mostly nocturnal but can also be active during the day. They shelter in a shallow squat in dense vegetation and do not build complex nests, though they are able to use their prehensile tail to carry light nesting material. The diet of Long-nosed Potoroos is generally dominated by the sporocarps (truffles) of hypogeous fungi. They find these by scent and dig cylindrical pits to extract them. They also eat other fungi as well as insects, fruits and plant material. Long-nosed Potoroos are not territorial but occupy stable, overlapping home ranges. At Naringal in south-west Victoria and Cape Conran in East Gippsland these were quite small; 1–3 hectares for females and to 2–4 hectares for males (Bennett 1987, Ricciardello 2006). Home ranges were much larger at a site in southern Tasmania; 2–11 hectares for females and 12–34 hectares for males (Kitchener 1973).

### Threats

The following threats to Long-nosed Potoroo are recognised (DEPI 2013a): Carnivory (cats and foxes), habitat damage or loss (vegetation clearance, timber harvesting, climate change), inappropriate fire regimes,

## Recovery actions

A recovery plan for Long-nosed Potoroo has not been prepared. However, the following recovery actions have been identified by the Victorian Department of Environment, Land, Water and Planning (DELWP) (DEPI 2013a):

- Apply ecological burning;
- Develop detailed population monitoring protocols;
- Assess threats;
- Conduct survey to determine abundance/extent;
- Provide input into regional fire management and operations plans;
- Control introduced animals;
- Undertake research into management requirements;
- Undertake research to identify key biological functions;
- Undertake periodic surveillance monitoring of populations; and,
- Assess impacts of bushfires.

## 2.3 Growling Grass Frog

### Status

The Growling Grass Frog is listed as Vulnerable under the EPBC Act, threatened under the FFG Act and Endangered on the Victorian Advisory List (DSE 2013).

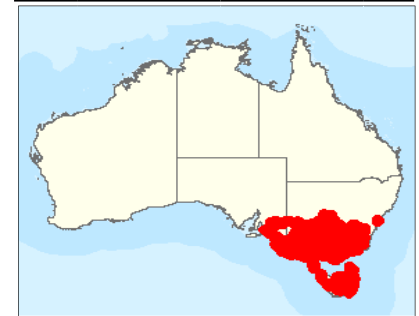
### Description

Growling Grass Frog is one of the largest frog species in Australia. It reaches up to 104 mm in length, with females usually larger (60-104 mm) than males (55-65mm) (Barker *et al.* 1995; Tyler 1978; Tyler and Barrie 1996). Growling Grass Frogs vary in colour and pattern but in general are olive to bright emerald green, with irregular gold, brown, black or bronze spotting. Their backs are warty and usually have a pale green mid-dorsal stripe. The eardrum is pronounced (DoE 2015a).



### Distribution

Growling Grass Frog is largely associated with permanent or semi-permanent still or slow flowing waterbodies (i.e. streams, lagoons, farm dams and old quarry sites) (Hero *et al.* 1991; Barker *et al.* 1995; Cogger 1996; Ashworth 1998). This species can also utilise temporarily inundated waterbodies for breeding purposes providing they contain water over the breeding season (Organ 2003).



**Inset 1:** Growling Grass Frog. Source: Ecology and Heritage Partners, DoE 2015a.

Based on previous investigations there is a strong correlation between the presence of the species and key habitat attributes at a given waterbody. For example, the species is typically associated with waterbodies supporting an extensive cover of emergent, submerged and floating vegetation (Robertson *et al.* 2002, Organ 2004, 2005). Emergent vegetation provides basking sites for frogs and protection from predators, while floating vegetation provides suitable calling stages for adult males and breeding and oviposition (egg deposition) sites. Terrestrial vegetation (grasses, sedges), rocks and other ground debris around wetland perimeters also provide foraging, dispersal and over-wintering sites for frogs.

Recent studies have revealed that the spatial orientation of waterbodies across the landscape is one of the most important habitat determinants influencing the presence of the species at a given site (Robertson *et al.* 2002; Heard *et al.* 2004; Hamer and Organ 2008). For example, studies have shown there is a positive correlation between the presence of the species and the distance of freestanding waterbodies to another occupied site. This is comparable to the spatial dynamics of many amphibian populations, including the closely related Green and Golden Bell Frog *Litoria aurea*.

Frogs are often located at the waterline, or in the nearby terrestrial zone (<100 metres from the waterline) (Heard *et al.* 2008; Heard *et al.* 2010; A. Organ pers. obs.), which highlights the importance of adequate buffers around wetlands and creeks. Dispersal is thought to occur primarily along drainage lines or other low-lying areas between waterbodies, and unhindered movement between and within waterbodies is considered important for population viability.

## Ecology

Growling Grass Frogs generally breed between November and March, following local flooding and a marked rise in water levels (from rain or other sources) which triggers calling in breeding males. The species feeds mainly on terrestrial invertebrates such as beetles, termites, cockroaches, moths, butterflies and various insect larvae. They sometimes prey on other frogs, including younger frogs of their own species and may also feed on vertebrates such as lizards, snakes and small fish (DoE 2015a).

## Threats

The following threats to Growling Grass Frog are recognised (DoE 2015a): habitat loss and fragmentation, habitat degradation, altered flooding regimes, disease (Chytrid fungus), predation by introduced fish, drought, chemical pollutions of water bodies, biocides, salinisation, road kills and ultraviolet-B radiation (DoE 2015a).

## Recovery actions

Previous recovery actions undertaken for the Growling Grass Frog include (DoE 2015a):

- Surveys carried out in the species known range;
- Research and monitoring in Victoria, NSW and South Australia;
- Forestry prescriptions to mitigate the impacts of forestry operations;
- State Forest surveys;
- The preparation of a 'Hygiene Protocol for the Control of Disease in Frogs' (NSW NPWS 2001) to reduce the transfer of disease-causing pathogens between frog populations; and,
- Providing information on the Growling Grass Frog to the community.

## 3 METHODS

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This section details the desk-based and field methods used to survey the target species as well as the methods used to assess the significance of impacts.

### 3.1 Desktop Assessment

Relevant literature, online-resources and numerous databases were reviewed to determine the likelihood of each target species occurring within the study area. The desktop assessment also aimed to determine if any additional significant fauna species required targeted field survey (Section 4.1). The following information sources were reviewed:

- The DELWP Biodiversity Interactive Map (DELWP 2015);
- The Victorian Biodiversity Atlas (VBA) (DEPI 2014) and Atlas of Victorian Wildlife (AVW) (Viridans 2013);
- The Commonwealth Department of the Environment (DoE) Protected Matters Search Tool (PMST);
- Aerial photography of the study area;
- Relevant environmental legislation and policies; and,
- Previous ecological assessments and literature relating to ecological values within the study area and project locality, including:
  - *Halladale & Speculant Project – MEG Pipeline: Flora and Fauna Assessment* (Biosis Pty Ltd 2014)
  - *Halladale Black Watch Project: Flora and Fauna Assessment* (Biosis Research Pty Ltd 2011)
  - The 2011 EPBC Act Referral for the Halladale & Black Watch Gas Field Development Project
  - *Shaw River Power Station Project; Power Station and Gas Pipeline: Detailed Flora and Fauna Survey* (Ecology and Heritage Partners Pty Ltd 2009).

Further information was obtained from various literature sources that are cited throughout this document.

### 3.2 Targeted Surveys

All fieldwork was carried out under the appropriate licences, including a Research Permit (10006893) and Scientific Procedures Fieldwork Licence (SPFL 410) issued by DELWP under the *Wildlife Act 1975*, and an Animal Research permit issued by the Wildlife and Small Institutions Animal Ethics Committee (22.13).

The methods adopted to survey each target species are described in the following sections. Table A1, Appendix 1.1 details the weather conditions during each field survey event.

### 3.2.1 Southern Brown Bandicoot and Long-nosed Potoroo

Surveys for Southern Brown Bandicoot and Long-nosed Potoroo were undertaken using remotely-triggered camera traps and adhered to the minimum survey requirements stated in the *National Survey Guidelines for Australia's Threatened Mammals* (SEWPaC 2011).

Two remote camera surveys were undertaken during the peak activity period of the target species (SEWPaC 2011), with nine remote cameras deployed during the following two periods:

- 03/04 February - 19/ 20 February 2015 (minimum 15 nights)
- 19 March - 02 April 2015 (14 nights)

Survey points were located within nine patches of potential habitat included in the project footprint (Figure 2 and Table 1). At each site a remotely-triggered camera (Scoutguard®) was installed as close as possible to the predefined location, having regard to a stable attachment point for the camera while minimising visibility of the equipment to reduce its possible vandalism or theft. Cameras were secured to a tree or other sturdy support and pointed towards an open area approximately one metre in front of the camera where bait (a mixture of oats, peanut butter, honey and vanilla essence) was secured. Cameras were set to record an image each time the motion sensor was triggered, both day and night.

**Table 1** Remote camera survey sites

Survey Site	Coordinates (GDA94, MGA54)	
	Eastings	Northings
S1	658663	5737592
S2	664013	5734471
S3	666059	5733884
S4	666404	5733855
S5	666813	5733848
S6	669348	5733085
S7	669410	5732667
S8	669483	5731902
S9	670183	5731150

While in the field, staff actively searched for indirect evidence of the target species, including scats or characteristic diggings.

### 3.2.2 Growling Grass Frog

Targeted surveys for Growling Grass Frog were completed on 3 and 19 February 2015 within the two identified areas of potential habitat (GGF 1 and 2) (Figure 2). Due to access constraints, survey of the unnamed tributary located north of Callaghans Road was restricted to the reach located approximately 120 metres east of the proposed crossing location.

Two Zoologists experienced in amphibian surveys, including significant species such as Growling Grass Frog, conducted nocturnal surveys during mild (approximately 20°C) conditions. Spotlighting and active searching was undertaken during the surveys, both of which are reliable techniques used to detect the species. The margins (within ~30 metres) of the waterbodies were carefully searched for active frogs using 30 watt 12 volt hand-held spotlights. The advertisement call was broadcast to elicit a response from any adult males present. Suitable refuge sites such as logs, rocks and other ground debris were lifted opportunistically to locate inactive frogs. Approximately one hour was spent actively searching for frogs at each site per survey event.

Detailed habitat assessments were undertaken concurrently with the targeted surveys to further assess the suitability of habitats within the study area. The following attributes of habitat quality for the Growling Grass Frog were recorded:

- The hydroperiod;
- The location and extent of instream pools and offstream waterbodies;
- Habitat values of each waterbody including the type (pond, dam, wetland, creek, billabong, drain or ditch) flow (still, slow rapid), depth and presence of terrestrial refuge sites (e.g. rocks, logs, debris);
- Aquatic vegetation cover (% cover of emergent, submergent and floating aquatic plants);
- Presence/ absence of predator fish (opportunistic); and,
- Barriers to frog movement between waterbodies.

The following reference sites were identified in consultation with representatives from DELWP (Evelyn Nicholson) and the Arthur Rylah Institute (ARI) (Dave Bryant) (Figure 3):

- Reference Site 1: Hopkins River, Ellerslie - Identified by DELWP as a possible reference site (species detected in 2013);
- Reference Site 2a: Port Campbell Creek, Port Campbell - The location of a 2002 record (DEPI 2014);
- Reference Site 2b: Port Campbell Creek, Port Campbell - Located approximately 350 metres upstream of the 2002 record; and,
- Reference Site 3: T-tree Creek, located approximately five kilometres east of Caramut (identified by DELWP and ARI as a possible reference site).

The reference sites were surveyed in an attempt to confirm the detectability of the species using the employed survey methods. The survey was undertaken in accordance with the recommended survey methods provided in the *Significant Impact Guidelines for the Vulnerable Growling Grass Frog (Litoria raniformis) EPBC Act Policy Statement 3.14* (DEWHA 2009).

### 3.3 Significance Assessments

The impact assessments completed for this study were based upon the project description provided in the recent flora and fauna assessment report (Biosis Pty Ltd 2014). Tests for significance were completed for each target species in accordance with the significant impact criteria specified in the *Matters of National Environmental Significance, Significant Impact Guidelines 1.1* (Department of the Environment 2013).



### 3.4 Assessment Qualifications and Limitations

Data and information held within the ecological databases and mapping programs reviewed as part of the desktop assessment are unlikely to represent all fauna observations that have occurred within, and surrounding, the study area. It is therefore important to acknowledge that the number of documented records for the target species within and surrounding the study area is not necessarily a reflection of population size or density. Furthermore, a documented record may indicate a species' presence in an area at a given point in time, but it generally does not offer information about how a species is making use an area (e.g. foraging, nesting, dispersing). This can be important information when determining the potential impact of a proposed action on a threatened species.

Southern Brown Bandicoots and Long-nosed Potoroos are generally cryptic species and therefore not detecting them during surveys does not necessary mean that they are not present or that they do not use an area of suitable habitat. However, the targeted surveys undertaken during this investigation were done so to maximise detectability. That is, they were undertaken during a period when the number and mobility of juveniles into populations is greatest, and the completed survey effort adhered to the minimum requirements of the national guidelines (SEWPaC 2011).

National survey guidelines (DEWHA 2009) were applied to detect the Growling Grass Frog and, therefore, it is considered that appropriate survey effort has been employed to determine the status of the species within the assessed sites. Additionally, since the surveys were undertaken during suitable climatic conditions and within the preferred survey period (November - March), it is likely that individuals would have been detected if present by active listening, call playback or active searching.

## 4 RESULTS

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### 4.1 Desktop Assessment

The desktop assessment confirmed the findings of the flora and fauna assessment (Biosis Pty Ltd 2014), which identified the following significant fauna species as potentially occurring within the study area:

- Nationally significant species: Southern Brown Bandicoot, Long-nosed Potoroo, Growling Grass Frog and Southern Bent-wing Bat *Miniopterus schreibersii bassanii*.
- State significant species: White-footed Dunnart *Sminthopsis leucopus*, Grey Goshawk *Accipiter novaehollandiae novaehollandiae*, Eastern Great Egret *Ardea modesta*, Rufous Bristlebird (Otways subsp.) *Dasyornis broadbenti caryochrous*, Little Egret *Egretta garzetta nigripes*, White-bellied Sea-eagle *Haliaeetus leucogaster*, Baillon's Crake *Porzana pusilla palustris*, Diamond Firetail *Stagonopleura guttata* and Swamp Skink *Lissolepis coventryi*.

Targeted field surveys are only considered necessary for species of national significance, which have the potential to make significant use of the study area or be significantly impacted by the proposed activity. Whilst the Southern Bent-wing Bat has the potential to forage over the site, there are no roost sites present within the immediate vicinity and this species is highly unlikely to be significantly affected by project activities.

The project will be assessed under the Moderate Risk-based Pathway of 'Victoria's Permitted clearing of native vegetation – Biodiversity assessment guidelines' (the Guidelines) (DEPI 2013b). As such, the formal assessment of impacts on State significant species is based on modelled data and losses are accounted for in the applicable offset obligations. Unless recommended by Council or DELWP during the investigation phase, or stipulated as a Condition of Approval, there is no requirement to complete targeted surveys for State significant fauna species.

#### 4.1.1 Southern Brown Bandicoot and Long-nosed Potoroo

The VBA (DEPI 2014) and AVW (Viridans 2013) contain 14 records of the Southern Brown Bandicoot and ten records of the Long-nosed Potoroo within 10 kilometres of the study area (Figure 3 and Table 2).

**Table 2** Southern Brown Bandicoot and Long-nosed Potoroo records in the project locality

Record ID	Date	Distance and Direction from the Study Area	Record ID	Date	Distance and Direction from the Study Area
<b>Southern Brown Bandicoot</b>			<b>Long-nosed Potoroo</b>		
1	2007	5.6km S	1	1999	2.6km S
2	2005	4.3km N	2	1984	8km N
3	2002	6.9km S	3	1982	2.2km NW
4	2002	8km SW	4	1981	8km N
5	2002	8km SW	5	1980	6.8km N
6	1999	9km S	6	1980	9km S
7	1998	9km S	7	1979	9.3km S
8	1995	6km S	8	1973	8.5km N
8	1995	7km SE	9	1973	8.2 km W
10	1988	5km SW	10	1972	9.3km N
11	1985	1.6km S			
12	1979	10km N			
13	1972	9km N			
14	1968	3.8km E			

#### 4.1.2 Growling Grass Frog

The VBA (DEPI 2014) and AVW (Viridans 2013) contain five records of the Growling Grass Frog within 10 kilometres of the study area (Figure 3 and Table 3). Consultation with representatives from DELWP (Evelyn Nicholson and Gary Peterson) confirmed that no additional records are known in the locality.

**Table 3** Growling Grass Frog records in the project locality

Record ID	Date	Distance and Direction from the Study Area
1	2002	7.4km SE
2	1982	10km NW
3	1982	8.7km NE
4	1982	1.9km S
5	1982	7.5km S

## 4.2 Habitat Assessment

### 4.2.1 Southern Brown Bandicoot and Long-nosed Potoroo

The habitat requirements for both the Southern Brown Bandicoot and Long-nosed Potoroo are relatively broad, with both species known to occur in a variety of habitats, including seemingly disturbed areas dominated by exotic species (e.g. Blackberry *Rubus* spp.). On this basis, all nine survey sites (S1-S9) provide potential habitat for these species. The nine survey sites comprise all areas of potential habitat (identified in Biosis 2014 and confirmed during the current assessment) located within the project footprint, which could not be avoided during the planning and design phase.

A summary of each survey location and photographs are presented in Table 4 and Appendix 3.

**Table 4** Habitat characteristics (S1-S9)

Site	Vegetation Type	Average Foliage Density (%) (0.2-1m height range)	Coarse Woody Debris (%)	Notes
S1	Lowland Forest	40	25	No scats or diggings observed
S2	Damp Heathy Woodland	15	20	No scats or diggings observed
S3	Damp Heath Scrub	80	15	European Rabbit scats and diggings observed
S4	Damp Heath Scrub	10	5	European Rabbit scats and diggings observed
S5	Damp Heath Scrub	40	20	No scats or diggings observed
S6	Damp Heathy Woodland	60	20	No scats observed. Signs of digging recorded
S7	Swampy Riparian Woodland	5	5	No scats or diggings observed
S8	Swampy Riparian Woodland	30	10	No scats or diggings observed
S9	Damp Heathy Woodland	10	80	No scats or diggings observed

#### 4.2.2 Growling Grass Frog

Areas of potential habitat for the Growling Grass Frog within the study area are limited to the unnamed tributary located north of Callaghans Road (GGF 1) and the large wetland located south of Squibbs Road (GGF 2) (Figure 2, Plates 1 and 2 - Appendix 3).

##### GGF 1

The unnamed tributary joins the Curdies River approximately 1.7 kilometres north-west of site GGF 1 (Figure 2). At the time of survey, standing water was observed within the drainage line (approximately 30 centimetres deep); however it is considered likely that the waterbody is ephemeral - drying out during extended periods of no/low rainfall.

The assessed site (located approximately 120 metres east of the proposed crossing location) was identified as providing low quality habitat for the Growling Grass Frog. The drainage line comprised an overgrown channel with little (<5%) submergent, emergent or floating vegetation. The potential for Growling Grass Frogs to breed within this habitat is considered low due to the absence of aquatic vegetation suitable for egg-laying and development, the high levels of shading and a very high likelihood of the drainage system becoming dry during the breeding season. While the creek may provide limited dispersal habitat, there are no recent records of the species within connected waterbodies or the surrounding landscape. Furthermore, there are no large permanent waterbodies either side of the crossing location that may be used by the species for breeding purposes i.e. there are no high quality breeding sites in the vicinity of the crossing location.

The flora and fauna assessment (Biosis Pty Ltd 2014) included a physical assessment of the crossing location (Site HS-AQ9 - unnamed tributary of Curdies River, west) and noted the following:

*The overall vegetation rating is considered to be very highly disturbed with very little native vegetation present and both banks being severely modified by grazing. Vegetation is dominated by introduced herbs and pasture grasses. Within the site tree cover was non-existent on both the right bank and left bank. No regeneration of woody vegetation was occurring at this site. Macrophytes provided cover for approximately 50% of the watercourse and is comprised solely emergent species; Cumbungi, Watercress, and Dock Rumex sp.*

## GGF 2

The large wetland located south of Squibbs Road provides high quality habitat for the Growling Grass Frog. At the time of survey, the wetland supported a high cover of submergent (80%) and floating (70%) vegetation. Fringing vegetation was dominated by Pithy Sword-sedge *Lepidosperma longitudinale*, Common Spike-sedge *Eleocharis acuta*, Rushes, Common Tussock-grass *Poa labillardierei* and Lesser Joyweed *Alternanthera denticulata*. The wetland is considered likely to be permanent, with a depth of approximately 1-2 metres. A minor drainage channel connects the wetland to Leech Creek, which is located approximately 860 metres downstream.

The project footprint traverses an area of grazed pasture and a small patch of Swampy Riparian Woodland, located approximately five metres north of the north-eastern corner of the wetland (Figure 2). If present, Growling Grass Frogs have the potential to use these areas during dispersal (no suitable breeding habitat within the project footprint at this location); however there are limited refuge opportunities (e.g. rocks, logs etc.) and sites of higher quality exist nearby.

## 4.3 Targeted Surveys

### 4.3.1 Southern Brown Bandicoot and Long-nosed Potoroo

No Southern Brown Bandicoots or Long-nosed Potoroos were recorded during the remote camera surveys. Based on the findings of the desktop review, targeted surveys and detailed habitat assessments, both species are considered unlikely to be present in the study area, or if present, in very low numbers. While the species have been recorded throughout the locality, the majority of these sightings are over 20 years old. It is likely that local populations have suffered from pressures associated with ongoing agricultural land use, habitat removal and fragmentation, pest species (e.g. Foxes and Feral Cats) and potentially disease (e.g. toxoplasmosis).

The targeted surveys recorded a total of seven common fauna species, including Feral Cat *Felis catus* (5 records), European Rabbit *Oryctolagus cuniculus* (47), European Hare *Lepus europaeus* (3), Eastern Grey Kangaroo *Macropus giganteus* (6), Ringtail Possum *Pseudocheirus peregrinus* (2), Brushtail Possum *Trichosurus vulpecula* (4) and Red Fox *Vulpes Vulpes* (6). An abundance of rodents (House Mouse *Mus musculus*, Black Rat *Rattus rattus* etc.) were also detected.

The findings of the surveys are presented in Tables A2 and A3, Appendix 1.2. Photos of recorded fauna species are presented in Appendix 3.

### 4.3.2 Growling Grass Frog

No Growling Grass Frogs were detected during the targeted surveys despite weather conditions being conducive for frogs to be active. During the targeted surveys, common frog species, such as Common Froglet *Crinia signifera*, Spotted Marsh Frog *Limnodynastes tasmaniensis*, Striped Marsh Frog *Limnodynastes peronii* and Southern Brown Tree Frog *Litoria ewingii* were recorded calling throughout the assessed sites. Despite the timing of surveys being optimal for the detection of juvenile/ metamorph Growling Grass Frogs, none were identified during intensive searches of the survey sites and adjoining areas.

The absence of records from each reference site is considered a reflection of the lack of reliable sites in south-west Victoria, rather than the suitability of survey timing. Consultation with DELWP indicated that the closest reliable reference sites are located around Birregurra, over 100 kilometres east of the study area.

Based on the findings of detailed surveys and habitat assessments, Growling Grass Frog is considered to have a low likelihood of occurrence within GGF 1. Despite not being recorded, the species is considered to have a medium likelihood of occurrence within GGF 2. The large wetland provides habitat conducive to breeding and is connected to adjoining waterbodies which potentially support the species.

## 5 POTENTIAL IMPACTS AND MITIGATION

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### 5.1 Potential Impacts

This section summarises the known and potential impacts of the project relative to threatened fauna, and identifies suitable mitigation measures for incorporation into the project CEMP.

Pipeline construction activities will involve the direct disturbance of fauna habitat and have the potential to cause indirect impacts on ecological values within the study area and broader locality. The pipeline works will employ directional drilling below all paved roads and the Curdies River, with all other alignment sections/crossings constructed through trenching (Figure 2). Following the construction activities, vegetation within the project footprint will be allowed to passively regenerate, forming similar conditions to what occurs within the existing pipeline alignment. Once constructed, the operation of the pipeline (including maintenance activities) is unlikely to adversely affect any ecological values.

Known and potential impacts of the project relative to the target species include:

- The potential for indirect impacts (e.g. sediment/ pollutant run-off) on the large wetland located south of Squibbs Road (GGF 2) associated with trenching and general construction activities. The Growling Grass Frog has a medium likelihood of occurring within the wetland and potentially uses areas within the project footprint for dispersal.

The Significant Impact Guidelines for the species (DEWHA 2009) recommend incorporating a minimum 200 metre buffer around waterbodies in temperate zones. As the existing pipeline alignment occurs within close vicinity to the waterbody, the preferred setback cannot be achieved. However, the wetland will not be directly impacted as part of the proposed activity and indirect impacts will be avoided through the employment of management measures prescribed (Section 5.3).

A small area of marginal dispersal habitat adjoining the wetland will be temporarily disturbed during pipeline trenching activities. Following construction activities the dispersal habitat will be reinstated to pasture and the project will not create barriers to frog movement in the long-term. Based on the findings of this assessment, the project is not likely to have a significant impact on Growling Grass Frog, or interfere with its recovery.

- The removal of approximately 0.31 hectares of vegetation identified as potential (albeit low likelihood) habitat for the Southern Brown Bandicoot and Long-nosed Potoroo. These species' were not recorded in the study area during recent surveys, and are considered unlikely to be present, or if present, in very low numbers. The project would remove approximately 0.31 hectares of suitable foraging habitat. While the project would reduce available habitat (albeit potential) in the short-term, the extent and linear nature of clearing proposed is unlikely to inhibit the movement of the species' through retained habitat corridors (i.e. no significant barriers to dispersal). Based on the findings of this assessment, the project is not likely to have a significant impact on the Southern Brown Bandicoot or Long-nosed Potoroo.
- Temporary disturbance of the unnamed drainage line located north of Callaghans Road (GGF 1) associated with trenching activities;

- The potential for injury and/or mortality from construction activities;
- Potential disturbance associated with increased human activity and noise during construction; and,
- Potential indirect impacts on adjacent areas outside of the limit of construction if activities and drainage are not appropriately managed.

## 5.2 Significance Assessment

For species listed under the EPBC Act, the significance of impacts is assessed in accordance with the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of the Environment 2013) where a 'significant impact' is defined as an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is affected, and upon the intensity, duration, magnitude and geographic extent of the impacts (Department of the Environment 2013). Importantly, for a 'significant impact' to be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility (Department of the Environment 2013).

The impact assessments concluded that the project is not likely to have a significant impact on the three target species, nor would it interfere with their recovery (refer Appendix 2).

## 5.3 Recommended Mitigation Measures

A general principle of environmental management is to, in order of preference:

- Avoid environmental impacts;
- Minimise impacts;
- Mitigate the impacts; and,
- Where impacts cannot be avoided or minimised, compensate for the residual impacts using other mitigation measures such as offsets.

Avoiding environmental impacts has been planned for where possible throughout the project planning and design phases. Project redesign has been undertaken in response to the findings of ecological surveys (Biosis Pty Ltd 2014; Biosis Research Pty Ltd 2011), significantly reducing the extent of native vegetation proposed for removal (Figure 2).

There will be ongoing opportunities to further avoid impacts at a local scale, as the alignment is further refined. Despite implementing the above mentioned design attributes, the project will also rely upon mitigation measures, which will be incorporated into the CEMP. It is noted that the flora and fauna assessment report (Biosis Pty Ltd 2014) provided recommendations relating to the management of the three target species (prior to the completion of targeted surveys and detailed habitat assessments). The following mitigation measures refine and build on the previous recommendations and should be incorporated into the CEMP where appropriate:



- The objectives for fauna management and the responsibilities of all vegetation removal/construction personnel should be incorporated into the site-orientated induction program attended by all staff, contractors, and subcontractors involved in the construction phase. The induction should include the following.
  - Information regarding the environmental values within the project area (i.e. native vegetation communities, threatened species potentially present);
  - The legislative context and an outline of the Duty of Care of all persons on site to avoid and minimise the occurrence and extent of potential impacts to the environment; and,
  - The key objectives and measures for fauna management.
- Potential risks to fauna should be managed by ensuring that vegetation removal and construction personnel are appropriately qualified to complete relevant tasks. Qualifications should be assessed at the beginning of employment/ engagement and periodically reviewed. This assessment should identify the minimum required competencies, qualifications and skills commensurate with the responsibilities of each project role.
- In order to avoid further disturbance to areas outside of those necessary for construction, areas of native vegetation adjoining the project footprint should be temporarily fenced by a qualified Botanist (flagging) prior to vegetation removal. Once the 'No-Go Area' has been marked, no vegetation removal or construction activities (including vehicle movements and equipment storage) should occur within this area.
- Engage a fauna handler to complete a pre-clearance survey of all areas of potential habitat for the Southern Brown Bandicoot and Long-nosed Potoroo immediately prior to clearing in order to capture and release any individuals or ensure they move freely from the construction area. Captured fauna should be relocated to adjoining areas of similar or higher quality habitat, within 100 metres of the project footprint. Any persons engaged to remove, salvage, hold or relocate native fauna during vegetation removal must hold a current Management Authorisation under the *Wildlife Act 1975* (issued by DELWP).
- Enforce hygiene protocols to reduce the risk of spread or introduction of weeds and plant and animal pathogens within areas of potential habitat.
- Promote the passive regeneration of cleared vegetation communities through weed and pest control. Should passive regeneration prove unsuccessful, consider active planting to reduce habitat fragmentation.
- Backfill all trenches overnight where possible. In the event that trenches are left open overnight, checks for trapped fauna should be made in the morning, prior to any works commencing on-site. Fauna salvage activities must be undertaken by a qualified fauna handler, under a current Management Authorisation.
- Protect water quality by installing sediment fences along the project footprint where sediment laden run-off has potential to impact on waterways. Ensure they are monitored to remain effective throughout the construction period.

- The following prescriptions relate specifically to the management of fauna during trenching activities over, and within the vicinity of waterbodies:
  - An experienced construction crew with a prescribed work method statement (or waterway crossing procedure) should undertake the sensitive works within waterways (i.e. GGF 1 and 2);
  - To minimise the risk of scour, pipelines should be buried to a suitable depth (deemed suitable by engineers);
  - Any bending, welding and pipe coating activities should be completed prior to commencement of trenching within the waterways;
  - The removal of vegetation on the banks and bed of the waterways should be restricted to the minimum necessary and should not exceed that described in approved construction drawings;
  - Drainage bed and bank material and trench spoil should be stockpiled separately away from the banks of waterways at a minimum distance of 10 metres from the break of slope;
  - No polluted or sediment laden runoff should be discharged directly or indirectly into the waterways, during or after the works. Appropriate silt/debris control measures should be installed to prevent any silt/debris discharging into the waterways from crossing works;
  - The storage and handling of fuels and chemicals should comply with all relevant legislation and Australian Standard AS1940 - The storage and handling of flammable and combustible liquids;
  - Spill response equipment should be located at the crossing location during construction. In the event of a spill, work should be shut down at the spill site and the spill response activated. Measures should be put in place to prevent recurrences;
  - The length of time the trench is to remain open within the waterways should be minimised as much as practicable; and,
  - Open trenches adjacent to Site GGF2 should be inspected prior to commencement of work each day for frogs. If found they should be removed by a qualified fauna handler and relocated to suitable nearby habitat at an appropriate distance to prevent animals returning to the construction area. In issuing Management Authorisations, DELWP specify that frogs may only be relocated a maximum of 100 metres from the site of capture.

## 6 SUMMARY OF LEGISLATIVE IMPLICATIONS

**Table 5.** Legislative implications associated with the target species

Relevant Legislation	Implications	Further Action
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	<p>The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of National Environmental Significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of NES.</p> <p>It is understood that Origin intends to refer the project under the EPBC Act.</p> <p>The findings of the targeted surveys indicate that Growling Grass Frog has a medium likelihood of occurrence within GGF 2 and potentially utilises adjoining land within the project footprint for dispersal. The large wetland is located outside the project footprint and assuming the implementation of mitigation measures detailed in Section 5.3, there are unlikely to be any indirect impacts on this species or suitable breeding habitat. While a small area of potential dispersal habitat will be temporarily disturbed, the impacts will be short-term and highly unlikely to affect any Growling Grass Frog individuals (if indeed present). The project will not result in Growling Grass Frog being significantly impacted (Appendix 2), as the known and potential impacts of the proposed activity do not trigger the significant impact thresholds detailed in the <i>Significant Impact Guidelines for the Vulnerable Growling Grass Frog (Litoria raniformis)</i> EPBC Act Policy Statement 3.14 (DEWHA 2009).</p> <p>Southern Brown Bandicoot and Long-nosed Potoroo are considered unlikely to be present in the study area, or if present, in very low numbers. Based on the significance assessment, these species will not be significantly impacted by the project (Appendix 2).</p>	Incorporate the findings of this assessment into the project referral application.
<i>Flora and Fauna Guarantee Act 1988</i>	<p>The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.</p> <p>The three target fauna species are listed under the FFG Act; however no permitting requirements apply.</p>	No further action required in relation to the target species.
<i>Wildlife Act 1975</i>	<p>The <i>Wildlife Act 1975</i> (and associated Wildlife Regulations 2002) is the primary legislation in Victoria providing for protection and management of wildlife. The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls. In addition to permit requirements relating to animal ethics, a Management Authorisation Permit is required to salvage, hold and relocate any threatened species.</p> <p>Fauna handlers engaged to implement the CEMP are required to hold appropriate licences under the Act.</p>	Ensure any fauna salvage activities are completed in accordance with current permits under the Act

## 7 CONCLUSION

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In response to recommendations outlined in the 2014 flora and fauna assessment report (Biosis Pty Ltd 2014), targeted surveys were completed for Southern Brown Bandicoot, Long-nosed Potoroo and Growling Grass Frog within a study area associated with a proposed new and replacement natural gas pipeline within the Otway Basin, Victoria.

The three target species are of national significance (i.e. listed under the EPBC Act) and were identified by previous ecological assessments (Biosis Pty Ltd 2014; Biosis Research Pty Ltd 2011) as having a medium-high likelihood of occurring within the preferred project footprint and the potential to be significantly impacted by the proposed activity. The surveys aimed to confirm the likelihood of each target species occurring, identify appropriate mitigation measures for inclusion in the project CEMP and determine the significance of impacts in order to support a project referral under the EPBC Act.

The surveys failed to detect each of the targeted species. Whilst not recorded, Growling Grass Frog is considered to have a medium likelihood of occurrence within the large wetland located south of Squibbs Road (GGF 2). The unnamed tributary located north of Callaghans Road (GGF1) is considered unlikely to support suitable breeding or foraging habitat for the species. Southern Brown Bandicoot and Long-nosed Potoroo are considered unlikely to be present in the study area, or if present, in very low numbers.

Based on the project description and assumed implementation of mitigation measures recommended in Section 5.3, the project is unlikely to result in a 'significant impact' to any threatened fauna species listed under the EPBC Act. It is recommended that measures are incorporated into the CEMP and that, where possible, the extent of vegetation removal be further reduced through design refinements.

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